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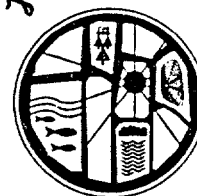


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Worldwide Estimates
and Bibliography
of Net Primary Productivity
Derived from
Pre-1982 Publications

G. Esser
H. F. H. Lieth
J. M. O. Scurlock
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MASTER



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FOR THE UNITED STATES
DEPARTMENT OF ENERGY

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Environmental Sciences Division

**WORLDWIDE ESTIMATES AND BIBLIOGRAPHY
OF NET PRIMARY PRODUCTIVITY
DERIVED FROM PRE-1982 PUBLICATIONS***

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ABBREVIATIONS

AEE	annual effective evapotranspiration
ANPP	above-ground net primary productivity
BNPP	below-ground net primary productivity
DAAC	Distributed Active Archive Center
GPPDI	Global Primary Production Data Initiative
HRBM	High Resolution Biosphere Model
NASA	National Aeronautics and Space Administration
NPP	net primary productivity
OBM	Osnabrück Biosphere Model
PIK	Potsdam Institute of Climate Impact Research
SCOPE	Scientific Committee on Problems of the Environment
TNPP	total net primary productivity

ABSTRACT

An extensive compilation of more than 700 field estimates of net primary productivity of natural and agricultural ecosystems worldwide was synthesized in Germany in the 1970s and early 1980s. Although the Osnabrück data set has not been updated since the 1980s, it represents a wealth of information for use in model development and validation. This report documents the development of this data set, its contents, and its recent availability on the Internet from the Oak Ridge National Laboratory Distributed Active Archive Center for Biogeochemical Dynamics. Caution is advised in using these data, which necessarily include assumptions and conversions that may not be universally applicable to all sites.

1. INTRODUCTION

1.1 BACKGROUND

An extensive compilation of field data on net primary productivity (NPP) of natural and agricultural ecosystems worldwide was synthesized in the 1970s and early 1980s. Much of this work was carried out at the University of Osnabrück, Germany. More than 700 single-point estimates of NPP or biomass were extracted from the scientific literature, each with a geographical reference (latitude/longitude). The literature cited dates from 1869 to 1982, with the majority of references from the 1960s and 1970s. Although this data set has not been updated since the 1980s, it represents a wealth of information for use in model development and validation. This report documents the development of this data set and its availability.

1.2 NPP DATA AND MODEL DEVELOPMENT

In the early 1970s, a subset of these NPP data was used to develop and test a series of statistical-correlative models of NPP as a function of mean annual temperature and precipitation. The later versions of these models included modifications for soil, seasonality, agriculture, and other human influences (Lieth, 1973; Esser, 1984; Esser and Lautenschlager, 1994).

Early work on modeling NPP on a continental or worldwide basis was based upon the correlation between NPP and "vegetation period" (i.e., length of growing season). In the absence of adequate worldwide data on vegetation period, the parameter annual effective evapotranspiration (AEE) was substituted, since it could be estimated on a regional basis. Using a set of NPP data published by Lieth (1972), the first NPP regression model was constructed by Lieth and Box (1972) and entitled the C. W. Thornthwaite Memorial Model. With an extended set of NPP data, this correlation was subsequently recalculated as a sigmoid function, modified by a soil-fertility correction factor derived from United Nations Food and Agriculture Organization soil classes (the Templin Model; Lieth and Esser, 1982).

Using climate data readily available for a multitude of points worldwide and a set of 52 NPP data points grouped into four regions from the tundra to the tropics, the early correlative model was refined to give the following functions and published as the Miami Model (Lieth, 1972, 1973, 1975):

$$NPP = \min [NPP_T, NPP_p],$$

where

$$NPP_T = 3000 / (1 + e^{1.315 - 0.119T}),$$

$$NPP_p = 3000(1 - e^{-0.000664p}),$$

T = mean annual temperature,

p = mean annual precipitation.

That is, NPP in g/m²/year (grams per square meter per year of dry matter) is estimated as the minimum of two functions which may be limiting productivity. In general, regions with mean annual temperature below 5°C are temperature-limited, while the majority of warmer regions are limited by precipitation. The Miami Model continues to be used as a benchmark for simulation of global NPP (Foley 1994); it was later modified using a look-up table of soil-fertility factors and published as the Hamburg Model (Esser et al., 1982).

The Osnabrück Biosphere Model (OBM) is a more sophisticated global carbon balance model, regionalized on a 2.5° grid and driven by climate (mean annual temperature and precipitation) together with correction factors for soil fertility, atmospheric CO₂, and human land-use influences (Esser, 1984, 1986, 1987, 1991). However, it is descended from the same family of models, having its equations for NPP based upon the earlier Miami and Hamburg models of Lieth (1973, 1975) and Esser et al. (1982). The OBM has been used to investigate the climatic limitations of grasslands in contrast to coniferous forests (Esser, 1992), and its predictions of biogeochemical responses to climate change have been contrasted with those of a more process-based model (McGuire et al., 1993).

The High Resolution Biosphere Model (HRBM) is the most recent member of this model lineage, running at 0.5° resolution and incorporating a wide range of equations to represent the carbon balance of a number of vegetation and soil compartments across 17 different biome types (Esser and Lautenschlager, 1994; Esser et al., 1994). It has been used to estimate the changes of carbon storage in the major pools of the terrestrial biosphere from 18,000 BP to the present for scenarios with and without a CO₂ fertilization effect. The latest versions of the HRBM incorporate the balance of stable carbon isotopes (Wittenberg and Esser, 1997) and the nitrogen cycle (Nevison et al., 1996).

1.3 GPPDI AND THE NPP DATABASE

Over the past few years, a coordinated strategy to improve global estimates of terrestrial primary production through measurements and modeling has emerged. An essential part of the strategy is compiling a reference database of NPP measurements from field studies for developing and/or validating global ecosystem models. This need is recognized by the scientific committees of the International Geosphere-Biosphere Programme's Data and Information System, and its core projects on Global Analysis Interpretation and Modeling, Global Change in Terrestrial Ecosystems, and Biological Aspects of the Hydrological Cycle, as well as by the International Council of Scientific Unions' Scientific Committee on Problems of the Environment (SCOPE). The Global Terrestrial Net Primary Productivity First Model Intercomparison Workshop, hosted by the Potsdam Institute of Climate Impact Research (PIK) at Potsdam, Germany, in July 1994, resulted in an action item to develop and make available a database of NPP data (Lurin et al., 1994; Cramer et al., 1997). As a result, the Global Primary Production Data Initiative (GPPDI) (Prince et al., 1995) has been adopted by a steering committee of representatives from the international groups listed.

The GPPDI project consists of four components: Oak Ridge National Laboratory (ORNL), United States; the Geography Department of the University of Maryland, United States; *Centre d'Etudes Spatiales de la Biosphère*, Toulouse, France; and PIK, Germany. ORNL is compiling field measurement data from the literature and other sources. Documenting and providing access to the NPP data described in this report is part of the work that ORNL is performing under the auspices of the GPPDI (Olson et al., 1995; Olson and Prince, 1996; Olson et al., 1997).

2. DATA PROCESSING

2.1 DATA COMPILATION

The data compilation process includes identifying sites and sources of NPP data, acquiring data and documentation, performing quality assurance checks, reformatting and documenting data, entering data into a database, reviewing data, and, finally, releasing data to the public. In the case of an existing extensive data compilation such as that described here, many of the initial steps in this process were already complete. Nevertheless, as DeAngelis et al. (1981) found more than 15 years ago when compiling and publishing the International Biological Program Woodlands Data Set,

“...data did not always conform easily to the uniform format in which it is presented here. Repeated communications with members of...projects were often employed before deciding on appropriate values.”

The task of presenting data in a uniform and user-friendly format is not to be underestimated. As far as possible, we have included here the information required by the metadata guidelines proposed by the Ecological Society of America (Michener et al., 1997). At the time of writing, we intend to republish these data and metadata, following these guidelines more exactly.

Several different versions of the Osnabrück data set were exchanged between Gerd Esser, Jonathan Scurlock, Miguel Clüsener, and Dick Olson between 1988 and 1995. Starting with an October 1995 version and eliminating duplicates, these were condensed into a list of 720 unique records by Scurlock and Olson. Most of these (632, or 88%) were matched to a list of 356 references from the primary literature. The original form of this bibliography contained many more references than records, including multiple sources for the same author and study, as well as additional references to data on standing biomass, soils, and so forth. Since this is a useful resource in its own right, an edited and corrected compilation of these 858 references is published here with the cross-references to the NPP records highlighted.

2.2 SITE SELECTION PROCESS

The sites primarily represent natural systems; however, unusual sites, such as crops, fertilized pastures, very young or very old forest stands, and plantations were included (and have been flagged where possible). The data set includes NPP data based on measurements collected over the past 100 years by investigators using a variety of methods and algorithms to estimate NPP. The scientific literature considered for inclusion in the data set was selected through a review of collections such as *Biological Abstracts*, *Chemical Abstracts*, *Agricola*, and *Current Contents*, as well as of a number of textbooks and monographs. Lieth, Esser, and co-workers extracted data predominantly from primary publications, that is, those papers that described the original work. The minimum requirements for data to be considered were the following:

- at least a vague geographical reference to the site of measurement (data related to vegetation types only were not considered) and
- the use of one of the commonly accepted methods of assessing terrestrial NPP (Whittaker and Marks, 1975).

Where the geographical coordinates of the experimental site were not included in the original paper, Lieth, Esser et al. selected the coordinates from maps or based them on site descriptions. Operational navigation charts (Defense Mapping Agency Aerospace Center, St. Louis Air Force Base, Missouri 63118, U.S.A.) and other regional and local maps were used for this purpose. Although croplands and other intensively used areas were generally left out of the data set, in order to show the total range of NPP within natural and semi-natural vegetation types, there was no general exclusion of anthropogenically influenced sites, and such influences were documented as far as possible.

2.3 DATA SCREENING AND QUALITY ASSESSMENT

The quality assessment process recently performed by Scurlock and Olson on these data consisted of selecting those records for which complete and consistent information was available on (1) NPP, (2) latitude/longitude (corresponding to known land masses), (3) biome or vegetation type, and (4) at least one literature reference. The criteria for consistency included the use of common systems of names, units, and so on. Names of countries and other data categories were translated from a mixture of English and German to English only. By sorting and re-sorting the records in order of each variable, it was possible to check for out-of-range values and to cross-check many suspect records against the original primary literature (or at least against the titles of the primary literature references). In certain cases where the primary literature was readily available (e.g., *Ecology*, *Journal of Ecology*, *Oecologia*, etc.), data, vegetation type, and geographical coordinates were checked more thoroughly (see also below). Further duplicates or near-duplicates were eliminated at this stage.

Sites were re-mapped using Geographical Information System software, and suspect sites that were located in oceans or other unlikely areas were identified. Suspect data were checked against original records and corrected in the database where necessary. During the checking process, it was discovered that the geographical coordinates were originally recorded using two conventions, decimal degrees (ddd.dd) and degrees and minutes (ddd.mm), with no easy way to distinguish the difference. Since all coordinates are now given as degrees to two decimal places (ddd.dd), the maximum potential error for an individual site is 0.39 degrees, assuming that a coordinate was originally recorded as ddd.59 (59 minutes) and then erroneously taken as decimal degrees, instead of converting to its actual decimal equivalent (ddd.98). Many of the records were checked against other compilations of NPP data (DeAngelis et al., 1981; Cannell, 1982) and if matches were found, correct coordinates were entered and flagged as being confirmed.

2.4 DATA FORMAT AND ORGANIZATION

The Osnabrück NPP data set includes a site identifier, latitude, longitude, author, country, NPP estimates, vegetation type, and other variables (Table 1). The vegetation-type field begins with a generalized biome type (including tundra, forest, Mediterranean, savanna, grassland, desert, wetland, and a number of managed vegetation types) and is followed by more specific vegetation terminology derived from the original data. Caution is advised in using these biome/vegetation types because they were not defined consistently within the original data set, and nearly 200 sites lack any vegetation designation.

To achieve completeness in a single synthesis file, a single NPP value (NPP_C) is included for each site that represents the sum of above-ground (ANPP) and below-ground (BNPP) components, expressed in grams of carbon per square meter per year (g C/m²/year). Conversion factors were used as agreed upon at the 1995 Potsdam NPP Model Intercomparison Workshop (Cramer et al.,

Table 1. Alphabetical list of variables in the Osnabrück NPP data set

Variable	Definition
ANPP_max	Above-ground NPP, maximum value given (g/m ² /year)
Author	First author of original reference
BNPP_max	Below-ground NPP, maximum value given (g/m ² /year)
Country	Country of study
Latitude	Latitude (decimal degrees)
LL_flag	Latitude/longitude, qualified as follows: ? = not verified; + = correct; * = reasonable estimate
Longitude	Longitude (decimal degrees)
NPP_C	Total NPP, adjusted to carbon units (g C/m ² /year)
NPP_flag	NPP qualified as follows: ? = suspect; I = irrigated; F = fertilized; E = error
NPP_ID	Identification number
Precip	Annual total precipitation (mm)
Soil_remarks	Soil characteristics
Species	Major species present
Temp	Annual average temperature (°C)
TNPP_max	Total NPP, maximum value given (g/m ² /year)
Vegetation_type	Vegetation type or mixture of types
Year	Year of study

1997; Olson et al., 1997). Where BNPP was not reported, it was assumed to be equal to ANPP. A ratio of 0.475 was used to convert dry biomass weight to carbon content. Total NPP was estimated as TNPP (where available), or as the sum of ANPP and BNPP (or from $\text{ANPP} \times 2$, if BNPP was not estimated), and then converted to g C/m²/year.

The data are available in a single spreadsheet file, as well as in two complementary ASCII files (see Appendix). The bibliography of original-source references in the Appendix is provided in another file. The references can be linked to the site records by the author combined with the year; we have found that only the first four characters of author are generally needed (the data file usually contains the name of the first author, whereas the bibliography file contains the full list of authors).

2.5 BIBLIOGRAPHY

The list of 858 references in the Appendix has been edited by Scurlock and Olson for consistency of citation style, since it was originally compiled by a number of individuals using different forms of abbreviations. Journal and book titles were checked against citation indexes and major libraries and are given in full where available. Duplicates, errors, and spelling and typographical mistakes have been eliminated as far as possible, as have obvious mismatches between journal volume numbers and years. A number of missing references described in the data set have been restored.

3. RESULTS

In order to show the scope of these data, the statistical distribution of the NPP data set is presented in Tables 2 and 3. Of the 720 records, about two-thirds have ANPP estimates that range between 1 and 8530 g/m²/year (dry matter)—or 2923 g/m²/year, excluding doubtful values, wetlands, and crops/pastures and other likely managed systems. Similarly, approximately one-fourth of the sites have estimates for BNPP that range between 0 and 5828 g/m²/year—or 2040 g/m²/year, excluding doubtful values, wetlands, and crops/pastures and other likely managed systems. Total NPP, for which more than half of the sites have estimates, ranges from 3 to 9320 g/m²/year (dry matter) — or 3580 g/m²/year, excluding doubtful values, wetlands, and crops/pastures and other likely managed systems. There were 17 records with NPP estimates considered questionable for their latitude and climate, one erroneous entry, and 22 sites flagged as definitely irrigated, fertilized, or both.

Sites were located in 57 countries (Table 4 and Fig. 1), with 42% of the sites located in the United States. The geographical position was reported for 679 records, of which 130 (19%) are known with certainty; 263 (39%) are considered reasonable estimates; and 286 (42%) have not been verified. Table 5 summarizes the distribution of 526 of the sites by generalized biome type, indicating that 37% were described as forests of various kinds. A wide variety of plant genera were represented by the sites: out of the 564 sites for which dominant species were given, a limited number of genera predominate (e.g., *Picea*, *Pinus*, *Quercus*, *Spartina*). Table 6 lists those genera with seven or more records (i.e., occurring at more than about 1% of all sites).

Table 2. Statistical analysis of variables in the Osnabrück NPP data set

Variable	Definition ^a	N	Mean	Minimum	Maximum
LAT_DD	Latitude (decimal degrees)	679	36	-65	76
LONG_DD	Longitude (decimal degrees)	679	-24	-165	177
ANPP_MAX	Above-ground NPP (g/m ² /year)	482	865	1	8530
BNPP_MAX	Below-ground NPP (g/m ² /year)	184	434	0	5828
TNPP_MAX	Total NPP (g/m ² /year)	405	1517	3	9320
NPP_C	Total NPP, adjusted (g C/m ² /year)	719	772	1	8104
TEMP	Annual average temperature (°C)	161	9	-12	28
PREC	Annual total precipitation (mm)	221	1049	95	4000

^aSee Table 1 for more complete definition of variables.

Table 3. Distribution of productivity variables by biome

Biome	ANPP ^a				BNPP ^b				TNPP ^c				NPP_C ^d			
	N	mean	min	max	N	mean	min	max	N	mean	min	max	N	mean	min	max
Unknown	1565	748	1	4144	22	502	0	1284	44	2224	30	9320	195	711	14	4427
Crops	12	1727	630	4100	5	884	121	2300	28	2999	410	6730	35	1564	195	3895
Desert	19	196	4	1585	14	198	21	629	29	480	20	1900	32	217	10	903
Forest	130	974	70	2923	67	195	9	750	129	1246	126	3620	192	701	60	2423
Grassland	52	530	77	2407	33	545	53	1166	44	1136	58	3538	72	523	28	1681
Mediterranean	5	374	100	850	1	310	310	310	1	722	722	722	5	346	95	808
Pasture	12	2686	134	8530	0	.	.	.	29	3765	409	8590	40	2057	127	8104
Plantation	7	1309	970	1551	5	253	190	363	7	1385	740	1799	9	802	352	1473
Savanna	11	1092	85	2080	10	1220	290	2040	15	1806	70	3580	16	820	33	1701
Tundra	24	134	7	1189	13	227	3	2110	31	302	3	3299	42	135	1	1567
Wetland	45	1248	106	4128	14	987	161	5828	48	1078	192	6136	81	891	91	3922

^aANPP = above-ground net primary productivity.

^bBNPP = below-ground net primary productivity.

^cTNPP = total net primary productivity.

^dNPP_C = adjusted total net primary productivity.

Table 4. Frequency of study sites by country

Country	Frequency	Percent
Afghanistan	1	0.1
Algeria	2	0.3
Antarctica	6	0.8
Australia	17	2.4
Austria	11	1.5
Belgium	16	2.2
Burma	4	0.6
Canada	33	4.6
Chad	5	0.7
Chile	1	0.1
Columbia	1	0.1
Costa Rica	1	0.1
Cuba	1	0.1
Czechoslovakia	1	0.1
Denmark	3	0.4
Denmark/Greenland	1	0.1
Egypt	1	0.1
El Salvador	3	0.4
Finland	5	0.7
France	10	1.4
Germany	11	1.5
Ghana	3	0.4
Greece	1	0.1
Hungary	2	0.3
India	40	5.6
Indonesia	3	0.4
Ireland	3	0.4
Israel	2	0.3
Ivory Coast	12	1.7
Jamaica	5	0.7
Japan	37	5.1
Java	1	0.1
Malaysia	2	0.3
Mexico	4	0.6
Netherlands	1	0.1
New Guinea	2	0.3
New Zealand	10	1.4
Nigeria	4	0.6
Norway	4	0.6
Peru	1	0.1
Philippines	1	0.1
Poland	2	0.3
Romania	5	0.7
Rwanda	2	0.3

Table 4 (continued)

Senegal	3	0.4
Sierra Leone	1	0.1
South Africa	2	0.3
Spain	1	0.1
Sweden	19	2.6
Syria	3	0.4
Tanzania	4	0.6
Thailand	1	0.1
Trinidad	4	0.6
UK	27	3.8
USA	300	41.7
USSR	66	9.2
Venezuela	4	0.6
Zaire	2	0.3
Zimbabwe	2	0.3

Table 5. Frequency of study sites by dominant genus

Species (genus)	Frequency	Percent
Abies	14	2.5
Agropyron	9	1.6
Andropogon	7	1.2
Artemisia	8	1.4
Beta	6	1.1
Betula	10	1.8
Calluna	11	2.0
Carex	13	2.3
Cynodon	9	1.6
Fagus	21	3.7
Festuca	9	1.6
Larix	7	1.2
Pennisetum	7	1.2
Picea	33	5.9
Pinus	37	6.6
Populus	9	1.6
Pseudotsuga	7	1.2
Quercus	41	7.3
Spartina	21	3.7
Zea	7	1.2
Other genera	278	49.3
Genus not reported	156	

Table 6. Frequency of study sites by generalized vegetation type

Biome	Frequency	Percent
Crops	35	6.7
Desert	32	6.1
Forest	194	36.9
Grassland	72	13.7
Mediterranean	5	1.0
Pasture	40	7.6
Plantation	9	1.7
Savanna	16	3.0
Tundra	42	8.0
Wetland	81	15.4
Unknown	194	

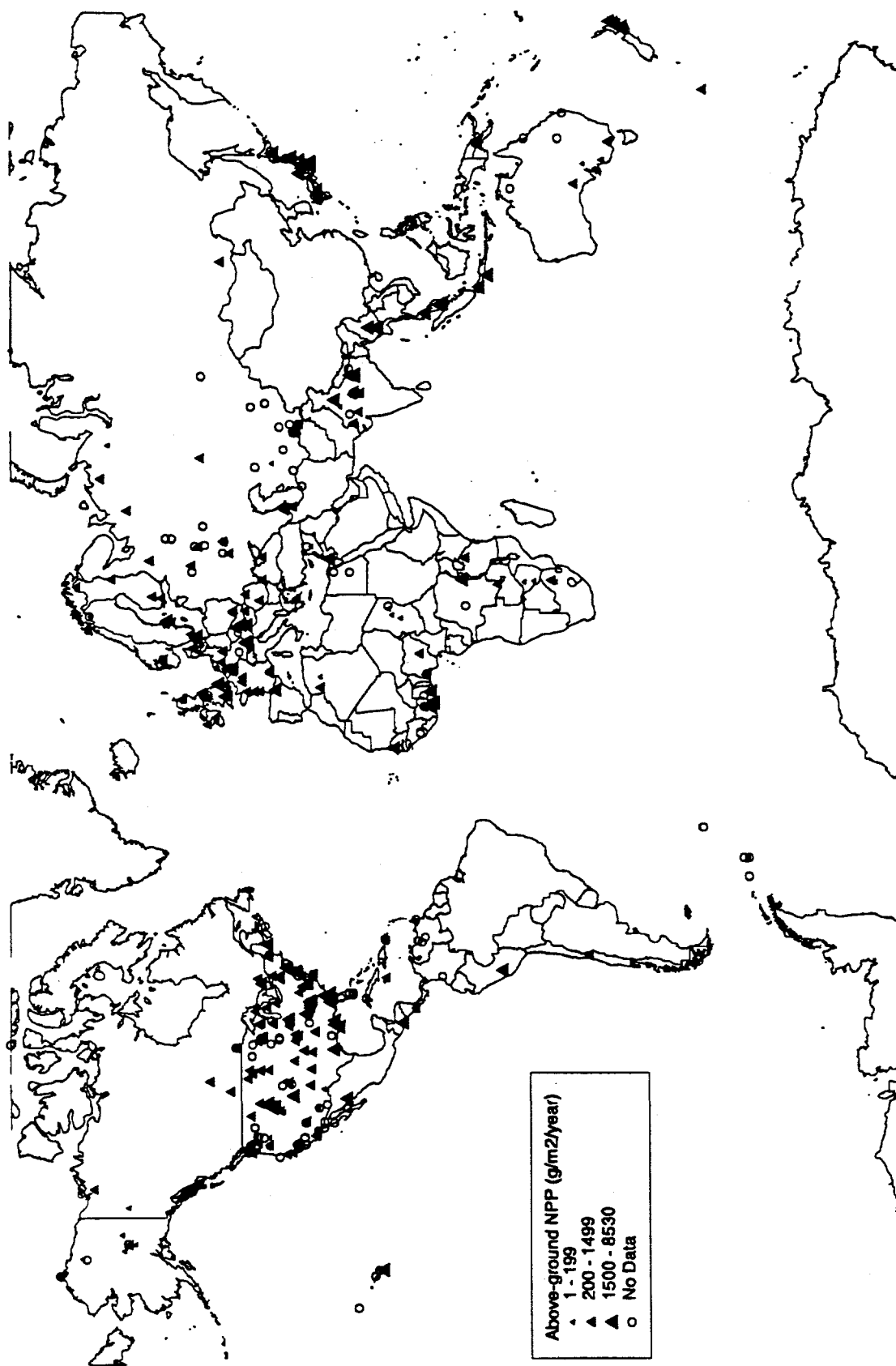


Fig. 1. Global map of study sites in the Osnabrück NPP data set, showing magnitudes of NPP values reported in the literature.

4. DATA AVAILABILITY

4.1 ORNL DISTRIBUTED ACTIVE ARCHIVE CENTER FOR BIOGEOCHEMICAL DYNAMICS

The NPP data are currently maintained and distributed by ORNL Distributed Active Archive Center (DAAC) for Biogeochemical Dynamics (<http://www-eosdis.ornl.gov>). The DAAC provides information about the Earth's biogeochemical dynamics to the global-change research community, policymakers, educators, and the interested general public. The ORNL DAAC is part of the Earth Observing System Data and Information System Project of the National Aeronautics and Space Administration (NASA), which forms an integral part of NASA's contribution to the U.S. Global Change Research Program. For information about this data set and others, the DAAC User Services staff may be contacted at

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4.2 CAUTIONS IN USING THE DATA

Some of the sites in the data set are agricultural sites, and others may represent natural systems with management treatments such as fertilizer, irrigation, grazing, burning, or thinning. Where possible, we have tried to indicate uncertainties or unusual treatments, but our data-checking could not possibly cover all the records included in the data set. Detailed descriptions of the study sites, sampling methods, and the method of estimating NPP are available only in the original literature, and the inclusion of points in this data set is no guarantee that the NPP values are strictly comparable. The data should be regarded as illustrating the range of NPP for natural ecosystems worldwide. Creating a single compilation of NPP data for this large number of sites required certain assumptions and conversions that may not be universally applicable to all sites (Section 2.4). We anticipate that users may find these files useful as an index to select more detailed NPP site data or that they may select a subset of these files for their use. Users of this synthesis are strongly encouraged to review the metadata and more detailed data files available for certain sites through the ORNL DAAC, or to check the primary literature prior to using these data.

5. REFERENCES

- Cannell, M.G.R. 1982. World Forest Biomass and Primary Production Data. Academic Press, London. 391 pp.
- Cramer, W., D.W. Kicklighter, A. Fischer, B. Moore, III, G. Churkina, A. Ruimy and A. Schloss 1997. Comparing global models of terrestrial net primary productivity (NPP): Overview and key results. *Global Change Biology* (forthcoming).
- DeAngelis, D.L., R.H. Gardner, and H.H. Shugart. 1981. Productivity of forest ecosystems studied during the IBP: the woodlands data set. pp. 567-672. In Reichle, D.E., (ed.) *Dynamics of Forest Ecosystems*. IBP 23. Cambridge University Press. 683 pp.
- Esser, G. 1984. The significance of biospheric carbon pools and fluxes for atmospheric CO₂: a proposed model structure. *Progress in Biometeorology* 3, 253-294.
- Esser, G. 1986. The carbon budget of the biosphere - structure and preliminary results of the Osnabrück Biosphere Model. *Veroff. Naturf. Ges. zu Emden von 1814* 7, 1-160. (in German with English summary)
- Esser, G. 1987. Sensitivity of global carbon pools and fluxes to human and potential climatic impacts. *Tellus* 39B, 245-260.
- Esser, G. 1991. Osnabrück Biosphere Model: structure, construction, results. In: Esser, G. and D. Overdieck, (eds.), *Modern Ecology: Basic and Applied Aspects*. Elsevier, Amsterdam and London. pp. 679-709.
- Esser, G. 1992. Implications of climate change for production and decomposition in grasslands and coniferous forests. *Ecological Applications* 2, 47-54.
- Esser, G., I. Aselman, and H.F.H. Lieth 1982. Modelling the carbon reservoir in the system compartment "litter". *Mitt. Geol-Palaeontol., Inst. Univ. Hamburg, SCOPE/UNEP Sonderband, Heft 52*, 39-58.
- Esser, G., J. Hoffstadt, F. Mack, and U. Wittenberg 1994. High Resolution Biosphere Model, Documentation, Model Version 3.00.00. *Mitteilungen aus dem Institut für Pflanzenökologie der Justus-Liebig-Universität Giessen, Heft 2*:68 S.
- Esser, G., and M. Lautenschlager 1994. Estimating the change of carbon in the terrestrial biosphere from 18000 BP to present using a carbon cycle model. *Environmental Pollution* 83, 45-53.
- Foley, J.A. 1994. Net primary productivity in the terrestrial biosphere—the application of a global model. *Journal of Geophysical Research—Atmospheres* 99, 20773-20783.
- Lieth, H.F.H. 1972. Modelling the primary productivity of the world (10 pp., offset). *Deciduous Forest Biome Memo Rep.* 72-9.
- Lieth, H.F.H. 1973. Primary production: terrestrial ecosystems. *Human Ecology* 1, 303-332.
- Lieth, H.F.H. 1975. Modelling the primary productivity of the world. In: Lieth, H. and R.H. Whittaker (eds.), *Primary Productivity of the Biosphere*. Ecological Studies 14. Springer-Verlag, New York and Berlin. pp. 237-283.

- Lieth, H.F.H., and E. Box 1972. Evapotranspiration and primary productivity: C.W. Thornthwaite Memorial Model. Publications in Climatology 25, 37-46. Centerton/Elmer, New Jersey.
- Lieth, H.F.H., and G. Esser 1982. Modelling the relation between global net primary productivity and environmental factors [in German]. Umwelttress, Wiss. Beiträge 1982/1983 der Martin Luther Universität Wittenberg, Halle (Saale), pp. 303-321.
- Lurin, B., W. Cramer, B. Moore III, and S.I. Rasool 1994. Global terrestrial net primary productivity. Global Change Newsletter, The International Geosphere-Biosphere Programme: A Study of Global Change (IGBP) of the International Council of Scientific Unions, No. 19, September 1994. pp 6-8.
- McGuire, A.D., L.A. Joyce, D.W. Kicklighter, J.M. Melillo, G. Esser, and C.J. Vorosmarty 1993. Productivity response of climax temperate forests to elevated temperature and carbon dioxide - a North American comparison between two global models. Climatic Change 24, 287-310.
- Michener, W.K., J.W. Brunt, J.J. Helly, T.B. Kirchner, and S.G. Stafford 1997. Non-geospatial metadata for the ecological sciences. Ecological Applications 7, 330-342.
- Nevison, C.D., G. Esser, and E.A. Holland 1996. A global model of changing N₂O emissions from natural and perturbed soils. Climatic Change 32, 327-378.
- Olson, R.J., J.M.O. Scurlock, R.S. Turner, and S.V. Jennings 1995. Ground-based grasslands data to support remote sensing and ecosystem modeling of terrestrial primary production. pp. 345-350. In: Guyot, G. (ed.) Proceedings of the International Colloquium on Photosynthesis and Remote Sensing. European Association of Remote Sensing Laboratories, Paris/ INRA, Avignon.
- Olson, R.J., and S.D. Prince 1996. Global Primary Production Data Initiative update. Global Change Newsletter, The International Geosphere-Biosphere Programme: A Study of Global Change (IGBP) of the International Council of Scientific Unions, No. 27, September 1996. p 13.
- Olson, R.J., J.M.O. Scurlock, W. Cramer, W.J. Parton, and S.D. Prince 1997. From Sparse Field Observations to a Consistent Global Dataset on Net Primary Production. IGBP-DIS Working Paper #16, International Geosphere-Biosphere Programme Data and Information System, Toulouse, France.
- Prince, S. D., R.J. Olson, G. Dedieu, G. Esser, and W. Cramer 1995). Global Primary Production Data Initiative Project Description. IGBP-DIS Working Paper #12. International Geosphere-Biosphere Programme Data and Information System, Toulouse, France. 38 pp.
- Whittaker, R.H., and P.L. Marks 1975. Methods of Assessing Terrestrial Productivity. In: Lieth, H., Whittaker, R.H. (eds.), Primary Productivity of the Biosphere. Ecological Studies 14. Springer-Verlag, New York and Berlin. pp. 55-118.
- Wittenberg, U., and G. Esser 1997. Evaluation of the ¹³C Suess effect in the terrestrial biosphere by a global carbon isotope model. Tellus (in press).

APPENDIX
GLOBAL NPP ESTIMATES

APPENDIX

GLOBAL NPP ESTIMATES

Table A of this appendix shows the 720 estimates of net primary productivity (NPP) in the database described in this report. The variables in the column headings are defined as follows.

Variable	Definition
NPP ID	Identification number
Country	Country of study
Author	First author of original reference; * = full citation not available
Year	Year of study
Latitude	Latitude (decimal degrees)
Longitude	Longitude (decimal degrees)
LL flag	Latitude/longitude, qualified as follows: ? = not verified; + = correct; * = reasonable estimate
ANPP max	Above-ground NPP, maximum value given (g/m ² /year)
BNPP max	Below-ground NPP, maximum value given (g/m ² /year)
TNPP max	Total NPP, maximum value given (g/m ² /year)
NPP C	Total NPP, adjusted to carbon units (g C/m ² /year)
NPP flag	NPP qualified as follows: ? = suspect; I = irrigated; F = fertilized; E = error
Temp	Annual average temperature (°C)
Precip	Annual total precipitation (mm)
Vegetation type	Vegetation type or mixture of types
Species	Major species present
Soil remarks	Soil characteristics

The data in the table are also available from the ORNL DAAC (details in Section 4.1) as a single spreadsheet file (ods_xls.bin, Excel 4.0; or ods_wk1.bin, Lotus 1-2-3 Version 2.0), or as two complementary ASCII files (ods_npp1.txt and ods_npp2.txt), which may be linked by the NPP_ID identification number in the two files. In these ASCII files, missing values or empty fields are indicated by large negative numbers beginning "-99", or "N/A" (not available) in the case of text fields.

This appendix also includes a bibliography of 858 original literature references to sources of data on net primary productivity. The bibliography is also available in a number of file formats (ods_doc.bin, Word 7.0; ods_wp5.bin, WordPerfect 5.1; ods_refs.txt, ASCII text).

Table A. Estimates of net primary productivity (NPP), in order of first author and year

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
259	USA	Adeghola, A.R., et al.	1966	34.00	-118.00	+	.	.	2720	1292	F	.	.	Pasture	Cynodon dactylon	
451	Trinidad	Adeniyi, S.A., et al.	1960	10.50	-61.25	*	.	.	4930	2342		.	.	Pasture	Digitaria decumbens	
793	USSR	Afanas' Yeva, Y.A.	1947	51.70	36.20	?	.	.	400	190		.	.	Grassland / meadow steppe		
1058	Spain	Alvera, B.	1973	42.50	-0.65	+	1756	.	.	1668		8	802	Forest	Pinus sylvestris; Ilex aquifolium; Fagus sylvatica	Calcareous well-drained
830	India	Ambasht, R.S., et al.	1971	26.42	85.05	?	.	.	2880	1368		.	.	Grassland		
814	India	Ambasht, R.S., et al.	1971	25.30	83.17	?	.	.	2880	1368		.	.	Grassland	Heteropogon contortus	
2150	Sweden	Andersson, F.	1970	55.73	13.30	?	.	.	720	342		7.3	615	Grassland	Filipendula ulmaria; Carex	
974	Sweden	Andersson, F.	1973	55.98	13.17	+	1540	240	1780	846		6.5	750	Forest	Fagus sylvatica; Lanium galeobdolon; Oxalis acetosella; Stellaria nemoreum	Brown forest soil on a glacial subfluvial subs.
975	Sweden	Andersson, F.	1973	55.75	13.92	+	1060	170	1230	584		6	800	Forest	Fagus sylvatica; Deschampsia	podsol with mor on sandy moraine
976	Sweden	Andersson, F.	1973	55.70	13.63	+	1670	230	1900	903		6.5	650	Forest	Fagus sylvatica; Mercurialis perennis	brown earth gley soil on moraine
1116	Sweden	Andersson, F.	1973	55.73	13.30	+	1290	230	1520	722		7.5	644	Forest / mixed deciduous woodland	Quercus robur; Tilia cordata; Sorbus aucuparia; Ulmus glabra	Brown forest gley
1115	Sweden	Andersson, F.	1973	55.98	13.17	+	1370	260	1630	774		6.5	750	Plantation	Picea abies; Oxalis; Rubus	
2343	Japan	Ando, T.	1981	33.33	133.00	+	804	121	925	439		13.6	2748	Forest	Tsuga sieboldii; Chamaecyparis;	Brown forest soil (dry)
2344	Japan	Ando, T.	1981	33.33	133.00	+	1304	180	1484	705		13.6	2748	Forest	Abies firma; Actinodaphne;	Brown forest soil (wet)
847	USSR	Andreev, V.N., et al.	1972	66.67	65.00	*	38	.	.	36		.	.	Tundra		
145	USA	Art *	1976	40.65	-73.12	?	.	.	1100	523		10.3	1200	Forest / temperate	Ilex; Sassafras; Nyssa; Prunus; Pyrus	
260	USA	Ashley, D.A., et al.	1965	.	.	.	.	.	2600	1235	1 F	.	.	Pasture	Cynodon dactylon	
261	USA	Ashley, D.A., et al.	1965	.	.	.	.	.	2190	1040	1 F	.	.	Pasture	Paspalum notatum	
2419	Australia	Attiwill, P.M.	1979	-37.42	145.17	+	1212	.	.	1151		11	1000	Forest	Eucalyptus obliqua	Krasnozems

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
157	USA	Baier, J.I., et al.	1972	40.00	-89.00	+	243	.	.	231	.	.	.	.	Agropyron desertorum	Sandy
180	USA	Baier, J.D., et al.	1972	40.00	-90.00	+	417	.	.	396	.	.	.	.	Atriplex confertifolia; Artemesia tridentata	
19	USA	Balph, D.F., et al.	1974	41.87	-112.75	?	170	.	.	162	.	20	273	.		
20	USA	Balph, D.F., et al.	1974	41.87	-112.75	?	228	.	.	217	.	.	273	.		
831	India	Bandhu, D.	1970	26.42	85.10	?	.	.	1550	736	.	.	.	Forest / dry deciduous		
2149	UK	Barclay-Estrup, P.	1970	57.67	-3.00	*	393	.	.	373	.	.	.		Calluna vulgaris	
82	Mexico	Barnard, J.L.	1962	30.50	-116.00	*	.	.	550	261	.	.	.	Wetland / salt marsh	Spartina foliosa	
592	Zaire	Bartholomew, W.V., et al.	1953	-3.00	22.00	+	.	.	3150	1496	.	.	.	Forest / tropical moist evergreen		
111	USA	Baumann, P.C., et al.	1974	43.40	-89.40	?	819	662	1481	703	.	6.9	777	Grassland / prairie-forest		
2409	Germany	Baungartner, A.	1981	48.00	12.00	+	1551	.	.	1473	.	7	875	Plantation	Picea	Para-brown earth
787	USSR	Bazilevich *	1962	55.00	83.00	+	.	.	980	466	.	.	.	Forest / deciduous	Betula; Populus; Salix; Carex; Calamagrostis	
786	USSR	Bazilevich *	1962	55.00	83.00	+	.	.	1260	599	.	.	.	Forest / deciduous broad-leaved		Dark grey solodised soil
832	India	Bazilevich, N.I., et al.	1966	26.28	73.08	?	.	.	1450	689	.	.	.	Savanna / dry	Prosopis sp.	
711	Syria	Bazilevich, N.I., et al.	1972	34.50	41.08	?	117	43	160	76	.	.	.	Desert	Frankenia hirsuta; Haloenemum strobilaceum 1)	Solonchaks (page 204; 1)
1010	UK	Bellamy, D.J., et al.	1966	54.75	-2.50	?	153	.	.	145	.	.	.	.	Calluna vulgaris	
2391	France	Berger, A., et al.	1978	43.50	4.50	*	1025	.	.	974	.	.	.	.	Salicornia	
72	USA	Bernard, J.M.	1974	45.33	-93.17	?	738	.	.	701	.	.	.	.	Carex rostrata	
253	USA	Bernard, J.M.	1974	45.42	-93.67	?	780	197	977	464	.	.	.	Wetland / bog	Carex rostrata; Equisetum fluviatile; Sagittaria latifolia	
279	USA	Bernard, J.M., et al.	1973	43.65	-94.72	?	.	298	.	283	.	.	.	.	Typha glauca; Sparganium eurycarpum	
388	USA	Bernard, J.M., et al.	1974	42.17	-77.00	*	1580	161	1741	827	.	.	.	Wetland	Carex lacustris	

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
591	Ivory Coast	Bernhard, F.	1970	8.00	-5.00	+	.	.	2300	1093	.	.	.	Forest / moist evergreen	Carex rostrata	
2530	USA	Bernhard, J.M., et al.	1979	43.42	-76.50	?	1080	260	1340	637	.	.	.	Tundra / alpine		
150	USA	Billings, Bliss *	1959	41.33	-106.00	*	.	.	186	88	.	.	.	Forest	Abies alba; Oxalis; Pleurozium	Brown forest soil
2399	Romania	Bindiu, C.	1981	45.38	23.25	+	1130	.	.	1074	.	5.1	1025		Saccharum officinale	
452	USA	Blackman, G.E., et al.	1959	25.00	-165.00	+	.	.	6410	3045	.	.	.	Crops		
153	USA	Bliss, L.C.	1956	44.00	-71.00	+	.	.	206	98	.	.	.			
151	USA	Bliss, L.C.	1956	41.33	-106.00	*	.	.	336	160	.	.	.	Tundra / alpine		
152	USA	Bliss, L.C.	1956	44.00	-71.00	+	.	.	85	40	.	.	.	Tundra / alpine		
154	USA	Bliss, L.C.	1956	41.33	-106.00	*	.	.	67	32	.	.	.	Tundra / alpine	Carex scopulorum; C. arummondiana; Ceum turbinatum	
155	USA	Bliss, L.C.	1956	69.00	-152.00	+	.	.	60	29	.	.	.	Tundra / arctic	Carex; Eriophorum	
2115	USA	Bliss, L.C.	1966	44.27	-71.30	+	176	.	.	167	.	-3.6	1880		Carex; Polytichum	Loamy sand; sandy loam
2121	USA	Bliss, L.C.	1966	44.27	-71.30	+	200	.	.	190	.	-3.4	1880		Deschampsia; Solidago; Vaccinium; Coptis; Clintonia; Cornus	
2118	USA	Bliss, L.C.	1966	44.27	-71.30	+	66	.	.	63	.	-3.4	1880		Diapensia; Rhododendron; Juncus; Solidago; Agrostis	
2117	USA	Bliss, L.C.	1966	44.27	-71.30	+	74	.	.	70	.	-3.4	1880		Juncus; Vaccinium; Potentilla; Carex; Diadensia	Loamy sand; sandy loam
2116	USA	Bliss, L.C.	1966	44.27	-71.30	+	124	.	.	118	.	-3.6	1880		Potentilla; Juncus; Vaccinium; Diapensia; Agrostis; Carex	Loamy sand; sandy loam
2120	USA	Bliss, L.C.	1966	44.27	-71.30	+	283	.	.	269	.	-3.4	1880		Vaccinium; Ledum; Cetraria	
121	Canada	Bliss, L.C.	1975	75.55	-84.67	?	82	104	185	88	.	.	.	Tundra		
122	Canada	Bliss, L.C.	1975	75.55	-84.67	?	150	130	280	133	.	.	.	Tundra		
123	Canada	Bliss, L.C.	1975	75.55	-84.67	?	37	59	97	46	.	.	.	Tundra		
124	Canada	Bliss, L.C.	1975	75.55	-84.67	?	15	28	44	21	.	.	.	Tundra		

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
125	Canada	Bliss, L.C.	1975	75.55	-84.67	?	49	5	53	25				Tundra		
327	Canada	Bliss, L.C.	1975	75.55	-84.67	?	38	60	99	47				Tundra		
329	Canada	Bliss, L.C.	1975	75.55	-84.67	?	20	3	22	10				Tundra		
337	Canada	Bliss, L.C.	1975	75.55	-84.67	?	7	104	185	88				Tundra		
188	Canada	Bliss, L.C., et al.	1972	69.50	-134.50	*			51	24				Tundra / arctic		
2222	Venezuela	Blydenstein, J.	1962				260			247				Savanna	Trachypogon	
450	Venezuela	Blydenstein, J.	1962	8.00	-66.00	+			404	192			1300	Savanna / llanos		
791	USSR	Bobritskaya, M.A.	1958	55.17	61.40	?	400			380						
81	USA	Botkin, D.B., et al.	1968	40.50	-74.48	+	396	1944	2340	1112	?		1120	Wetland / meadow		
595	Ghana	Bourliere, F., et al.	1970	8.00	-2.00	+			2920	1387			860	Forest / tropical savanna		
83	USA	Boyd *	1970	33.00	-79.50	*	150			143					Scirpus americanus	
1063	Denmark	Boysen-Jensen, Cited By Kira E	1967						740	352				Plantation / ash	Fraxinus	
2297	Tanzania	Braun, H.M.H.	1973	-3.00	35.00	+	336			319					Andropogon greenwayi	
2298	Tanzania	Braun, H.M.H.	1973	-2.92	35.17	?	164			156					Kyllinga, Sporobolus	
2296	Tanzania	Braun, H.M.H.	1973	-2.83	34.83	?	427			406					Themeda sp.	
378	USA	Bray, J.R., et al.	1959	45.40	-93.17	+			120	57		5.8	693		Aristida basimarea, Setaria glauca	Fine sand; few loam
377	USA	Bray, J.R., et al.	1959	45.40	-93.17	+			960	456		5.8	693		Secale cereale	Fine sand; few loam
379	USA	Bray, J.R., et al.	1959	45.40	-93.17	+			160	76		5.8	693		Sorghastrum nutans	Fine sand; few loam
375	USA	Bray, J.R., et al.	1959	45.40	-93.17	+			1680	798		5.8	693		Typha (hybrid)	Fine sand; few loam
376	USA	Bray, J.R., et al.	1959	45.40	-93.17	+			630	299		5.8	693		Zizania aquatica	Fine sand; few loam
380	USA	Bray, J.R., et al.	1959	45.40	-93.17	+			410	195		5.8	693	Crops	Zea mays	Fine sand; few loam
25	Canada	Bray, J.R., et al.	1963	44.25	-79.08	?			412	196				Forest	Populus grandidentata, P. tremuloides	
26	USA	Bray, J.R., et al.	1963	46.92	-95.00	*			1014	482				Forest	Populus tremuloides	

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
939	New Zealand	Brougham, R.W.	1959	-40.35	175.62	?	2300	.	.	2185	?	.	.	.	.	.
932	Australia	Bryan, W.W., et al.	1965	.	.	.	.	.	2420	1150	F	.	.	Pasture	Digitaria decumbens	.
1113	Austria	Brzoska *	1973	46.98	11.07	?	32	.	.	30	.	.	.	.	Androsace	.
1045	Austria	Brzoska *	1973	46.98	11.07	?	.	.	32	15	.	.	.	Tundra / alpine	.	.
136	USA	Bunnell et al. *	1975	71.30	-156.67	?	50	.	.	48	.	.	.	.	.	.
138	USA	Bunnell et al. *	1975	71.30	-156.67	?	100	.	.	95	.	.	.	.	.	.
137	USA	Bunnell et al. *	1975	71.30	-156.67	?	160	.	.	152	.	.	.	.	Various species (27)	.
112	USA	Bunnell et al. *	1978	71.30	-156.70	?	100	.	.	95	.	-12	125	.	.	.
2447	Australia	Bunt, J.S., et al.	1979	-18.27	146.25	?	.	.	1606	763	.	.	.	Forest / mangrove	Rhizophora; Ceriops; Bruguiera;	.
350	USA	Burger, A.W., et al.	1967	40.17	-88.17	?	1790	.	.	1701	.	.	.	Pasture	Sorghum bicolor x sudanensis	.
159	USA	Burger, A.W., et al.	1967	40.00	-89.00	+	.	.	1790	850	.	.	.	Pasture	Sorghum sp.	.
179	USA	Burgess, R.L., et al.	1976	36.00	-79.00	+	.	860	.	817	.	.	.	.	Pinus taeda	.
178	USA	Burgess, R.L., et al.	1976	36.00	-84.00	+	.	370	.	352	.	.	.	.	Quercus alba	.
47	USA	Burgess, R.L., et al.	1976	35.97	-84.28	?	952	.	.	904	.	13.3	1360	.	Quercus; Carya; Pinus	Paleudults
39	USA	Burgess, R.L., et al.	1976	36.00	-84.00	+	.	.	1226	582	.	.	.	Forest	.	.
40	USA	Burgess, R.L., et al.	1976	35.50	-85.50	*	.	.	831	395	.	.	.	Forest	.	.
41	USA	Burgess, R.L., et al.	1976	35.83	-83.50	?	.	.	1081	513	.	.	.	Forest	.	.
42	USA	Burgess, R.L., et al.	1976	35.50	-84.50	*	.	.	940	447	.	.	.	Forest	.	.
43	USA	Burgess, R.L., et al.	1976	36.00	-87.00	+	.	.	894	425	.	.	.	Forest	.	.
44	USA	Burgess, R.L., et al.	1976	36.17	-86.83	?	.	.	970	461	.	.	.	Forest	.	.
45	USA	Burgess, R.L., et al.	1976	35.83	-89.00	*	.	.	1074	510	.	.	.	Forest	.	.
48	USA	Burgess, R.L., et al.	1976	35.97	-84.28	+	618	200	818	389	.	13.3	1360	Forest	Cercis; Pinus; Liriodendron	Alluvial emory silt loam
160	USA	Burr, G.O., et al.	1957	21.00	-156.60	*	.	.	6730	3197	F	.	.	Crops	Saccharum sp.	.

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
927	Australia	Burrows, W.H.	1972	-26.42	146.22	?	.	.	79	38	.	.	467	Desert / shrub	<i>Eremophila gilesii</i>	Lateritic red earth; bulk density 1.7
352	USA	Burton, G.W., et al.	1959	31.42	-83.50	+	2720	.	.	2584	F	.	.	Pasture	<i>Cynodon dactylon</i>	loamy sand
262	USA	Burton, G.W., et al.	1963	31.42	-83.50	+	2010	.	.	1910	F	.	.	Pasture	<i>Cynodon dactylon</i>	loamy sand
2393	France	Cabanettes, A., et al.	1978	.	.	.	1750	110	1860	884	.	.	.	Forest / mediterranean	<i>Pinus pinea</i>	.
66	USA	Cable, D.R.	1975	32.00	-111.00	+	.	.	58	28	.	.	.	Grassland	.	.
12	USA	Cahoon, R.D.	1975	38.17	-75.00	*	676	.	.	642	.	.	.	Wetland / salt-marsh	<i>Spartina alterniflora</i>	.
139	USA	Caldwell, M.M., et al.	1974	41.08	-113.08	+	109	315	424	201	.	.	.	Desert	<i>Ceratoides lanata</i> ; <i>Atriplex confertifolia</i>	.
31	USA	Caldwell, M.M., et al.	1975	41.87	-112.75	?	60	272	.	158	.	.	.	Desert	<i>Artemesia tridentata</i>	.
32	USA	Caldwell, M.M., et al.	1975	41.87	-112.75	?	64	186	.	119	.	.	.	Desert	<i>Ceratoides lanata</i>	.
30	USA	Caldwell, M.M., et al.	1975	41.87	-112.75	?	154	443	597	284	.	.	.	Desert	<i>Atriplex confertifolia</i>	.
437	USA	Cameron, G.N.	1972	38.10	-122.50	?	.	.	1200	570	.	.	.	Wetland / salt-marsh	<i>Salicornia virginica</i>	.
433	USA	Cameron, G.N.	1972	38.10	-122.50	?	.	.	1750	831	.	.	.	Wetland / salt-marsh	<i>Spartina foliosa</i>	.
162	USA	Caro-Costa, R., et al.	1972	18.00	-66.50	*	.	.	3730	1772	.	.	.	Pasture	<i>Cynodon</i>	.
391	USA	Carter, M.R., et al.	1973	26.00	-81.50	*	.	.	1170	556	.	.	.	Wetland / swamp	Cypress	.
386	USA	Carter, M.R., et al.	1973	26.00	-81.50	*	.	.	367	174	.	.	.	Wetland / swamp	<i>Taxodium</i>	.
546	Ivory Coast	Cesar., et al.	1972	8.00	-5.00	+	1000	1200	2200	1045	.	.	.	Savanna / grass	<i>Andropogon</i>	.
1037	UK	Chapman, S.B., et al.	1975	50.78	-2.00	*	300	.	.	285	.	.	.	.	<i>Calluna vulgaris</i>	Humus-iron podsol on ecocene
833	India	Chaudhary, V.B.	1967	25.30	83.17	?	.	.	853	405	.	.	.	Grassland	.	.
210	USA	Chew, R.M., et al.	1965	34.00	-112.00	+	131	.	.	124	.	.	.	.	<i>Larrea tridentata</i>	.
742	India	Choudhuri, G.N., et al.	1979	25.38	83.57	?	176	90	266	126	.	.	.	Grassland / mixed	.	.
741	India	Choudhuri, G.N., et al.	1979	25.27	83.33	?	188	126	314	149	.	.	.	Grassland / mixed	Lynodm; <i>Sporobolus</i> ; <i>Bothrischloa</i> ;	.

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
593	Egypt	CIMMYT *	1971	30.00	31.00	+	.	.	2910	1382	.	.	.	Crops	Zea mays	
471	Peru	CIMMYT *	1971	-12.00	-75.00	+	2580	.	.	2451	.	.	.	Crops	Zea mays	
2389	Romania	Coldea, G., et al.	1978	47.83	24.83	?	660	.	.	627	.	2	1250		Pinus mugo	Ranker
113	USA	Cole et al. *	1978	47.87	-122.95	?	1436	363	1799	855	.	9.8	1364	Forest	Pseudotsuga menziesii; Tsuga heterophylla	
467	Antarctica	Collins *	1975	-60.00	-45.00	+	.	.	900	428	.	.	.	Tundra		
1322	USA	Conner, Day *	1976	.	.	.	1574	.	.	1495	.	.	.		Acer rubrum var. Drummondii	
1321	USA	Conner, Day *	1976	.	.	.	1140	.	.	1083	.	.	.		Taxodium-Nyssa	
357	Mexico	Cooper, J.P.	1975	27.50	-109.50	*	1830	.	.	1739	.	.	.	Crops	Triticum vulgare	
363	USA	Cooper, J.P.	1975	38.50	-121.83	?	.	.	2760	1311	.	.	.		Medicago sp.	
364	USA	Cooper, J.P.	1975	36.83	-119.83	?	.	.	2970	1411	.	.	.		Medicago sp.	
365	USA	Cooper, J.P.	1975	47.00	-98.00	+	.	.	1250	594	.	.	.		Medicago sp.	
355	USA	Cooper, J.P.	1975	36.83	-121.67	?	.	.	4240	2014	.	.	.	Crops	Beta vulgaris	
359	USA	Cooper, J.P.	1975	46.20	-119.77	?	.	.	3200	1520	.	.	.	Crops	Beta vulgaris	
361	USA	Cooper, J.P.	1975	38.50	-121.75	?	.	.	2240	1064	.	.	.	Crops	Oryza sativa	
353	USA	Cooper, J.P.	1975	38.00	-121.33	?	.	.	2200	1045	.	.	.	Crops	Solanum tuberosum	
798	Malaysia	Corley, R.H., et al.	1971	4.00	102.00	+	2940	.	.	2793	.	.	.	Crops	Elaeis guineensis (oil palm)	
2454	Senegal	Comet, A.	1981	15.33	-15.58	?	331	.	.	314	.	.	334		Tephrosia; Aristida; Schoenefeldia;	
2453	Senegal	Comet, A.	1981	15.33	-15.55	?	190	.	.	181	.	.	327		Zornia; Erafrostis;	
59	Canada	Coupland *	1972	50.70	-107.72	?	391	600	991	471	.	.	.	Grassland	Agropyron; Koeleria	Heavy clay brown steppe soil
244	Canada	Coupland, R.T.	1973	54.00	-105.00	+	252	410	662	314	.	.	.	Grassland	Agropyron; Koeleria	
198	USA	Crow, T.R.	1978	45.42	-89.17	?	887	.	.	843	.	5.3	800	Forest		Acid loamy till - acid sandy loam till
9264	Columbia	Crowder, L.V., et al.	1964	3.50	-76.50	*	.	.	5060	2404	F	.	.	Pasture	Digitaria decumbens	
354	USA	Cuan, R.L., et al.	1972	39.17	-108.75	+	2660	.	.	2527	I	.	.	Crops	Zea mays	

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
700	India	Dabaghao, P.M., et al.	1970	25.43	78.58	?	334	.	.	317	.	.	.	.	Heteropogon	
701	India	Dabaghao, P.M., et al.	1970	25.43	78.58	?	556	.	.	528	.	.	.	.	Heteropogon	
393	USA	Dahlmann, R.C., et al.	1965	38.50	-93.50	*	.	429	.	408	.	.	.	Grassland		
779	USSR	Danilov, D.N.	1958	67.50	56.00	*	266	.	.	253	.	.	.	Tundra	Betula nana	
780	USSR	Danilov, D.N.	1958	67.50	56.00	*	305	.	.	290	.	.	.	Tundra	Salix glauca; S. lanata	
246	USA	Daubenmire, R.	1970	46.00	-123.00	+	129	.	.	123	.	.	.	Grassland	Bromus tectorum	
245	Costa Rica	Daubenmire, R.	1972	10.40	-85.10	+	1387	.	.	1318	.	.	1926	Grassland / savanna	Hyparrhenia rufa	silty clay loam
398	USA	De La Cruz, A.A.	1974	30.33	-88.50	?	1484	.	.	1410	.	.	.	Wetland	Distichlis spicata	
401	USA	De La Cruz, A.A.	1974	30.33	-89.67	?	1697	.	.	1612	.	.	.	Wetland	Juncus roemerianus	
272	USA	De La Cruz, A.A.	1974	30.33	-89.00	*	1079	.	.	1025	.	.	.	Wetland	Juncus; Spartina; Scirpus; Distichlis	
394	USA	De La Cruz, A.A.	1974	30.33	-89.67	?	2330	.	.	2214	.	.	.	Wetland	Phragmites communis	
395	USA	De La Cruz, A.A.	1974	30.33	-89.67	?	600	.	.	570	.	.	.	Wetland	Sagittaria lancifolia	
402	USA	De La Cruz, A.A.	1974	30.33	-89.67	?	1056	.	.	1003	.	.	.	Wetland	Scirpus robustus	
396	USA	De La Cruz, A.A.	1974	30.33	-88.50	?	1964	.	.	1866	.	.	.	Wetland	Spartina alterniflora	
397	USA	De La Cruz, A.A.	1974	30.33	-88.50	?	1089	.	.	1035	.	.	.	Wetland	Spartina alterniflora (short form)	
400	USA	De La Cruz, A.A.	1974	30.33	-89.67	?	2190	.	.	2081	.	.	.	Wetland	Spartina cynosuroides	
399	USA	De La Cruz, A.A.	1974	30.33	-89.67	?	1922	.	.	1826	.	.	.	Wetland	Spartina patens	
146	USA	De La Cruz, A.A., et al.	1977	30.25	-89.33	?	.	1360	.	1292	.	.	.	Wetland	Juncus roemerianus	
802	Java	De Vries, C.A., et al.	1967	-8.83	110.00	*	4100	.	.	3895	.	.	.	Crops	Manihot esculenta	
65	USA	Dennis, et al.	1972	71.30	-156.67	?	.	.	130	62	.	.	.	Grassland	DuPontia fischeri; Carex aquatilis; Eriophorum angustifolium	
181	USA	Dix, R.L.	1960	47.50	-102.00	*	183	.	.	174	.	.	.	Grassland	Stipa; Carex	
2333	USSR	Djhalilov, K.G.	1981	38.83	48.52	+	858	.	.	815	.	10	700	Forest	Quercus castaneifolia; Zelkova; Parrotia	Subtropical yellow soils

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
2397	Romania	Donita, N., et al.	1981	44.90	28.72	+	627			596		10.2	500	Forest	Quercus pedunculifolia; Acer; Brachypodium;	Leached chernozem
2396	Romania	Donita, N., et al.	1981	44.90	28.72	+	438			416		10.6	480	Forest	Quercus pubescens; Cotinus; Galium;	Rendzina
265	USA	Doss, B.D., et al.	1966						2210	1050				Pasture	Cynodon dactylon	
1016	Ireland	Doyle, G.J.	1973	54.25	-9.75	?	176	162	338	161				Wetland / bog	Schoenus nigricans; Molinia caerulea; Calluna vulgaris; Erica tetralix; Sphagnum	
1089	Ireland	Doyle, G.J.	1973	53.00	-8.00	+	1083	580	1663	790				Wetland / meadow	Festuca arundinacea; Trifolium repens; Ranunculus repens	
1091	USSR	Drozdzov, A.V.	1971	54.57	38.22	?			840	399				Forest	Beta vulgaris	
164	USA	Duckworth	1975	36.67	-121.67	?			4240	2014				Crops	Angiosperm	
221	USA	Durand, J.B., et al.	1972	40.00	-74.00	+			369	175				Wetland / salt-marsh	Ipomoea batatas (yam)	
691	Indonesia	Dutch Soil Monitoring Station *	1937	-6.58	106.78	?			6520	3097				Crops	Manihot esculenta	
692	Indonesia	Dutch Soil Monitoring Station *	1937	-6.58	106.78	?	1800	2300	4100	1948				Crops	Zea mays	
693	Indonesia	Dutch Soil Monitoring Station *	1937	-6.58	106.78	?			2000	950				Forest	Quercus robur; Fraxinus excelsior; Corylus avelana; Carpinus betulus	Pseudogley
1043	Belgium	Duvigneaud et al. *	1967	51.17	5.00	*	1080	100	1180	561		8.6	850	Forest	Quercus; Corylus; Carpinus; Fraxinus	
2153	Belgium	Duvigneaud, P.	1968	50.15	5.28	?	1080	100	1180	561				Forest	Corylus; Quercus; Fraxinus	
2139	Belgium	Duvigneaud, P.	1971	50.15	5.28	?			1430	679				Forest	Corylus; Quercus; Fraxinus	
1005	Belgium	Duvigneaud, P.	1971	51.17	5.00	*	1200	135	1335	634				Forest	Corylus; Quercus; Fraxinus	Pseudogley; base-rich clay; pH 6.2
1003	Belgium	Duvigneaud, P.	1971	50.58	4.53	?	1013	235	1248	593				Forest	Crataegus; Quercus	Magnesium; clay pseudogley; pH 5.2
1004	Belgium	Duvigneaud, P.	1971	50.07	4.33	?	1083	233	1316	625				Forest	Fagus; Acer; Quercus; Carpinus	Rendzina; Ca-rich clay; pH 6.4-7.4

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
973	Belgium	Duvigneaud, P.	1971	50.17	5.00	*	910	218	1202	571				Forest	Quercus; Betula	Acidic humus
1002	Belgium	Duvigneaud, P.	1971	50.17	5.00	*	851	160	1011	480				Forest	Quercus; Betula	Podsol pseudogley; pH 3.5
987	Belgium	Duvigneaud, P.	1971	49.75	5.00	*	1279	226	1505	715				Forest / deciduous	Quercus; Corylus	Mull forestier pH 5.4
2137	Belgium	Duvigneaud, P., et al.	1969	50.07	4.37	?	1220	213	1433	681				Forest		
1036	USSR	Dykyjova, D.	1971	49.17	14.78	?			3416	1623				Grassland	Typha angustifolia; Phragmites communis; Scirpus lacustris	
706	USSR	Dylis, N.	1971	55.50	37.75	?	1235			1173				Forest	Quercus; Picea; Pilosae-Caricocum	
1115	USA	Edmonds, R.L.	1978	44.25	-122.33	?	193	19	212	101		7.5	2313	Forest	Pseudotsuga menziesii; Tsuga heterophylla	Very poor soil
928	New Guinea	Edwards, P.J.	1977	-6.00	145.18	*	2000	350	2350	1116			3690	Forest / lower montane rainforest		Humic brown clay
1381	New Guinea	Edwards, P.J.	1977	-6.00	145.18	*			635	302		13	4000	Forest / lower montane rainforest		Humic brown clay
940	New Zealand	Egunjobi, J.K.	1967	-41.00	175.00	+	1300			1235						
943	New Zealand	Egunjobi, J.K.	1967	-41.00	175.00	+			2000	950				Forest	Ulex europaeus	
2458	Nigeria	Egunjobi, J.K.	1978	7.17	3.87	?	1192			1132			1200		Terminalia superba	
2043	Nigeria	Egunjobi, J.K. *	1975	7.17	3.87	?			1900	903		19.5	1800		Pinus caribaea	
972	Denmark / Greenland	Elkington, T.T.; Jones, B.M.G.	1974	61.10	-45.97	+	198	9	207	98			700	Forest / scrub woodland	Betula pubescens	Moranic. Sand infills
2412	Germany	Ellenberg, H.	1981	51.75	9.60	+	1224			1163		6.3	1063	Forest / broadleaf	Fagus sylvatica	Acid brown earth
2411	Germany	Ellenberg, H.	1981	51.75	9.57	+	1008			958		6.1	1063	Forest / broadleaf	Fagus sylvatica	Acid brown earth
2410	Germany	Ellenberg, H.	1981	51.82	9.58	+	1123	250	1373	652		6.1	1063	Forest / broadleaf	Fagus sylvatica	Acid brown earth
2415	Germany	Ellenberg, H.	1981	51.75	9.58	+	849			807		5.9	1063	Forest / needleleaf	Picea abies	Acid brown earth
2413	Germany	Ellenberg, H.	1981	51.82	9.58	+	936			889		5.9	1063	Forest / needleleaf	Picea abies	Acid brown earth
2414	Germany	Ellenberg, H.	1981	51.73	9.57	+	747			710		5.9	1063	Forest / needleleaf	Picea abies	Acid brown earth

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
594	Sierra Leone	Enyi, A.B.C.	1972	9.00	-12.00	+	.	.	3330	1582	.	.	.	Crops	Manihot esculenta	
2378	USSR	Fiala, K.	1979	49.72	15.97	?	810	.	.	770	.	6.3	786	Grassland	Nardus; Festuca; Saugisorba;	Humus gley podsol
165	Mexico	Fisher, F.L., et al.	1959	27.50	-112.00	*	.	.	1830	869	.	.	.	Crops	Triticum vulgare	
356	USA	Fisher, F.L., et al.	1959	30.50	-96.33	+	6940	.	.	6593	IF	.	.	Pasture	Cynodon dactylon	
1031	UK	Ford, E.D., et al.	1977	51.25	0.67	?	1000	.	.	950	.	.	760		Castanea sativa; Ground Vegetation	Low organic matter; poorly drained
1735	UK	Forrest *	1970	.	.	.	168	183	.	167	.	.	.		Calluna vulgaris	
1734	UK	Forrest *	1970	.	.	.	407	228	.	302	.	.	.		Calluna; Empetrum; Eriophorum	
1038	UK	Forrest, G.I.	1971	50.82	-1.92	?	168	.	.	160	.	.	.			
1032	UK	Forrest, Smith *	1975	50.82	-2.25	?	.	.	659	313	.	.	.	Wetland / bog	Calluna; Sphagnum; Eriophorum	
1018	UK	Forrest, Smith *	1975	54.75	-2.50	?	530	211	741	352	.	.	.	Wetland / bog	Eriophorum angustifolium; Trichophorum caespitosum; Sphagnum papillosum; other species	
167	USA	Fribourg, H.A., et al.	1971	36.67	-86.75	*	2314	.	.	2198	F	.	.	Pasture	Cynodon dactylon	Silt loam
27	USA	Fujimori *	1971	45.03	-120.00	*	.	.	3620	1720	?	10.3	2995	Forest	Tsuga heterophylla	
2313	USA	Gallagher, J.L., et al.	1980	31.42	-81.25	?	2400	.	.	2280	.	.	.	Wetland / salt-marsh	Spartina; Juncus	
2536	USA	Gessel, S.P.	1981	47.38	-121.95	+	1436	363	1799	855	.	9.8	1360	Plantation	Pseudotsuga menziesii	Typic haplorthod; gravelly sandy loam
2062	USA	Gholz, H.L.	1980	44.00	-120.00	+	110	.	.	105	.	.	.		Juniperus occidentalis	
547	Chad	Gillet, H.	1960	13.83	18.58	?	165	.	.	157	.	.	320			
548	Chad	Gillet, H.	1967	16.83	21.17	?	125	.	.	119	.	.	320			
555	Chad	Gillet, H.	1967	16.00	19.50	*	37	.	.	35	.	.	320			
551	Chad	Gillet, H.	1967	17.00	21.83	?	.	.	325	154	.	.	320	Savanna		
596	Chad	Gillet, H.	1967	.	.	.	.	.	70	33	.	.	.	Savanna		

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
156	USA	Golley, F.B., et al.	1962	18.25	-66.50	?	.	.	930	442	.	.	.	Forest / tropical mangrove	Rhizophora mangle	Sod, marsh
633	USSR	Golubev, V.N.	1972	44.83	35.00	*	437	.	.	415	.	5.7	1000	Grassland	Bromus riparius; Carex prumilis; Festuca sulcata	Leached chernozem-type
2532	Canada	Gordon, A.G.	1981	45.28	-78.28	+	990	.	.	941	.	4	1243	Forest	Picea; Tsuga; Abies; Thuja;	Orthic ferro-humic podsol
2534	Canada	Gordon, A.G.	1981	45.23	-78.38	+	451	.	.	428	.	4	1243	Forest	Picea; Pinus; Tsuga;	Lithic ferro-humic podsol
2531	Canada	Gordon, A.G.	1981	45.28	-78.27	+	383	.	.	364	.	4	1243	Forest	Picea; Tsuga; Abies;	Hydric humisol
2533	Canada	Gordon, A.G.	1981	45.53	-78.82	+	870	.	.	827	.	4	1243	Forest	Picea; Tsuga; Acer; Abies;	Orthic ferro-humic podsol
2331	USSR	Goryshina, T.K.	1981	50.63	35.97	+	975	.	.	926	.	6	537	Forest / steppe	Quercus robur; Tilia; Acer;	Grey and dark grey loam / sandy loam
2330	USSR	Goryshina, T.K.	1981	50.63	35.97	+	964	.	.	916	.	6	537	Forest / steppe	Quercus robur; Tilia; Acer; Euonymus;	Grey and dark grey loam / sandy loam
444	USA	Gosz, J.R.	1980	35.60	-105.92	?	574	.	.	545	.	.	.	Forest	Populus tremuloides	
1109	Austria	Grabherr, G., et al.	1980	47.17	11.00	*	85	75	160	76	.	.	807	Tundra / alpine		Shallow profile, brown earth; pH 4.5
2306	USA	Gray, J.T., et al.	1981	34.33	-119.33	?	255	.	.	242	.	.	.	Mediterranean / scrub	Ceanothus megacarpus	
1331	USA	Gray, J.T., et al.	1981	.	.	.	255	.	.	242	.	16.2	478	Mediterranean / scrub	Salvia; Artemisia californica	
2478	USA	Grier, C.C., et al.	1981	47.32	-121.58	?	645	1182	1827	868	.	5.4	2730		Abies amabilis	Typic spodosol
2479	USA	Grier, C.C., et al.	1981	47.32	-121.58	?	455	1223	1678	797	.	5.4	2730		Abies amabilis	Typic spodosol
58	USA	Grier, Logan *	1977	44.00	-122.00	+	759	271	1030	489	.	8.5	2300	Forest	Pseudotsuga; Polystichum	Typic dystrochrepts
358	USA	Guitard, A.A., et al.	1965	64.82	-147.87	?	.	.	450	214	.	.	.	Crops	Triticum vulgare	
2351	India	Gupta, S.R., et al.	1979	25.45	78.58	?	.	439	.	417	.	.	.		Themeda quadrivalis	
2452	Zimbabwe	Guy, P.R.	1981	-18.17	28.23	+	70	.	.	67	.	22.2	.	Forest / woodland	Colophospermum; Brachystegia	
2310	Canada	Haag, R.W.	1974	69.45	-133.03	?	.	.	490	233	.	.	.	Tundra	Betula; Empetrum	Orthic gleysol
2311	Canada	Haag, R.W.	1974	.	.	.	.	.	295	140	.	.	.	Tundra	Carex; Eriophorum	Peat polygon soil

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
271	USA	Harris et al. *	1975	36.00	-84.00	+	.	.	1669	793	.	13.3	1265	Forest	Quercus spp.; Liriodendron tulipifera	Deep alluvial silt loam
1231	USA	Harris, W.F., et al.	1973	36.00	-85.00	+	331	750	1081	513	.	.	.	Forest	Liriodendron tulipifera; Quercus	Emory cherty silt loam; fullerton silt lo
240	Canada	Hatcher, Mann *	1975	44.75	-63.17	?	.	.	710	337	.	.	.	Wetland / salt-marsh	Spartina alterniflora	.
2402	Finland	Havas, P.	1981	66.37	29.00	+	421	20	441	209	.	0	500	Forest	Picea excelsa; Vaccinium;	podsol; poorly drained
1085	UK	Heal et al. *	1975	54.75	-2.25	?	.	.	659	313	.	.	.	Wetland / bog	Calluna vulgaris; Sphagnum; Eriophorum	.
1061	UK	Heal, O.W.	1972	54.75	-2.25	?	.	.	635	302	.	.	1850	Wetland / bog	Calluna; Eriophorum; Sphagnum	.
934	Australia	Henzell, E.F.	1963	.	.	.	.	.	2440	1159	F	.	.	Pasture	Paspalum commersoni; P. plicatulum	.
933	Australia	Henzell, E.F.	1968	.	.	.	.	.	2350	1116	.	.	.	Pasture	Chloris gayana	.
935	Australia	Henzell, E.F.	1968	.	.	.	.	.	3000	1425	.	.	.	Pasture	Pennisetum clandestinum	.
982	Sweden	Holmen, H.	1964	59.33	19.00	*	1	.	.	-999	E	5	500	.	Picea	Highly humified peat
9027	Nigeria	Hopkins, B.	1965	7.42	3.55	+	680	.	.	646	.	27.9	1327	.	.	.
196	USA	Hopkinson, C.S., et al.	1978	29.50	-89.50	*	.	.	2932	1393	.	20	1500	Wetland / salt-marsh	.	.
2316	UK	Hughes, M.K.	1970	54.65	-1.43	?	270	.	.	257	.	.	.	Forest	Rubus; Dryopteris; Betula; Alnus	.
1696	UK	Hughes, M.K.	1971	55.00	-1.50	*	713	.	.	677	.	.	.	Forest	Alnus; Betula	.
22	USA	Hunter, R.B.	1975	36.50	-115.50	*	213	.	.	202	.	.	.	.	.	.
33	USA	Hunter, R.B.	1975	36.67	-116.00	*	56	.	.	53	.	.	.	.	.	.
2263	Sweden	Hyteborn, H.	1975	60.15	17.82	?	774	.	.	735	.	5.5	566	.	Acer; Betula; Populus; Quercus; Tilia	Calcareous glacial clay
2264	Sweden	Hyteborn, H.	1975	60.15	17.32	?	483	.	.	459	.	5.5	566	.	Betula spp.	.
2265	Sweden	Hyteborn, H.	1975	60.15	17.32	?	723	.	.	687	.	5.5	566	.	Quercus robur; Corylus; Betula	Brown earth mull/moder
2056	USA	Irving, R.S., et al.	1980	34.50	-91.55	+	623	.	.	592	.	17.3	1310	Grassland	See Table 2	Silt loam

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
2057	USA	Irving, R.S., et al.	1980	34.55	-91.42	+	1131	.	.	1074	.	17.3	1310	Grassland	See Table 2	Silt loam
2058	USA	Irving, R.S., et al.	1980	34.55	-91.55	+	628	.	.	597	.	17.3	1310	Grassland	See Table 2	Silt loam
784	USSR	Isayev, Y.M.	1957	40.50	47.50	*	230	.	.	219	.	.	.	.	Artemisia sp.; Hanseniana	.
2352	India	Jain, S.K.	1980	23.83	78.67	?	1236	937	2173	1032	.	24.8	1250	Grassland	Heteropogon contortus	"page 132"
2214	India	Jain, S.K., et al.	1972	23.83	78.67	?	.	1284	.	1220	.	.	1250	.	Quercus petraea; Q. cerris; Cornus; Acer;	Brown forest soil
2400	Hungary	Jakucs, P.	1981	47.90	20.47	+	715	.	.	679	.	9.9	582	Forest	Arthentherum elatius	.
1033	Poland	Jankowska, K.	1971	50.00	19.92	?	770	.	.	732	.	.	.	Tundra	Carex; Juncus; Peltandra; Polygonum; Sagittaria; Dryopteris	.
469	Antarctica	Jenkin *	1975	-54.50	158.95	?	1189	2110	3299	1567	?	.	.	Wetland / marsh	Carex; Rosa; Spiraea; Viburnum; Alnus	.
239	USA	Jervis, R.A.	1969	40.85	-74.37	+	1491	.	.	1416	.	.	.	Wetland / marsh	Typha; Rumex; Impatiens; Polygonum; Peltandra	.
236	USA	Jervis, R.A.	1969	40.85	-74.37	+	1699	.	.	1614	.	.	.	Wetland / marsh	Zizania aquatica; Sparganium eurycarpum; Peltandra virginica	.
238	USA	Jervis, R.A.	1969	40.85	-74.37	+	1904	.	.	1809	.	.	.	Forest / tropical moist semi-deciduous	Diospyros spp.	silty clay loam latosol
237	USA	Jervis, R.A.	1969	40.85	-74.37	+	1547	.	.	1470	.	.	.	Forest	Spartina alterniflora	Sandy podsolc soil over sandstone
590	Ghana	John, D.M.	1973	6.15	-0.92	+	.	.	2500	1188	.	.	1650	Wetland	Angiosperm	.
73	USA	Johnsen, Risser *	1974	35.17	-97.00	*	1260	230	1490	708	.	.	862	Tundra	Chloris gayana; Setaria sphacelata	Deep sandy soils; low P
10	USA	Johnson, M.	1970	38.17	-76.50	*	1207	.	.	1147	.	.	.	Wetland / salt-marsh	.	.
220	USA	Johnson, M.	1970	38.17	-76.55	*	.	.	1218	579	.	.	.	Wetland / heath	.	.
79	USA	Johnson, P.L., et al.	1970	71.30	-156.65	?	82	100	182	86	.	.	.	Pasture	.	.
949	Australia	Jones, R.	1968	-30.00	134.00	+	308	5828	6136	2915	?	.	.	.	.	.
936	Australia	Jones, R.L., et al.	1968	.	.	.	.	.	3160	1501	IF	.	.	.	.	.

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
937	Australia	Jones, R.L., et al.	1968						3180	1511	IF			Pasture	Setaria sphacelata; Paspalum spp.	
2027	Finland	Kallio, P.	1975	69.75	27.02	?	680			646		-2.1	375	Forest	Pinus sylvestris	
2329	USSR	Karpov, V.G.	1981	56.50	32.67	+	530	115	645	306		3.4	640	Forest / taiga	Picea abies; Vaccinium;	Clayed silty loam weak podsol
2322	USSR	Kazimirow	1981	62.00	34.00	+	287	51	338	161		2.2	650	Forest / boreal evergreen	Picea abies	Humus iron podsol
2323	USSR	Kazimirow	1981	62.00	34.00	+	445	82	527	250		2.2	650	Forest / boreal evergreen	Picea abies	Humus iron podsol
2324	USSR	Kazimirow	1981	62.00	34.00	+	570	104	604	287		2.2	650	Forest / boreal evergreen	Picea abies	Humus iron podsol
2325	USSR	Kazimirow	1981	62.00	34.00	+	617	116	733	348		2.2	650	Forest / boreal evergreen	Picea abies	Humus iron podsol
2326	USSR	Kazimirow	1981	62.00	34.00	+	621	110	731	347		2.2	650	Forest / boreal evergreen	Picea abies	Humus iron podsol
2327	USSR	Kazimirow	1981	62.00	34.00	+	534	93	527	250		2.2	650	Forest / boreal evergreen	Picea abies	Humus iron podsol
2328	USSR	Kazimirow	1981	62.00	34.00	+	350	65	415	197		2.2	650	Forest / boreal evergreen	Picea abies	Humus iron podsol
224	USA	Keefe, C.W., et al.	1973	38.00	-75.50	*			558	265				Wetland / marsh		
2143	Belgium	Kestemont, P.	1970	49.93	4.88	?	814			773					Quercus robur; Betula pendula	
2141	Belgium	Kestemont, P.	1970	49.93	4.88	?	908			863					Quercus robur; Q. petraea; Betula pendula	
1014	Belgium	Kestemont, P.	1970				910	0		432					Quercus; Betula; Sorbus; Corylus	
1011	Belgium	Kestemont, P.	1971	50.17	5.00	*	540			513					Quercus; Betula; Corylus; Sorbus	
1013	Belgium	Kestemont, P.	1971	49.83	5.00	*	914			868					Quercus; Betula; Fagus; Populus	Silty loam on schist; pH 4.3
2140	Belgium	Kestemont, P.	1973	50.03	5.25	?	644			612					Filipendula; Fagus; Alnus; Festuca	
2492	USA	Keyes, M.R., et al.	1981	46.00	-121.33	?	730	810	1540	732			1000		Pseudotsuga menziesii	Everett series soil

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
2493	USA	Keyes, M.R., et al.	1981	46.00	-121.33	?	1370	410	1780	846			1000		<i>Pseudotsuga menziesii</i>	Wilkeson series soil
644	Japan	Kimura, M.	1960	32.50	131.00	*			2060	979					<i>Distilium</i> ; <i>Shiia</i> ; <i>Cyclobalanopsis</i> ; <i>Camelia</i>	Volcanic on granite and sandstone weath.
749	Malaysia	Kira, T.	1978	2.98	102.30	+	2114	553	2667	1267		25	2000	Forest / lowland rainforest	<i>Shorea</i> ; <i>Dipterocarpus</i>	
750	Thailand	Kira, T., Shidei, T.	1967	7.58	99.80	+	2923	55	2978	1415		27.2	2696	Forest / tropical rainforest	<i>Padbruggea pubescens</i> ; <i>Akstonia spathulata</i> ; <i>Eugenia clarkeana</i>	Deep; sandy loam soil of granitic origin
67	USA	Kirby, C.J., et al.	1976	29.30	-90.15	+	1984			1885				Wetland / salt-marsh	<i>Spartina alterniflora</i>	
274	USA	Kirby, C.J., et al.	1976	29.30	-90.15	+	1176			1117				Wetland / salt-marsh	<i>Spartina alterniflora</i>	
2342	Japan	Kitazawa, Y.	1981	36.67	138.50	+	610	140	750	356		4.2	1455	Forest / subalpine	<i>Tsuga diversifolia</i> ; <i>Abies</i> ; <i>Betula</i>	Wet podsollic soil
247	USA	Klippel, Costello *	1960	39.50	-105.50	*			900	428				Grassland / shortgrass prairie		
270	USA	Klopatek, J.M.	1975	43.52	-88.42	?			3500	1663		7.6	714	Wetland / freshwater marsh		
182	USA	Kucera *	1967	38.00	-92.50	*	500			475					<i>Andropogon gerardi</i>	
248	USA	Kucera, C.L., et al.	1967	38.67	-94.00	*	482	547	1029	489				Grassland / tall-grass prairie		
264	USA	Kuramoto, R.T., Bliss, L.C.	1970	47.67	-123.50	?	113			107				Grassland / meadow	<i>Festuca idahoensis</i> ; <i>Delphinium glareosum</i>	Entisol/inceptisol (spodosol)
297	USA	Kuramoto, R.T., et al.	1970	47.00	-124.00	+	356			338				Grassland / meadow		
63	USA	Kuramoto, R.T., et al.	1970	47.67	-123.67	?		325		309				Grassland / meadow	<i>Artemisia</i> ; <i>Phacelia</i>	
296	USA	Kuramoto, R.T., et al.	1970	47.00	-124.00	+	156			148				Grassland / meadow	<i>Carex nigricans</i>	
278	USA	Kuramoto, R.T., et al.	1970				252			239				Grassland / meadow	<i>Festuca idahoensis</i> ; <i>Acreanaria</i> ; <i>Lupinus</i>	Entisol/inceptisol (spodosol)
64	USA	Kuramoto, R.T., et al.	1970	47.67	-123.67	?		750		713				Grassland / meadow	<i>Lupinus</i> ; <i>Polygonum</i>	

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
62	USA	Kuramoto, R.T., et al.	1970	47.67	-123.67	?		1000		950				Grassland / meadow	Saussurea; Viola; Hydrophyllum	Entisol/inceptisol (spodosol)
273	USA	Kuramoto, R.T., et al.	1970	47.67	-123.50	?	434			412				Grassland / meadow	Saussurea americana; Heracleum lanatum; Hydrophyllum occidentale	
699	USSR	Kurochkina et al. *	1972	46.82	74.98	?			152	72				Desert / arid shrub steppe	Ephedra lomatolepis; Calligonum alatifolium	
1182	USA	Lang, G.E.	1974	40.50	-74.57	?	1550			1473			1120	Forest	Quercus; Carya; Fraxinus	Silt-loam; moder
989	Austria	Larcher, W.	1977	47.22	11.33	?	108			103		0.5			Calluna; Vulgaris; Alectoria; Ochroleuca	Shallow profile; iron humic podsol
991	Austria	Larcher, W.	1977	47.22	11.33	?	317			301		2.2			Loiseleuria procumbens	Deep profile; iron humic podsol
990	Austria	Larcher, W.	1977	47.22	11.33	?	485			461		2			Vaccinium myrtillus	Deep profile; iron podsol
169	USA	Law *	1968	46.00	-119.77	?			3200	1520				Crops	Beta vulgaris	
1078	France	Lemee, G.	1978	48.40	2.70	?	476	80	556	264		10.2	697	Forest	Fagus sylvatica	
2395	France	Lemee, G.	1981	48.42	2.63	+	440			418		10.2	674	Forest / temperate deciduous	Fagus sylvatica; Brachypodium	Leached soil
2448	Ivory Coast	Lemee, G.	1981	5.70	-4.10	+	1480			1406			1739		Dacryodes klainiana; Coula; Scottellia	Strongly unsaturated ferralitic schist
2449	Ivory Coast	Lemee, G.	1981	5.38	-4.03	+	1630			1549		26.2	2095		Turraecanthus africana; Dacryodes;	Strongly unsaturated ferralitic sandy
999	Germany	Lieth, H., et al.	1965	49.00	9.50	*			2600	1235		8.6	850	Forest	Populus hybrid	Alluvial sandy loam
2404	Sweden	Lindgren, L., et al.	1981	55.75	13.92	+	1060	170	1230	584		6	900	Forest	Fagus sylvatica; Deschampsia	podsol
2403	Sweden	Lindgren, L., et al.	1981	55.70	13.63	+	1670	230	1900	903		7	650	Forest	Fagus sylvatica; Mercurialis; Allium;	Brown forest soil (with gley horizon)
141	USA	Linhurst, R.A., et al.	1978	38.83	-75.33	*	2582			2453				Wetland / estuarine	Distichlis spicata; Juncus gerardii; Phragmites communis; Spartina patens	
140	USA	Linhurst, R.A., et al.	1978	31.50	-81.25	*	4128			3922				Wetland / estuarine	Distichlis spicata; Spartina patens; S. cynosuroides; Sporobolus virginicus	

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
142	USA	Linthurst, R.A., et al.	1978	44.40	-68.25	*	2668	.	.	2535	.	.	.	Wetland / estuarine	Juncus spp.; Spartina spp.	
453	USA	Little, S., et al.	1959	18.00	-67.00	+	.	.	4860	2309	IF	.	.	Pasture	Panicum maximum	
454	USA	Little, S., et al.	1959	18.00	-67.00	+	.	.	6650	3159	IF	.	.	Pasture	Pennisetum purpureum	
719	USSR	Litvinova, N.P.	1972	41.60	69.72	?	.	.	66	31	.	.	.	Desert / montane		
723	USSR	Litvinova, N.P.	1972	39.42	70.37	?	.	.	1708	811	.	.	.	Desert / mountain shrubs	Amygdalus ulmifolia; Crataegus turkestanica	
718	USSR	Litvinova, N.P.	1972	38.55	68.58	?	.	.	1900	903	.	.	.	Desert / thyme	Agropyron trichophorum; Perovskia scrophularifolia	
731	USSR	Litvinova, N.P.	1972	38.55	68.58	?	.	.	889	422	.	.	.	Savanna / semi-savanna	Poa bulbosa; Agropyrum trichophorum	
409	Antarctica	Longton, R.E.	1970	-60.72	-50.00	*	.	.	342	162	.	.	.	Tundra		
956	Antarctica	Longton, R.E.	1970	-65.25	-65.00	*	.	.	421	200	.	.	.	Tundra	Polytrichum alpestre	
957	Antarctica	Longton, R.E.	1970	-54.28	-37.00	*	.	.	462	219	.	.	.	Tundra	Polytrichum alpestre	
958	Antarctica	Longton, R.E.	1970	-60.72	-45.00	*	.	.	342	162	.	.	.	Tundra	Polytrichum alpestre	
267	USA	Loomis, R.E., et al.	1963	20.00	-155.00	+	.	.	6410	3045	F	.	.	Crops	Saccharum officinale	
360	USA	Loomis, R.S., et al.	1963	32.67	-115.67	?	.	.	3380	1606	F	.	.	Crops	Beta vulgaris	
1079	France	Lossaint, P., et al.	1971	48.36	1.65	+	644	.	.	612	.	13.4	987			
2535	USA	Loucks, O.L., et al.	1981	43.03	-89.40	+	819	662	1481	703	.	6.9	777	Forest	Quercus alba; Prunus	Silt loam
532	South Africa	Louw, A.J.	1968	-24.67	28.67	?	390	.	.	371	.	.	.			
80	USA	Madgwick, H.A.J.	1968	38.00	-81.00	+	1430	.	.	1359	.	.	.	Forest	Pinus virginiana	
983	Finland	Maelkoenen *	1975	60.52	23.88	+	333	145	478	227	.	3.7	545	Forest	Pinus sylvestris	podsol; fine sand moraine
984	Finland	Maelkoenen *	1975	61.67	24.32	?	487	166	653	310	.	2.9	576	Forest	Pinus sylvestris	podsol; coarse sand
985	Finland	Maelkoenen *	1975	60.52	23.85	?	633	209	842	400	.	3.7	545	Forest	Pinus sylvestris	podsol; fine sand moraine
436	USA	Mahall, B.E., et al.	1976	38.13	-122.37	+	.	.	958	455	.	.	.	Wetland / salt-marsh	Salicornia virginica	

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
438	USA	Mahall, B.E., et al.	1976	38.13	-122.53	+	.	.	553	263	.	.	.	Wetland / salt-marsh	Salicornia virginica	
434	USA	Mahall, B.E., et al.	1976	38.13	-122.53	+	.	.	689	327	.	.	.	Wetland / salt-marsh	Spartina foliosa	
432	USA	Mahall, B.E., et al.	1976	38.13	-122.37	+	.	.	274	130	.	.	.	Wetland / salt-marsh	Spartina foliosa	
2392	Austria	Maier, R., et al.	1978	47.78	16.70	?	2685	.	.	2551	?	.	.		Phragmites communis	
2450	Zaire	Malaisse, F.	1981	-11.48	27.60	+	1110	150	1260	599	.	20.3	1273	Forest / miombo woodland	Marquesia macroura	Latosol
549	Senegal	Marel, Bourliere *	1962	16.67	-15.83	?	40	.	.	38	.	.	300			
1080	Greece	Margaris, N.S.	1978	37.97	23.72	?	412	310	722	343	.	18.2	416	Mediterranean / shrubland	Phrygana	
13	USA	Marshall, D.E.	1970	35.00	-76.00	+	1080	.	.	1026	.	.	.	Wetland / salt-marsh	Spartina alterniflora	
1021	UK	Mason, C.F., et al.	1975	52.58	1.00	*	1515	.	.	1439	.	.	.	Wetland	Typha angustifolia	
1023	UK	Mathews, C.P., et al.	1969	50.78	-2.33	?	293	.	.	278	.	.	.		Glyceria maxima	
873	USSR	Matreyeva, N.V., et al.	1975	75.50	110.00	*	126	.	.	120	.	.	.	Tundra		
744	India	Maurya, A.N.	1970	.	.	.	.	.	1359	646	.	.	.	Grassland / mixed		
475	Venezuela	Medina, E., et al.	1972	8.90	-67.40	+	.	.	2460	1169	.	.	.			
476	Venezuela	Medina, E., et al.	1972	10.00	-67.00	+	.	.	2340	1112	.	.	.	Forest / tropical evergreen cloud forest		
2416	Poland	Medwecka-Komas, E.	1981	50.10	20.37	+	1006	124	1130	537	.	7.8	729	Forest / temperate deciduous forest	Quercus robur; Tilia; Carpinus;	Leached brown
566	Ivory Coast	Ménaut, J.-C., et al.	1979	6.22	-5.03	+	1890	1060	2950	1401	.	.	1300	Savanna / dense shrub		
569	Ivory Coast	Ménaut, J.-C., et al.	1979	6.22	-5.03	+	1540	2040	3580	1701	.	.	1300	Savanna / grass		
564	Ivory Coast	Ménaut, J.-C., et al.	1979	6.22	-5.03	+	830	1320	2150	1021	.	.	1300	Savanna / intermediate		
568	Ivory Coast	Ménaut, J.-C., et al.	1979	6.22	-5.03	+	920	1320	2240	1064	.	.	1300	Savanna / intermediate		

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
570	Ivory Coast	Menaut, J.-C., et al.	1979	6.22	-5.03	+	1545	1905	3450	1639			1300	Savanna / intermediate		
565	Ivory Coast	Menaut, J.-C., et al.	1979	6.22	-5.03	+	1420	1340	2760	1311			1300	Savanna / open shrub		
567	Ivory Coast	Menaut, J.-C., et al.	1979	6.22	-5.03	+	2080	1260	3340	1587			1300	Savanna / woodland		
275	USA	Mendelssohn, I.A., et al.	1976	37.92	-75.58	?	362			344				Wetland / salt-marsh	<i>Spartina alterniflora</i>	
276	USA	Mendelssohn, I.A., et al.	1976	37.33	-76.67	?	572			543				Wetland / salt-marsh	<i>Spartina alterniflora</i> ; <i>Distichlis spicata</i> ; <i>Spartina patens</i>	
277	USA	Mendelssohn, I.A., et al.	1976				563			535				Wetland / salt-marsh	<i>Spartina alterniflora</i> ; <i>S. cynosuroides</i> ; <i>Juncus</i> spp.	
2335	USSR	Merzoev, O.G.	1981	41.00	48.00	+	250			238			450	Forest	<i>Betula pendula</i> ; <i>Rosa</i>	
2336	USSR	Merzoev, O.G.	1981	41.00	48.00	+	410			390			450	Forest	<i>Betula pendula</i> ; <i>Rosa</i>	
2386	UK	Miller, et al.	1978				270			257				Forest	<i>Calluna vulgaris</i>	
941	New Zealand	Miller, R.B.	1963	-41.00	175.00	+			840	399				Forest	<i>Nothofagus truncata</i>	
959	New Zealand	Miller, R.B.	1971	-41.33	174.83	?			900	428				Forest / rainforest	<i>Nothofagus truncata</i>	
544	Algeria	Miroshnichenko	1970	33.00	0.00	+	325			309					<i>Atriplex halimus</i> ; <i>Suaeda fruticosa</i> ; <i>Salsola tetrandra</i>	
689	India	Misra, R.	1970	25.30	83.17	?			780	371				Crops	<i>Zea mays</i>	
631	India	Misra, R.	1970	24.70	83.37	?			1296	616			1050	Forest	<i>Diospyros tomentosa</i> ; <i>Shorea robusta</i> ; <i>Terminalia</i>	Shallow and bright red
630	India	Misra, R.	1970	25.30	83.17	?		298	744	353			1050	Grassland		Sandy loam; alluvial deposit
836	India	Misra, R.	1972	25.30	83.17	?			2445	1161					<i>Sterculiaurens</i> ; <i>Emblica officinalis</i> ; <i>Anogeissus latifolia</i>	
834	India	Misra, R.	1972	25.30	83.17	?	1500			1425						
835	India	Misra, R., et al.	1967	25.20	83.17	?			1296	616				Forest	<i>Shorea</i> sp.	

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
383	USA	Mitsch, W.J.	1975	27.00	-81.00	+	.	.	416	198	.	.	.	Wetland / swamp		
389	USA	Mitsch, W.J.	1975	26.00	-81.00	+	.	.	192	91	?	.	.	Wetland / swamp		
390	USA	Mitsch, W.J.	1975	28.83	-82.33	?	.	.	600	285	.	.	.	Wetland / swamp		
1104	Denmark	Moeller, C.M., et al.	1954	56.00	9.00	+	.	.	1276	606	.	.	.	Plantation	Fagus sylvatica	
250	USA	Moir, W.H.	1969	40.00	-105.00	+	340	.	.	323	.	.	470	Grassland / mixed-grass prairie	Andropogon; Stipa	
187	USA	Monk, C.D.	1973	35.05	-83.43	+	1198	.	.	1138	.	.	.	Plantation	Pinus strobus	
2460	Chile	Mooney, H.A.	1981	-33.07	-71.08	?	689	.	.	655	.	.	.		Cryptocarya lithraea; Kageneckia	
2502	USA	Mooney, H.A.	1981	.	.	.	412	247	.	313	.	.	.			
1087	Ireland	Moore et al. *	1975	54.20	-9.75	?	361	162	523	248	.	.	1400	Wetland / bog		Peat
222	USA	Morgan, M.H.	1961	38.83	-75.00	*	.	.	445	211	.	.	.	Wetland / salt-marsh	Angiosperm	
1071	Austria	Moser et al. *	1977	46.98	11.07	?	.	.	30	14	.	.	.		Ranunculus glacialis; Oxryia dygna; Geum	
46	Canada	Muc *	1972	75.55	-84.67	?	.	.	46	22	.	.	.	Tundra		
147	Canada	Muc *	1973	75.55	-84.67	?	40	151	192	91	.	.	.	Tundra		
539	Ivory Coast	Mueller, D., Nielsen J.	1965	5.33	-4.17	+	1150	190	1340	637	.	26.9	1900	Forest / tropical rainforest	Combretodendron; Conopharyngia; Funtumia; Octoknema; Strombosia	pH 3.8-4.4; 1.8-2.3% organic matter (0-2 cm)
431	USA	Nemeth *	1973	35.33	-76.75	?	1316	272	1588	754	.	17.2	1410	Forest		Ultisols alfisols; fine loamy; thermic
2406	Sweden	Nihlgard, B.	1981	55.98	13.17	+	1540	240	1780	846	.	7	800	Forest	Fagus; Stelloria;	Acidic brown forest soil
2405	Sweden	Nihlgard, B.	1981	55.98	13.17	+	1370	260	1630	774	.	7	800	Forest	Picea abies; Oxalis; Rubus	Acidic brown forest soil
2249	Sweden	Nilsson, J.	1970	56.60	14.20	+	330	1100	1430	679	.	.	700		page 185	Brown earth
965	Australia	Noble, I.R.	1977	-32.12	139.37	?	50	.	.	48	.	.	180		Atriplex vesicaria; Maireana sedifolia; Stipa nitida	
268	USA	Nordfeldt, S.	1951	21.00	-156.60	*	.	.	4350	2066	.	.	.	Pasture	Pennisetum purpureum	

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
954	Australia	Norman, M.J.T.	1963	-14.65	132.70	?	.	.	148	70	.	.	660	Grassland	Sorghum plumosum; Themeda australis; Chrysopogon fallax	
748	Japan	Numata, M.	1975	38.73	140.25	?	800	200	1000	475	.	9.8	2335		Miscanthus sinensis (Tallgrass)	
747	Japan	Numata, M.	1975	40.67	140.92	?	250	750	1000	475	.	6.2	1425	Grassland / shortgrass	Zoysia japonica	
552	Ghana	Nye, P.H., Greenland, D.J.	1960	6.15	-0.92	+	2201	261	2462	1169	.	.	1500	Forest / rainforest	Diospyros spp.	silty clay loam latosol
2445	New Zealand	O'Brien, B.J., et al.	1978	.	.	.	.	.	800	380	.	.	.		Lolium trifolium	Typic dystrochrept
477	USA	Odum, Jordan *	1970	18.00	-66.50	*	.	.	1230	584	.	.	.	Forest / lower montane rainforest		
183	USA	Old, S.M.	1969	40.00	-89.00	+	328	.	.	312	.	.	.	Grassland	Andropogon gerardi	
639	USSR	Omina *	1955	51.50	39.17	?	.	.	650	309	.	.	.	Forest	Quercus; Fraxinus; Corylus; Carex	Dark grey forest sandy loam
440	USA	Onuf, C.P., et al.	1978	34.10	-119.00	*	.	.	727	345	.	.	.	Wetland / salt-marsh	Mixed Succulents	
439	USA	Onuf, C.P., et al.	1978	34.10	-119.00	*	.	.	286	136	.	.	.	Wetland / salt-marsh	Salicornia virginica	
1006	UK	Ovington *	1959	52.58	0.75	?	1303	.	.	1238	.	.	.	Forest	Pinus sylvestris	
1007	UK	Ovington *	1959	52.58	0.75	?	1275	.	.	1211	.	.	.	Forest	Pinus sylvestris	
1008	UK	Ovington *	1959	52.58	0.75	?	2550	.	.	2423	?	.	.	Forest	Pinus sylvestris	
1009	UK	Ovington *	1959	52.42	0.75	?	1450	.	.	1378	.	.	.	Forest	Pinus sylvestris	
1097	UK	Ovington *	1959	54.00	-2.00	+	.	.	1420	675	.	.	.	Forest		
1050	UK	Ovington, J.D.	1956	51.25	0.67	?	884	.	.	840	.	.	.	Forest / plantation	Abies; Larix; Tsuga; Picea; Castanea; Nothofagus; Pinus; Chamaecyparis; Thuja; Quercus	
1053	UK	Ovington, J.D.	1956	52.58	0.75	?	560	.	.	532	.	.	.	Forest / plantation	Alnus; Larix; Pseudotsuga; Pinus; Betula	

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
1054	UK	Ovington, J.D.	1956	51.80	-2.50	?	681	.	.	647	.	.	.	Forest / plantation	Pseudotsuga; Larix; Pinus; Picea; Castanea; Quercus; Fagus; Abies	
249	USA	Ovington, J.D., et al.	1963	46.00	-94.00	+	946	121	1067	507	.	.	.	Crops	Zea mays	
1096	UK	Ovington, Madgwick *	1969	54.00	-2.00	+	.	.	360	171	.	.	.	Forest / deciduous broad-leaved		
2353	India	Pandey, D.D., et al.	1980	25.30	83.17	?	1159	281	1440	684	.	.	902	Grassland	Dichanthium annulatum	
2354	India	Pandey, H.N., et al.	1980	25.27	83.52	?	1637	.	.	1555	.	26	1057		Dichanthium	
2355	India	Pandey, H.N., et al.	1980	25.27	83.52	?	2381	.	.	2262	.	26	1057		Heteropogon; Vetiveria; Desmostachya	
2356	India	Pandey, H.N., et al.	1980	25.27	83.52	?	1550	.	.	1473	.	26	1057	Forest	Shorea buchanania; Terminalia	
2373	Hungary	Papp, L.B.	1979	47.90	20.47	?	1013	65	1078	512	.	9.9	557	Forest	Quercus petraea; Q. cervis	Brown earth
15	USA	Parker, G.R., et al.	1975	46.50	-86.00	*	576	.	.	547	.	.	.		Alnus rugosa	Very fine sand loam
14	USA	Parker, G.R., et al.	1975	46.50	-86.00	*	641	.	.	609	.	.	.		Alnus rugosa; Fraxinus nigra; Cornus stolonifera	Poorly drained silty clay loam
653	USSR	Parshchikov, A.I.	1957	59.28	40.22	?	.	.	540	257	.	.	.	Forest	Picea excelsa	Peaty humus gley
645	USSR	Parshchikov, A.L.	1962	26.33	31.00	*	.	.	670	318	.	.	.	Forest / coniferous and mixed		Medium podsolized loam
2480	USA	Pastor, J., et al.	1981	45.83	-89.67	?	1030	120	1150	546	.	.	800	Forest	Populus; Acer; Betula; Quercus	Typic fragiorthod orthic humo ferric pod.
458	Trinidad	Paterson, D.D.	1938	10.50	-61.25	*	.	.	4360	2071	.	.	.	Pasture	Panicum barbinode	
457	Trinidad	Paterson, D.D.	1938	10.50	-61.25	*	.	.	4170	1981	.	.	.	Pasture	Pennisetum purpureum	
456	Trinidad	Paterson, D.D.	1938	10.50	-61.25	*	.	.	3620	1720	.	.	.	Pasture	Tripsacum laxum	
34	USA	Patten, D.T.	1975	33.83	-112.00	*	.	.	98	47	.	.	.	Desert		
1046	Sweden	Pearsall, W.H., et al.	1957	68.50	19.05	?	.	.	240	114	.	.	.	Tundra		
415	USA	Pearson, L.C.	1965	43.82	-111.78	+	2024	.	4050	1924	?	.	.		Fraxinus americana	Azonal sand; loam soil
417	USA	Pearson, L.C.	1965	44.17	-110.83	?	1848	.	4160	1976	?	.	.		Pinus contorta	
414	USA	Pearson, L.C.	1965	44.50	-111.00	+	2222	.	4990	2370	?	.	.		Pinus; Abies	

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
427	USA	Pearson, L.C.	1965	44.50	-111.00	+	4144		9320	4427	?	.			Pinus; Abies	
416	USA	Pearson, L.C.	1965	44.50	-111.20	+	2024		4550	2161	?	.			Pinus; Populus	
413	USA	Pearson, L.C.	1965	43.00	-111.67	?	3780		8520	4047	?	.			Populus; Lupinus	
418	USA	Pearson, L.C.	1965	43.50	-112.00	*	1707		3410	1620		.			Typha latifolia	
424	USA	Pearson, L.C.	1965	43.82	-111.78	?	858	516	1374	653	I	.		Crops	Raphanus sativus	Azonal sandy loam soil
425	USA	Pearson, L.C.	1965	43.82	-111.78	?	669	1065	1734	824	I	.		Crops	Solanum tuberosum	Azonal sandy loam soil
423	USA	Pearson, L.C.	1965	43.82	-111.78	?	815	416	1231	585		.		Crops	Triticum aestivum	Sandy azonal soil
404	USA	Pearson, L.C.	1965	43.75	-112.00	+	55		123	58		.		Desert	Chrysothamnus; Tetradymania; Oryzopsis	Sierozem soil
405	USA	Pearson, L.C.	1965	43.75	-112.00	+	78		176	84		.		Desert	Juniperus; Artemesia; Stipa	Azonal; very shallow soil
420	USA	Pearson, L.C.	1965	44.00	-112.00	+	173		390	185		.		Desert	Prunus; Purshia; Stipa	sand dunes
421	USA	Pearson, L.C.	1965	43.82	-111.78	+	123	42	165	78		.	270	Desert / shrub steppe (grazed)	Artemesia; Stipa; Poa	Azonal shallow soil over lava
422	USA	Pearson, L.C.	1965	43.82	-111.78	+	98	164	262	124		.	270	Desert / shrub steppe (protected)	Stipa; Poa; Artemesia	Azonal shallow soil over lava
426	USA	Pearson, L.C.	1965	43.50	-112.00	*	205		409	194		.		Pasture	Verbascum thapsus; Hordeum jubatum; Poa pratensis	
2418	Philippines	Penafiel, S.R.	1979				157			149	?	.	3171		Themeda; Andropogon;	Loamy
171	USA	Peterson, Davis *	1975	38.00	-122.00	+			2240	1064		.		Crops	Oryza sativa	
2	Canada	Pollard, D.F.W.	1971	46.00	-77.43	+	960			912		4.2	788		Populus tremuloides	
3	Canada	Pollard, D.F.W.	1971	46.00	-77.43	+	950			903		4.2	788		Populus tremuloides Populus grandidentata	Sand over deep compacted silt
1	Canada	Pollard, D.F.W.	1971	46.00	-77.43	+	284			270		4.2	788		Quercus; Betula; Populus tremuloides; P. grandidentata	
862	USSR	Polozova, T.G., et al.	1970	75.00	90.00	+	40			38		.		Tundra		
2398	Romania	Popescu-Zeletin, I.	1981	45.38	23.25	+	925			879		5.7	895	Forest	Fagus sylvatica; Abies; Pulmonaria;	Brown forest soil
269	USA	Prine, G.M., et al.	1956						2530	1202	F	.		Pasture	Cynodon dactylon	

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
1110	Austria	Puempel, B.	1977	47.17	12.50	?	20	.	.	19	.	.	.	.	.	.
1112	Austria	Puempel, B.	1977	47.17	12.50	?	374	.	.	355	.	.	.	Forest	Picea; Sphagnum	Soil of lowland peat bog type
646	USSR	P'yavchenko A. B *	1969	59.17	40.00	*	.	.	590	280	.	.	.	.	.	Soil of lowland peat bog type
796	USSR	P'yavchenko, N.I.	1960	60.00	40.22	?	.	.	310	147	.	.	.	Forest / coniferous and mixed	Pinus sp; Sphagnum sp	Upland peat bog
184	USA	Quinnald, C.L., et al.	1958	47.50	-102.00	*	215	.	.	204	.	.	.	.	Agropyron smithii	.
550	Nigeria	Rains, A.B.	1963	9.00	9.00	+	340	.	.	323	.	.	1118	.	.	.
116	USA	Ralston, C.W.	1973	36.00	-78.00	+	1190	190	1380	656	.	13.6	1150	Plantation	Pinus taeda	.
837	India	Rao, A.	1970	25.30	83.17	?	.	.	2313	1099	.	.	.	.	Dichanthium sp.	.
828	India	Rao, A.	1970	25.33	83.00	*	.	.	2852	1355	.	.	.	Grassland	Dichanthium; Desmodium	.
2144	France	Rapp, M.	1971	48.56	1.61	+	650	.	.	618	.	14.4	770	.	.	Red mediterranean paleosol
2145	France	Rapp, M.	1971	48.54	1.64	+	140	.	.	133	.	14.4	770	.	.	Brown calcareous soil
2385	France	Rapp, M., et al.	1981	.	.	.	340	.	.	323	.	.	.	.	Pinus; Pistacia; Dorycnium; Bromus;	.
2384	France	Rapp, M., et al.	1981	.	.	.	370	.	.	352	.	.	.	.	.	.
258	Canada	Reader, Stewart *	1971	49.88	-95.90	?	372	1461	1942	922	.	.	.	Wetland / bog	.	.
78	Canada	Reader, Stewart *	1972	49.88	-95.90	?	.	.	1631	775	.	.	.	Wetland / peatland	Div.	.
76	Canada	Reader, Stewart *	1972	49.88	-95.90	?	.	.	993	472	.	.	.	Wetland / peatland	Ledum; Chamaedaphne; Kalmia; Vaccinium; Picea; Sphagnum	.
77	Canada	Reader, Stewart *	1972	49.88	-95.90	?	.	.	710	337	.	.	.	Wetland / peatland	Pleurozium schreberi; Ledum groenlandicum; Picea mariana	.
186	USA	Redmann, R.E.	1968	47.50	-102.00	*	77	.	.	73	.	.	.	Grassland	Bouteloua	.
185	USA	Redmann, R.E.	1968	47.50	-102.00	*	200	.	.	190	.	.	.	Grassland	Sporobolus	.
2307	USA	Reichle, D.E.	1981	35.92	-84.28	+	.	.	1381	656	.	13.3	1265	Forest	Liriodendron tulipifera; Quercus	Alluvial emory silt loam
2312	USA	Reimold, R.J., et al.	1975	31.42	-81.25	*	1846	.	.	1754	.	.	.	Wetland	Spartina; Juncus	.

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
118	USA	Reiners, W.A.	1972	45.00	-93.00	+	707	.	.	672	.	.	.	.	Acer; Alnus; Betula; Ulmus; Carpinus; Fraxinus; Prunus; Quercus; Thuja	Nutrient-rich neutral to near neutral peat
119	USA	Reiners, W.A.	1972	45.33	-93.00	*	891	.	.	846	.	.	.	.	Quercus; Populus; Prunus; Fraxinus; Betula; Alnus	Well drained sandy soil mor and mull
117	USA	Reiners, W.A.	1972	45.33	-93.00	*	1032	.	.	980	.	.	.	.	Thuja Occidentalis; Acer; Alnus; Ulmus; Larix; Fraxinus	High peat deposits
362	USA	Reitz, L.P.	1967	46.67	-117.17	?	.	.	2980	1416	.	.	.	Crops	Triticum vulgare	
1056	USSR	Remezov, N.P.	1964	51.67	39.17	?	524	214	738	351	.	.	.	Forest steppe		
1057	USSR	Remezov, N.P.	1964	51.67	39.17	?	722	175	879	418	.	.	.	Forest steppe zone		
776	USSR	Remezov, N.P., et al.	1963	54.80	43.33	?	.	.	610	290	.	.	.	Forest	Pinus sp.; Vaccinium vitis-Idaea	
636	USSR	Remezov, N.P., et al.	1963	56.33	31.00	*	.	.	890	423	.	.	.	Forest / coniferous and mixed		Light loam podsol
638	USSR	Remezov, N.P., et al.	1963	56.33	31.00	*	.	.	740	352	.	.	.	Forest / coniferous and mixed		Peaty podsol
637	USSR	Remezov, N.P., et al.	1963	56.33	31.00	*	.	.	1070	508	.	.	.	Forest / coniferous and mixed	Picea sp.; Betula sp.	Peaty podsol
640	USSR	Remezov, N.P., et al.	1963	51.50	39.17	?	.	.	1740	827	.	.	.	Forest / deciduous broad-leaved	Populus; Quercus; Carex; Aegopodium	Grey forest sand soil
255	USA	Richardson, C.J., et al.	1976	44.33	-84.83	?	341	.	.	324	.	.	.	.	Betula pumila; Chamaedaphne calyculata	
536	South Africa	Robinson	1970	-25.75	28.17	?	110	.	.	105	.	.	607	.		
216	USA	Rochow, J.J.	1974	38.80	-92.20	+	600	200	800	380	.	12.8	940	Forest	Quercus; Hickory	
1884	USSR	Rodin, Bazilevich *	1969	.	.	.	.	.	531	252	.	.	.	Forest / tundra	Picea	
841	USSR	Rodin, L.E. *	1979	46.08	59.00	*	.	.	535	254	.	.	120	Desert	Ammodendron argenteum; Artemisia terraealta; Annabasis saka	
842	USSR	Rodin, L.E. *	1979	40.75	63.75	?	.	.	125	59	.	15.2	95	Desert	Artemisia turanica; A. diffusa; Nanophyton erinaceum	

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
843	USSR	Rodin, L.E. *	1979	44.33	76.00	*	.	.	1682	799	.	9	217	Desert	Ephedra lomatolepis; Eurotia ceratoides; Artemisia albae; Agropyron fragile	
844	USSR	Rodin, L.E. *	1979	38.67	68.18	?	.	.	747	355	.	16	114	Desert	Haloxylon ammodendron	
840	USSR	Rodin, L.E. *	1979	38.67	58.27	?	.	.	360	171	.	15.6	148	Desert	Haloxylon persicum; Calhigonum rubens; Salsola arbuscula; S. gemmascens	
1866	USSR	Rodin, L.E., Bazilevich, N.I.	1956	43.00	60.00	+	88	431	.	247	.	.	.	.	Anabasis salsa	Primitive; taky; solonchak
785	India	Rodin, L.E., Bazilevich, N.I.	1968	24.18	73.67	?	440	290	730	347	.	.	.	Savanna / dry		Red brown tropical soil
545	Algeria	Rodin, L.E., et al.	1972	33.00	3.00	+	115	62	177	84	.	.	.	Desert / semi-desert	Artemisia herba-alba	
634	Syria	Rodin, L.E., et al.	1972	36.00	38.00	+	.	.	238	113	.	18	155	Desert	Poa sinaica; Salsola rigida; Phytretum	Gray soils on alluvium of limestone
702	Syria	Rodin, L.E., et al.	1972	35.00	38.00	+	130	108	238	113	.	.	.	Grassland / steppe	Poa sinaica; Artemisia	
738	USSR	Rodin, L.E., et al.	1972	37.00	54.00	+	.	.	70	33	.	.	.	.	Halocnemum strobilaceum; Kalidium caspicum	Sulphate-chloride solonchaks
1090	Sweden	Rosswall *	1975	68.37	19.05	?	132	24	156	74	.	.	.	Tundra		
722	Afghanistan	Rousyaeva, G.G.	1972	35.50	71.67	?	40	.	.	38	.	8.7	235	.	Artemisia vachanica; Carex pachystylis; Poa bulbosa; Polygenum paronychioid	
1852	Burma	Rozanov, B.G., Rozanova, I.M.	1964	.	.	.	800	.	.	760	.	.	.	Dendrocalamus strictus		Tropical cinnamon-brown
643	Burma	Rozanov, B.G., Rozanova, I.M.	1964	19.00	96.00	+	1070	.	.	1017	.	.	.	Trop. Cinnamon-brown		
642	Burma	Rozanov, B.G., Rozanova, I.M.	1964	20.00	96.00	+	1610	.	.	1530	.	.	.	Krasnozern	Dendrocalamus; Oxytenanthera	
641	Burma	Rozanov, B.G., Rozanova, I.M.	1964	22.00	96.00	+	1950	.	.	1853	.	.	.	Zheltozern	Oxytenanthera	
2337	USSR	Rudneva et al.	1981	64.67	47.50	+	537	60	597	284	.	-1.2	499	Forest / boreal	Picea abies; Juniperus;	Clay podsol loamy
1084	Germany	Runge, M.	1973	51.78	9.67	?	1243	250	1493	709	.	6.5	1100	Forest	Fagus sylvatica; Luzula	

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
2217	India	Sahai, R., Asthana, M., et al.	1975	26.75	83.33	?	117	256	1430	679						
2216	India	Sahai, R., Asthana, M., et al.	1975	26.75	83.33	?	777	318	1095	520				Grassland		
2494	Canada	Sakai, A., et al.	1979	68.30	-133.48	?	216			205		-9.7	260		<i>Betula papyrifera</i>	
2407	UK	Satchell, J.E.	1981	54.21	-2.89	+	992	269	1261	599		7.8	1115	Forest / temperate deciduous	<i>Quercus petraea</i> ; <i>Betula</i> ; <i>Fraxinus</i> ;	Glacial drift and brown earth
2269	Japan	Satoo, T.	1968	35.15	140.15	?	1585			1506				Forest	<i>Cinnamomum</i>	
825	Japan	Satoo, T.	1969	37.00	139.00	+	770	540	1310	622					<i>Pinus densiflora</i>	
855	Japan	Satoo, T.	1970	39.75	141.00	*			1846	877		10.2	1806		<i>Larix leptolepis</i>	
848	Japan	Satoo, T.	1971	43.22	142.43	+	1213			1152		6.7	1200		<i>Picea abies</i>	
2319	Japan	Satoo, T.	1971	35.93	138.85	+	1423			1352		8.2	1900		<i>Picea abies</i>	
2340	Japan	Satoo, T.	1981	39.03	141.35	+	1638			1556		11.3	1467	Forest	<i>Pinus densifolia</i> ; <i>Quercus</i> ; <i>Carex</i> ;	Brown forest soil
2339	Japan	Satoo, T.	1981	39.75	141.00	+	1449	264	1713	814		10.2	1806	Plantation	<i>Larix leptolepis</i> ; <i>Morus</i> ; <i>Prunus</i> ;	Black volcanic ash
804	Japan	Satoo, T. *	1967	37.00	141.00	+	1447	131	1580	751				Forest / natural woodland	<i>Pinus densiflora</i>	
853	Japan	Satoo, T. *	1974	43.22	142.38	?	1450			1378		7.9	1188		<i>Abies sachalinensis</i>	Brown forest soil
856	Japan	Satoo, T. *	1974	43.22	142.43	+	625			594			1200		<i>Betula maximowicziana</i>	Moist brown forest
854	Japan	Satoo, T. *	1974	42.55	142.38	?	1510			1435					<i>Larix leptolepis</i>	
849	Japan	Satoo, T., et al.	1974	35.00	139.00	+	1720			1634					<i>Metasequoia glyptostroboides</i>	
850	Japan	Satoo, T., et al.	1974	37.53	136.90	?	1129			1073		12.7	2278		<i>Thuopsis dolabrata</i>	
851	Japan	Satoo, T., et al.	1974	37.53	136.90	?	1918			1822					<i>Thuopsis dolabrata</i>	
2520	USA	Schlesinger, W.H.	1978	30.83	-82.33	*	106			101	?			Wetland / swamp	<i>Itea</i> ; <i>Lyonia</i> ; <i>Clethra</i> ;	
2302	USA	Schlesinger, W.H.	1978	30.70	-82.33	*	692			657				Wetland / swamp	<i>Taxodium distichum</i>	
2304	USA	Schlesinger, W.H., et al.	1980	34.50	-119.50	*	850			808				Mediterranean / scrub	<i>Ceanothus megacarpus</i>	

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
1111	Austria	Schmidt, L.	1977	47.22	11.33	?	338	.	.	321	.	.	.	.	Vaccinium; Loiseleuria; Empetrum	
942	New Zealand	Sears, P.D.	1948	-40.35	175.62	?	1900	.	.	1805	.	.	.	.	.	
703	USSR	Shamsiev, A.	1972	37.45	70.37	?	4	51	55	26	.	.	.	Desert / arid steppe	Aristida plumosa	
704	USSR	Shamsiev, A.	1972	37.45	70.37	?	54	204	158	75	.	.	.	Desert / arid steppe	Haloxylon persicum	
694	USSR	Shamsiev, A.	1972	37.45	70.37	?	28	25	54	26	.	.	.	Desert / arid steppe	Zygophyllum gontscharovii	
705	USSR	Shamsiev, A.	1972	37.45	70.37	?	85	465	550	261	.	.	.	Savanna / shortgrass semi-savanna	.	
2210	India	Shankar, V., et al.	1978	25.70	78.35	+	796	984	1780	846	.	.	.	Grassland	Chrysopogon fucvas	
2211	India	Shankar, V., et al.	1979	25.70	78.35	+	508	449	957	455	.	.	.	Grassland	Ickilema laxum	
838	India	Sharma In Misra, Pandey *	1972	25.20	83.17	?	.	.	292	139	.	.	.	Forest	Shorea sp.	
938	Australia	Shaw, N.H., et al.	1965	-27.50	153.00	*	.	.	3190	1515	.	.	.	Pasture	Paspalum plicatulum	
818	Japan	Shidei, T.	1971	43.00	143.00	+	.	.	2380	1131	.	.	.	Forest	Abies sachalinensis	
816	Japan	Shidei, T.	1971	43.00	143.00	+	.	.	1350	641	.	.	.	Forest	Abies sp; Picea sp	
820	Japan	Shidei, T.	1971	37.00	139.00	+	.	.	1680	798	.	.	.	Forest	Abies veitchii	
822	Japan	Shidei, T.	1971	37.00	138.00	+	.	.	2100	998	.	.	.	Forest	Abies veitchii	
817	Japan	Shidei, T.	1971	43.00	143.00	+	.	.	1930	917	.	.	.	Forest	Larix leptolepsis	
819	Japan	Shidei, T.	1971	40.00	141.00	+	.	.	1460	694	.	.	.	Forest	Larix leptolepsis	
821	Japan	Shidei, T.	1971	37.00	138.00	+	.	.	1330	632	.	.	.	Forest	Larix leptolepsis	
815	Japan	Shidei, T.	1971	43.00	143.00	+	.	.	1010	480	.	.	.	Forest	Larix sp	
2341	Japan	Shidei, T.	1981	35.33	135.75	+	1010	150	1260	599	.	11.3	2788	Forest	Fagus crenata; Carpinus; Quercus;	Brown forest soil
369	USA	Sims, P.L., et al.	1971	45.53	-102.00	*	203	399	602	286	.	7.2	330	Grassland	.	

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
2074	USA	Sims, P.L., et al.	1978	46.40	-119.55	+	98	.	.	93	.	.	.	Grassland / bunchgrass	<i>Agropyron spicatum</i>	Silty loam mollisol
2070	USA	Sims, P.L., et al.	1978	32.60	-106.85	+	148	147	295	140	.	.	.	Grassland / desert	<i>Bouteloua eriopoda</i>	Loamy sand aridisol
2066	USA	Sims, P.L., et al.	1978	46.90	-102.82	+	351	932	1283	609	.	.	.	Grassland / mixed grass prairie	<i>Agropyron smithii</i>	Silty clay loam mollisol
2071	USA	Sims, P.L., et al.	1978	43.95	-101.87	+	249	547	795	378	.	.	.	Grassland / mixed grass prairie	<i>Agropyron smithii</i>	Silty clay loam mollisol
2069	USA	Sims, P.L., et al.	1978	38.87	-99.38	+	363	1062	1425	677	.	.	.	Grassland / mixed grass prairie	<i>Andropogon scoparius</i>	Loamy mollisol
2068	USA	Sims, P.L., et al.	1978	47.32	-114.27	+	272	.	.	258	.	.	.	Grassland / montane	<i>Festuca scabrella</i>	Cobbly silt loam mollisol
2073	USA	Sims, P.L., et al.	1978	45.78	-110.78	+	249	471	720	342	.	.	.	Grassland / montane	<i>Festuca idahoensis</i>	Silty loam mollisol
2072	USA	Sims, P.L., et al.	1978	35.30	-101.53	+	257	633	890	423	.	.	.	Grassland / shortgrass prairie	<i>Bouteloua gracilis</i>	Silty clay loam mollisol
2075	USA	Sims, P.L., et al.	1978	40.82	-104.77	+	172	568	740	352	.	.	.	Grassland / shortgrass prairie	<i>Bouteloua gracilis</i>	Sandy loam mollisol
2067	USA	Sims, P.L., et al.	1978	36.95	-96.55	+	346	542	887	421	.	.	.	Grassland / tallgrass prairie	<i>Andropogon scoparius</i>	Silty clay mollisol
839	India	Singh, J.S.	1967	25.30	83.17	?	.	.	744	353	.	.	.	Grassland	.	.
745	India	Singh, J.S.	1967	25.30	83.17	?	.	.	764	363	.	.	.	Grassland	.	.
659	India	Singh, J.S.	1970	25.30	83.17	?	.	.	1838	873	.	.	.	Grassland / dry	<i>Dichanthium annulatum</i>	.
709	India	Singh, J.S., et al.	1969	25.30	83.17	?	740	.	.	703	.	.	1100	.	.	loamy calcareous; pH 8.5
2213	India	Singh, J.S., et al.	1974	29.97	76.85	+	2407	1131	3538	1681	.	22	800	Grassland	<i>Dichanthium annulatum</i> ; <i>Panicum miliare</i> ; <i>Alhagi camelorum</i>	.
2349	India	Singh, R., et al.	1980	28.38	75.00	*	170	53	223	106	.	.	.	Grassland	<i>Prosopis</i> ; <i>Zizyphus</i>	.
217	USA	Smalley, A.E.	1958	31.50	-81.50	*	.	.	973	462	.	.	.	Wetland / salt-marsh	Angiosperm	.
778	USSR	Smimova, K.M., Gorodentseva, G.A.	1958	56.00	38.00	+	.	.	1110	527	.	.	.	Forest / deciduous broad-leaved	.	.
2431	USA	Smith, L.L.	1979	19.00	-155.00	+	2628	.	.	2497	.	24	1050	Wetland	<i>Scirpus</i> ; <i>Bracharia</i>	.

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
792	USSR	Sochava, V., et al.	1962	52.05	113.50	?	213	.	.	202	.	.	.	Forest	Eucalyptus; Melaleuca; Baeckea;	
199	USA	Sollins, P., et al.	1973	36.00	-85.00	+	900	300	1200	570	.	.	.			
2539	Australia	Specht, R.L.	1966	.	.	.	35	.	.	33	.	.	.			
2295	Australia	Specht, R.L.	1969	-36.03	140.50	?	88	.	.	84	.	.	450		Banksia; Xanthorrhoea	page 296
2294	Australia	Specht, R.L.	1969	-36.33	140.50	?	88	.	.	84	.	.	450		Eucalyptus; Melaleuca	page 296
2292	France	Specht, R.L.	1969	43.62	3.88	?	410	.	.	390	.	.	750		Quercus coccifera	page 294
2293	USA	Specht, R.L.	1969	34.17	-117.75	?	100	.	.	95	.	.	800	Mediterranean / scrub	Adenostoma; Ceanothus	page 294
2432	Australia	Specht, R.L.	1981	.	.	.	180	.	.	171	.	.	.		Eucalyptus incrassata; Melaleuca uncinata	
1034	Germany	Speidel, Weiss *	1972	51.75	9.58	?	316	487	603	286	.	.	.	Wetland / meadow	Festuca rubra	Variegated brown earth, pH 4.5
1035	Germany	Speidel, Weiss *	1972	51.75	9.58	?	808	609	1417	673	.	.	.	Wetland / montane meadow	Festuca rubra	Variegated brown earth, pH 4.5
172	USA	Stanford *	1975	37.00	-120.00	+	.	.	2970	1411	.	.	.		Medicago sp.	
799	Israel	Stanhill, G.	1962	31.00	34.50	*	1860	.	.	1767	.	.	.		Medicago sp.	
696	USSR	Stanyukovich, K.V., et al.	1972	37.45	70.37	?	811	629	1440	684	.	.	.	Desert / montane shrub meadow	Crataegus	
698	USSR	Stanyukovich, K.V., et al.	1972	38.55	68.58	?	1585	315	1900	903	.	.	.	Desert / steppe	Agropyron	
695	USSR	Stanyukovich, K.V., et al.	1972	37.45	70.37	?	30	21	51	24	.	.	.	Desert / steppe	Artemisia parvifolia	
407	Canada	Svoboda *	1972	75.67	-84.67	?	15	.	20	10	.	.	.	Desert / semi-polar-desert		
24	Canada	Svoboda *	1973	75.55	-84.67	?	.	.	61	29	.	.	.	Tundra		
810	Japan	Tadaki, Y.	1965	33.00	130.00	+	.	.	1670	793	.	.	.		Cryptomeria japonica	
811	Japan	Tadaki, Y.	1965	31.50	131.00	*	.	.	1510	717	.	.	.		Cryptomeria japonica	
808	Japan	Tadaki, Y.	1968	31.50	131.00	*	.	.	2270	1078	.	.	.	Forest	Castanopsis cuspidata	
809	Japan	Tadaki, Y., et al.	1967	34.00	131.00	+	.	.	1880	893	.	.	.		Cryptomeria japonica	

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
813	Japan	Tadaki, Y., et al.	1969	36.00	138.00	+	.	.	1390	660	.	.	.	.	Fagus crenata	
807	Japan	Tadaki, Y., et al.	1970	36.00	138.00	+	.	.	1266	601	.	.	.	Forest / subalpine forest	Abies	
635	Israel	Tadmor, N.H., et al.	1972	31.37	34.58	?	340	.	.	323	.	.	250	.	Brachypodium; Hordeum; Elymus; Phalaris; Stipa; Trigonella; Arthemisia; Erucaria	Deep sandy loam soil
1282	Jamaica	Tanner, E.V.J.	1980	18.00	-77.00	+	760	.	.	722	.	15.4	2230	.	.	
1283	Jamaica	Tanner, E.V.J.	1980	18.00	-77.00	+	680	.	.	646	.	15.4	2230	.	.	
1284	Jamaica	Tanner, E.V.J.	1980	18.00	-77.00	+	650	.	.	618	.	15.4	2230	.	.	
1285	Jamaica	Tanner, E.V.J.	1980	18.00	-77.00	+	690	.	.	656	.	15.4	2230	.	.	
1286	Jamaica	Tanner, E.V.J.	1980	18.00	-77.00	+	990	.	.	941	.	15.4	2230	.	.	
2168	USSR	Tesarova, M.	1976	.	.	.	850	.	.	808	.	.	.	Grassland / meadow	Alopecurus pratensis	
2167	USSR	Tesarova, M.	1976	.	.	.	750	.	.	713	.	.	.	Grassland / meadow	Festuca sulcata	
2169	USSR	Tesarova, M.	1976	.	.	.	1462	.	.	1389	.	.	.	Grassland / meadow	Glyceria maxima	
2401	Denmark	Thamdrup, H.M.	1981	56.30	10.48	+	1499	375	1874	890	.	7.1	660	Forest / temperate deciduous	Fagus sylvatica; Anemone; Carex;	Grey-brown podsollic mollic hapludalf
254	USA	Tieszen, L.L.	1972	71.33	-156.65	*	101	.	.	96	.	.	.	Tundra	Carex aquatilis; Dupontia fischeri; Eriophorum angustifolium; Poa arctica; Calamagrostis holmii; Eriophorum scheuchzeri; other species	
384	USA	Tieszen, L.L.	1972	71.30	-156.67	*	102	.	.	97	.	.	.	Tundra	Dupontia fischeri; Carex aquatilis; Eriophorum angustifolium	
800	Japan	Togari, Y., et al.	1970	39.70	141.15	?	890	.	.	846	.	.	.	Crops	Glycine max	
801	Japan	Togari, Y., et al.	1970	33.00	131.00	+	630	.	.	599	.	.	.	Crops	Glycine max	
746	India	Tripathi, J.S.	1970	.	.	.	.	.	520	247	.	.	.	Grassland / mixed		

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
2347	India	Trivedi, B. K., Mishra, G.P.	1979	25.17	79.25	?	824	773	1597	759		25	876	Grassland	Schima; Dichanthium	
2350	India	Trivedi, B. K., Mishra, G.P.	1979	25.45	70.58	?	1223	1166	2389	1135		25	876	Grassland	Schima; Dichanthium	
38	USA	Turner, F.B., et al.	1974	36.67	-116.00	*	57			54				Desert		
37	USA	Turner, F.B., et al.	1974	36.67	-116.00	*			67	32			213	Desert	Calluna vulgaris	
2387	Sweden	Tyler, G., et al.	1973				307			292						
445	USA	Valk, Davis *	1978	42.00	-93.00	+		560	1575	748				Forest / boreal evergreen	Picea mariana; Ledum;	Pergelic cryaquept
2538	USA	Van Cleve, K.	1981	64.00	-148.00	+	159	80	239	114						
2537	USA	Van Cleve, K.	1981	64.00	-148.00	+	81	45	126	60		-3.4	277	Forest / boreal evergreen	Picea; Ledum;	Pergelic cryaquept
2476	USA	Van Cleve, K., et al.	1981	64.75	-148.25	+	724			688		-0.4	267	Forest / boreal evergreen	Picea mariana	Pergelic cryaquept
2477	USA	Van Cleve, K., et al.	1981	64.75	-148.25	+	132			125		-3.4	267	Forest / boreal evergreen	Picea mariana	Alfic cryaquept
2408	Netherlands	Van Der Drift, J.	1981	51.92	6.70	+	1120			1064		8.6	780	Forest / temperate	Quercus petraea; Fagus; Sorbus	Mor layer on humus infiltrated sands
533	Rwanda	Verschuren	1970	-2.00	29.00	+	1750			1663			860			
537	Rwanda	Verschuren	1970	-2.00	29.00	+	630			599			860			
535	Tanzania	Verschuren	1970	-3.00	35.00	+	520			494			700			
460	USA	Vicente-Chandler, J., et al.	1959	18.00	-67.00	+			4880	2318				Pasture	Panicum maximum	
461	USA	Vicente-Chandler, J., et al.	1959	18.00	-67.00	+			4060	1929				Pasture	Panicum purpurascens	
173	USA	Vicente-Chandler, J., et al.	1959	18.00	-66.50	*			8590	4080				Pasture	Pennisetum purpureum	
459	USA	Vicente-Chandler, J., et al.	1959	18.00	-67.00	+			8470	4023				Pasture	Pennisetum purpureum	
462	USA	Vicente-Chandler, J., et al.	1964	18.00	-67.00	+			3340	1587				Pasture	Digitaria decumbens	

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks	
1060	Czechoslovakia	Vyskot, M.	1976	48.80	16.77	?	1788	.	.	1699	.	9	524	.	Quercus; Fraxinus; Tilia; Ulmus		
218	USA	Waits *	1976	35.00	-76.00	+	.	.	1189	565	.	.	.	Wetland / salt-marsh	Angiosperm		
1025	Sweden	Wallentinus, H.G.	1973	59.20	17.50	+	430	.	.	409	.	5.9	557	Grassland / seashore meadow	Juncus gerardii	Heavy clay	
158	Canada	Warren, et al.	1957	75.00	-95.00	+	.	.	3	1	.	.	.	Tundra / arctic tundra	Salix arctica		
463	El Salvador	Watkins, J.M., Lewy Van Severen, M.	1951	13.83	-89.00	*	3150	.	.	2993	.	.	.	Pasture	Hyparrhenia rufa		
464	El Salvador	Watkins, J.M., Lewy Van Severen, M.	1951	13.83	-89.00	*	2990	.	.	2841	.	.	.	Pasture	Panicum maximum		
472	El Salvador	Watkins, J.M., Lewy Van Severen, M.	1951	13.83	-89.00	*	8530	.	.	8104	.	.	.	Pasture	Pennisetum purpureum		
366	USA	Weber, C.R., et al.	1966	42.00	-93.58	+	.	.	1040	494	.	.	.	Crops	Glycine max		
256	Canada	Wein, R. W., et al.	1974	64.75	-138.35	?	169	.	.	161	.	.	.	.	.	.	
257	USA	Wein, R. W., et al.	1974	65.43	-145.50	?	110	.	.	105	.	.	.	Tundra	.		
410	USA	Wein, R. W., et al.	1974	65.19	-149.70	+	84	.	.	80	.	.	.	Tundra	Eriophorum; Ledum; Vaccinium; Carex; Empetrum; Betula nana; Rubus; Andromeda		
411	USA	Wein, R. W., et al.	1974	65.43	-145.50	?	72	.	.	68	.	.	.	Tundra	Eriophorum; Ledum; Vaccinium; Carex; Empetrum; Betula nana; Rubus; Andromeda		
412	USA	Wein, R. W., et al.	1974	69.37	-151.92	?	57	.	.	54	.	.	.	Tundra	Eriophorum; Ledum; Vaccinium; Carex; Empetrum; Betula nana; Rubus; Andromeda		
114	USA	Wells et al. *	1975	35.92	-79.00	+	970	190	1160	551	.	15.6	1150	Plantation	Pinus taeda		
534	Zimbabwe	West	1970	-20.50	28.50	*	145	.	.	138	?	.	650	.	.		
252	USA	Westman, Whittaker *	1975	39.33	-123.83	?	307	96	402	191	.	.	.	Forest	.		

Table A (continued)

Table 1 (continued)																	
NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks	
197	USA	White et al. *	1978	31.00	-92.50	*	.	.	1649	783	.	.	.	Wetland / salt marsh	<i>Distichlis spicata</i> ; <i>Spartina patens</i> ; <i>S. alterniflora</i> ; <i>Juncus roemerianus</i>	Podsolc Harplothod	
193	USA	Whittaker et al. *	1974	44.00	-71.50	+	986	52	1038	493	.	.	1250	Forest	Acer; Betula; Fagus		
2078	USA	Whittaker, R.H.	1966	35.70	-83.45	?	983	.	.	934	.	.	.	.	.		
2081	USA	Whittaker, R.H.	1966	35.75	-83.37	?	498	.	.	473	.	.	.	.	Pinus		
2082	USA	Whittaker, R.H.	1966	35.75	-83.50	?	539	.	.	512	.	.	.	.	Quercus		
2099	USA	Whittaker, R.H.	1966	35.70	-83.45	?	566	.	.	538	.	.	.	Forest	Abies		
2100	USA	Whittaker, R.H.	1966	35.70	-83.45	?	653	.	.	620	.	.	.	Forest	Abies		
2085	USA	Whittaker, R.H.	1966	35.70	-83.45	?	812	.	.	771	.	.	.	Forest	Abies; Rhododendron		
2086	USA	Whittaker, R.H.	1966	.	.	.	1221	.	.	1160	.	.	.	Forest	Acer		
2091	USA	Whittaker, R.H.	1966	35.75	-83.37	?	1097	.	.	1042	.	.	.	Forest	Aesculus; Tilia		
2094	USA	Whittaker, R.H.	1966	35.67	-83.42	?	906	.	.	861	.	.	.	Forest	Fagus		
2093	USA	Whittaker, R.H.	1966	35.67	-83.42	?	668	.	.	635	.	.	.	Forest	Fagus		
2083	USA	Whittaker, R.H.	1966	35.83	-83.17	?	1333	.	.	1266	.	.	.	Forest	Fagus; Tsuga		
2090	USA	Whittaker, R.H.	1966	35.75	-83.37	?	2408	.	.	2288	.	.	.	Forest	Liriodendron		
2097	USA	Whittaker, R.H.	1966	35.67	-83.50	?	1024	.	.	973	.	.	.	Forest	Picea; Abies		
2098	USA	Whittaker, R.H.	1966	35.67	-83.50	?	1173	.	.	1114	.	.	.	Forest	Picea; Abies		
2080	USA	Whittaker, R.H.	1966	35.80	-83.42	?	991	.	.	941	.	.	.	Forest	Pinus		
2079	USA	Whittaker, R.H.	1966	35.67	-83.85	?	875	.	.	831	.	.	.	Forest	Pinus		
2095	USA	Whittaker, R.H.	1966	35.67	-83.85	?	828	.	.	787	.	.	.	Forest	Quercus		
2096	USA	Whittaker, R.H.	1966	35.67	-83.85	?	568	.	.	540	.	.	.	Forest	Quercus		
2089	USA	Whittaker, R.H.	1966	35.75	-83.37	?	1465	.	.	1392	.	.	.	Forest	Quercus; Acer		
2088	USA	Whittaker, R.H.	1966	36.00	-84.33	?	1203	.	.	1143	.	.	.	Forest	Quercus; Carya		
2087	USA	Whittaker, R.H.	1966	35.75	-83.50	?	1911	.	.	1815	.	.	.	Forest	Quercus; Liriodendron		
2092	USA	Whittaker, R.H.	1966	.	.	.	1183	.	.	1124	.	.	.	Forest	Tsuga		

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
2084	USA	Whittaker, R.H.	1966	35.75	-83.37	?	1022	.	.	971	.	.	.	Forest	Tsuga; Rhododendron	
175	USA	Whittaker, Woodwell *	1969	40.50	-74.00	*	.	.	1350	641	.	.	.	Forest		
194	USA	Whittaker, Woodwell *	1969	35.83	-84.00	*	.	.	1378	655	.	.	.	Forest		
195	USA	Whittaker, Woodwell *	1969	35.83	-84.00	*	.	.	1248	593	.	.	.	Forest		
403	USA	Wiegert, R.G., et al.	1964	42.63	-83.83	*	313	144	457	217	.	.	.	Grassland	Aristida purpurascens; Poa compressa	Gray-brown podsollic sandy loam (upland)
403a	USA	Wiegert, R.G., et al.	1964	42.63	-83.83	*	1004	358	1362	647	.	.	.	Grassland	Poa pratensis; Asclepias syriaca; Setaria glauca; Rumex acetosella	Gray-brown podsollic sandy loam plus silt (swale)
68	USA	Wiegert, R.G., et al.	1975	33.20	-81.80	+	1007	.	.	957	.	.	.	Pasture	Lespedeza cuneata	Sandy loam
1026	Norway	Wielgolaski, F.E.	1972	60.33	7.50	?	289	245	534	254	.	.	.	Wetland / dry meadow		
1027	Norway	Wielgolaski, F.E.	1972	60.33	7.50	?	.	.	833	396	.	.	.	Wetland / wet meadow	Carex nigra	
1017	Norway	Wielgolaski, F.E.	1972	60.30	7.68	?	425	410	835	397	.	.	.	Wetland / wet meadow	Salix lapponum; Salix herbacea; Carex nigra;	
1020	Norway	Wielgolaski, F.E.	1978	60.33	7.68	?	.	.	350	166	.	2.5	900	Wetland / alpine tundra		Undergr. Granite; gneiss
213	USA	Wight, J., et al.	1972	47.72	-104.15	?	443	.	.	421	.	.	.	Pasture		
214	USA	Wight, J., et al.	1972	47.72	-104.15	?	134	.	.	127	.	.	.	Pasture		
960	New Zealand	Will, G.M.	1964	-37.63	177.00	*	1636	.	.	1554	.	.	.		Pinus radiata	
929	New Zealand	Will, G.M.	1964	-39.00	176.00	+	2000	350	2350	1116	.	.	.	Forest	Pinus radiata	
2237	New Zealand	Will, G.M.	1966	-38.40	176.60	+	3319	304	3623	1721	.	.	.		Pinus radiata	Pumice soils
219	USA	Williams, R.B., et al.	1969	35.00	-76.00	+	.	.	650	309	.	.	.	Wetland / salt-marsh	Angiosperm	
1022	UK	Williamson, P.	1976	51.00	-0.90	+	691	.	.	656	.	.	.	Grassland	Festuca rubra	Humic soil over chalk; pH 7.8-8.0
11	USA	Wise, E.S.	1970	37.50	-79.50	*	498	.	.	473	.	.	.	Wetland / salt-marsh	Spartina alterniflora	

Table A (continued)

NPP ID	Country	Author	Year	Latitude	Longitude	LL flag	ANPP max	BNPP max	TNPP max	NPP_C	NPP flag	Temp (°C)	Precip (mm)	Vegetation type	Species (mostly in order of importance)	Soil remarks
465	Cuba	Wollner, H., et al.	1968	23.00	-82.50	*	.	.	3940	1872	F	.	.	Pasture	<i>Digitaria decumbens</i>	
28	USA	Woodwell, Whittaker *	1967	40.83	-72.90	+	.	.	1260	599		9.8	1240	Forest	<i>Quercus alba</i> ; <i>Q. coccinea</i> ; <i>Pinus rigida</i>	Sandy podsol
367	USA	Worker, G.F., et al.	1968	32.67	-115.67	?	.	.	4660	2214		.	.	Crops	<i>Sorghum bicolor</i> X <i>S. sudanensis</i>	
368	USA	Young, O.R., et al.	1963	20.83	-156.60	*	.	.	3070	1458		.	.	Crops	<i>Beta vulgaris</i>	
74	USA	Zavitkovski, J., et al.	1972	42.00	-125.00	+	.	.	2600	1235		.	.		<i>Alnus rubra</i>	
2473	USA	Zavitkovski, J., et al.	1981	46.33	-1.00	*	440	.	.	418		.	.		<i>Pinus banksiana</i>	
2474	USA	Zavitkovski, J., et al.	1981	45.33	-1.00	*	520	.	.	494		.	.		<i>Pinus banksiana</i>	
2475	USA	Zavitkovski, J., et al.	1981	47.67	-1.00	*	330	.	.	314		.	.		<i>Pinus banksiana</i>	
441	Mexico	Zedler, J., et al.	1978	32.58	-117.17	?	.	.	630	299		.	.	Wetland / salt-marsh	Mixed succulents	
435	USA	Zedler, J., et al.	1978	32.58	-117.17	*	.	.	920	437		.	.	Wetland / salt-marsh	<i>Spartina foliosa</i>	
428	USA	*	1975	40.50	-124.25	?	265	.	.	252		.	.		<i>Cupressus pygmaea</i> ; <i>Pinus contorta</i>	
429	USA	*	1975	40.50	-124.25	?	1020	.	.	969		.	.		<i>Pinus muricata</i>	
430	USA	*	1975	40.50	-124.25	?	1335	.	.	1268		.	.		<i>Sequoia sempervirens</i>	

REFERENCES TO APPENDIX

The following bibliography contains 858 original literature reference sources of data on net primary productivity (NPP). Literature that is not directly cross-referenced to NPP records in Table A is marked with an asterisk (*). Most database, spreadsheet, or word-processor programs should enable users of the electronic version of this report to separate these more than 500 asterisked references from the rest.

*Abee, A.; Lavender, D. 1972. Nutrient cycling in throughfall and litterfall in 450-year-old Douglas-fir stands. *Research on Coniferous Forest Ecosystems*, Portland Oregon, pp. 133-143.

*Abouguendia, Z.M.; Whitman, W.C. 1979. Disappearance of dead plant material in a mixed grass prairie. *Oecologia* 42, 23-30.

Adegbola, A.R.; Mckell, C.M. 1966. Regrowth potential of coastal Bermuda grass as related to previous nitrogen fertilisation. *Agronomy Journal* 58, 145-146.

Adeniyi, S.A.; Wilson, P.N. 1960. Studies on Pangola grass at ICTA, Trinidad. *Tropical Agriculture, Trinidad* 37, 271-282.

Afanas' Yeva, Y.A. 1947. Origin, composition and properties of chernozems. In: Rodin, L.E.; Bazilevich, N.J. (eds.), 1969, *Trudy Pochvovedenie Inst. Akad. Nauk SSR*, No. 25.

*Agarwae, S.K. 1972. Observations on the dry matter production by deciduous trees in Rajasthan. In: Golley, P.M.; Golley, F.B. (eds.), 1972, *Papers from a Symposium on Tropical Ecology with an Emphasis on Organic Productivity. Tectona grandis Linn. f.*, Athens, pp. 185-104.

*Alban, D.H.; Perala, D.A.; Schlaegel, B.E. 1978. Biomass and nutrient distribution in aspen, pine, and spruce stands on the same soil type in Minnesota. *Canadian Journal of Botany* 8, 290-299.

*Alberda, T. 1968. Dry matter production and light interception of crop surfaces. *Netherlands Journal of Agricultural Science* 16, 142-153.

*Alberda, B. 1981. Descomposicion de hojas en un pinar altoaragones. *Anales de Edafologia y Agrobiologia (Madrid)* 40, 37-46.

*Aleksandrova, V.D. 1958. An attempt to measure the overground and underground productivity of plant communities in the arctic tundra. *Botaniceskii Zhurnal (Leningrad)* 43, 1748-1762.

*Aleksandrova, V.D. 1970. The vegetation of the tundra zones in the USSR and data about its productivity. In: Fuller, W.A.; Kevan, P.G., (eds.), 1970, *Proceedings of the Conference on Productivity and Conservation in Northern Circumpolar Lands*, Edmonton, 1969, IUCN Publ. New Series No. 16 (Morges, Switzerland), pp. 93-114.

*Aleksandrova, V.D. 1970. Vegetation and primary productivity in the Soviet Subarctic. In: Fuller, W.A.; Kevan, P.G., (eds.), 1970, Proceedings of the Conference on Productivity and Conservation in Northern Circumpolar Lands, Edmonton, 1969, IUCN Publ. New Series No. 16 (Morges, Switzerland), pp. 93-114.

Alvera, B. 1973. Estudios en bosques de coniferas del Pirineo Central. Pirineos (Zaragoza) 109, 17-29; In: Lieth, H.F.H. (ed.), 1978, Patterns of Primary Production in the Biosphere, Benchmark Papers in Ecology 8, Dowden, Hutchinson and Ross, Stroudsburg, Pennsylvania, p.219, In: Reichle, D.E. (ed.), 1981, Dynamic Properties of Forest Ecosystems, IBP 23. Cambridge University Press, p. 615.

*Alway, F.J.; Zon, R. 1930. Quantity and nutrient contents of pine leaf litter. Journal of Forestry 28, 715-727.

*Alway, F.J.; Methly, W.J.; Younge, O.R. 1933. Distribution of volatile matter, lime and nitrogen among litter, duff and leaf mold under different forest types. Soil Science 36, 399-407.

Ambasht, R.S.; Maurya, A.N.; Singh, U.N. 1971. Primary production and turnover in grasslands of Varanasi. In: Golley, P.M.; Golley, F.B. (eds.), 1972, Papers from a Symposium on Tropical Ecology with an Emphasis on Organic Productivity. Athens, p. 418.

*Ambroes, P. 1969. La biomasse aerienne de la strate arborescente. Bulletin de la Societe Royale de Botanique de Belgique (Brussels) 102, 325-338.

*Andersson, S.O.; Enander, J. 1948. Ueber die Produktion von Blattabfall und dessen Zusammensetzung in einem mittelschwedischen Espenstand. Svenska Skogsvardsfoereningens Tidskrift (Stockholm) 4, 265-270.

Andersson, F. 1970. Plant biomass, primary production and turnover of organic matter. Botaniska Notiser (Lund) 123, 8-51.

Andersson, F. 1973. IBP-studies on plant productivity of south Swedish forest ecosystems. In: Reichle, D.E. et al. (eds.), 1973, Modeling Forest Ecosystems, Report EDFB-IBP-73-7, Oak Ridge National Laboratory, Tennessee, USA, pp. 11-26.

*Anderson, J.M. 1973. Stand structure and litter fall of a coppiced *Fagus sylvatica* and sweet chestnut *Castanea sativa* woodland. Oikos 24, 128-135.

Ando, T. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, Dynamic Properties of Forest Ecosystems, IBP 23. Cambridge University Press. pp. 604-605.

*Andreev, V.N. 1966. Peculiarities of zonal distribution of the aerial and underground phytomass on the east European Far North. Botaniceskii Zhurnal (Leningrad) 51, 1410-1411.

- Andreev, V.N.; Galaktinova, T.F.; Zakharova, V.J.; Neustrueva, J.J. 1972. Methods of estimation of seasonal changes in above-ground phytomass of herbs. In: Wielgolaski, F.E.; Rosswall, T. (eds.), 1972, Proceedings IV Intl. Meeting on the Biological Productivity of Tundra, Leningrad, Oct. 1971. Tundra Biome Steering Committee, Stockholm, pp. 102-110.
- *Anonymous. 1967. Forest statistics. In: Seth, Kaul, Sharma, (eds.), 1972, Central Forestry Comm. Govt. of India. Bull. No. 4, p. 273.
- *Armentano, T.V.; Woodwell, G.M. 1976. The production and standing crop of litter and humus in a forest exposed to chronic gamma irradiation for twelve years. *Ecology* 57, 360-366.
- *Asada, S.; Akai, T. 1963. On the treatments of forest in subalpine zone. Nagano - Rinya 38/7, 2-49.
- Ashley, D.A.; Bennett, O.L.; Doss, B.D.; Scarsbrook, C.E. 1965. Effect of nitrogen rate and irrigation on yield and residual nitrogen recovery by warm season grasses. *Agronomy Journal* 57, 370-373.
- *Ashton, D.H. 1976. Phosphorus in forest ecosystems at Beenak, Victoria. *Journal of Ecology* 64, 171-186.
- *Assmann, et al. 1967. Research personnel, group leaders Solling, spruce forest. In: Heller, H.; (ed.), 1971, Studies on Primary Production of Spruce Forest in IBP -Areas in Germany (FRG), Rosswall, T. (ed.), 1971, Systems Analysis in Northern Coniferous Forests - IBP Workshop. Swedish Natural Science Research Council, Stockholm; Bulletin from the Ecological Research Committee 14, p. 40.
- Attiwill, P.M.; Guthrie, H.B.; Leuming, R. 1978. Nutrient cycling in a *Eucalyptus obliqua* (l'Herit) forest. I. Litter production and nutrient return. *Australian Journal of Botany* 26, 79-92.
- Attiwill, P.M. 1979. Nutrient cycling in a *Eucalyptus obliqua* forest. *Australian Journal of Botany* 27, 439-458.
- *Auclair, A.N.D.; Bouchard, A.; Pajaczkowski, J. 1976. Plant standing crop and productivity relations in a *Scirpus-Equisetum* wetland. *Ecology* 57, 941-952.
- *Aussenac, G. 1969. Production de litiere dans divers peuplements forestiers de l'est de la France. *Oecologia Plantarum* 2, 225-236.
- *Auten, J.T. 1941. Black locust, pines and sassafras as builders of forest soil. In: Bray, R.; Gorham, E. (eds.), 1964, Litter production in forests of the world. Tech. Notes Cent. St. For. Exp. Sta. 32, 9 pp.
- Baier, J.D.; Bazzaz, F.A.; Bliss, L.C.; Boggess, W.R. 1972. Primary production and soil relations in an Illinois sand prairie. *American Midland Naturalist* 88, 200-208.

Balph, D.F.; Shinn, R.S.; Anderson, R.D.; Cist, C. 1974. Curlew Valley validation site. In: Desert Biome Ecosystem Analysis Studies (IBP), Report of 1973 Progress, Ecology Center, pp. 1-61.

Bandhu, D. 1970. A study of the productive structure of northern tropical dry deciduous forest near Varanasi. *Tropical Ecology* 11.

Barclay-Estrup, P. 1970. The description and interpretation of cyclical processes in a heath community. *Journal of Ecology* 58, 243-249.

*Bares, R.H.; Wali, M.K. 1979. Chemical relations and litter production of *Picea marina* and *Larix laricina* stands on an alkaline peatland in northern Minnesota. *Vegetatio* 40, 79-94.

Barnard, J.L. 1962. Benthic marine exploration of Bahia de San Quintin, Baja California. *Pac. Nat.* 3, 251-274.

Bartholomew, W.V.; Meyer, J.; Laudelot, H. 1953. Mineral nutrient immobilization under forest and grass fallow in the Yangambi (Belgian Congo) region. In: Bray, R.; Gorham, E.; (eds.), 1964, *Litter Production in Forests of the World*. Publ. INEAC Ser. Sci. 57, p. 27.

*Bartos, D.L.; Debyle, N.V. 1981. Quantity, decomposition, and nutrient dynamics of aspen litterfall in Utah, USA. *Forest Science* 27, 381-390.

*Baskerville, G.L. 1965. Dry matter production in immature balsam fir stands. *Forest Science Monograph* 9, 1-41.

*Baskerville, G.L. 1966. Dry matter production in immature balsam fir stands: Roots, lesser vegetation and total stand. *Forest Science* 12, 49-53.

Baumann, P.C.; Kitchell, J.F.; Magnuson, J.J. Kayes, T.B. 1974. Lake-Wingra, 1837-1973. A case history of human impact. *Transactions of the Wisconsin Academy of Science, Arts and Letters* 62, 57-94.

Baumgartner, A. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, *Dynamic Properties of Forest Ecosystems*, IBP 23. Cambridge University Press, p. 665.

*Bazilevich, N.I.; Rodin, L.E. 1956. The role of vegetation in the formation and evolution of the takyr soils of the Meshed-messeri alluvial deltaic plain. In: Rodin, L.E.; Bazilevich, N.I. (eds.), 1968, *Production and Mineral Cycling in Terrestrial Vegetation*, Oliver and Boyd, Edinburgh, pp.45-113 In: *West Turkmenian takyrs and their agricultural utilization*. Moscow, 1956.

Bazilevich, N.I.; Rodin, L.E. 1966. The biological cycle of nitrogen and ash elements in plant communities of the tropical and sub-tropical zones. In: Golley, P.M.; Golley, F.B. (eds.), 1972, *Papers from a Symposium on Tropical Ecology with an Emphasis on Organic Productivity*. Athens, pp. 229-293. For. Abst. Leading Serv. 38.

Bazilevich, N.I.; Rodin, L.E.; Gorina, A.J. 1972. Productivity and biogeochemistry of succulent communities on Solonchaks. USSR Academy of science, Leningrad Publishing, House Nauka, pp. 203-207.

*Bazzaz, F.A.; Bliss, L.C. 1971. Net primary production of herbs in a central Illinois deciduous forest. Bulletin of the Torrey Botanical Club 98, 90-94.

*Beatley, J.C. 1969. Biomass of desert winter annual plant populations in southern Nevada. Oikos 20, 261-273.

*Begg, J.E. 1965. High photosynthetic efficiency in a low-latitude environment. Nature 205, 1025-1026.

Bellamy, D.J.; Holland, J.P. 1966. Determination of the net annual aerial production of *Calluna vulgaris* (L.), Hull, in northern England. Oikos 17, 272-275.

*Bella, I.E.; De Franceschi, J.P. 1980. Biomass productivity of young aspen stands in western Canada. Northern Forest Research Center, Edmonton, NOR-X-219.

Berger, A.; Corre, J.J.; Heim, G. 1978. Structure, productivity and water regime of an halophytic plant community in the Mediterranean area. La Terre et la Vie 32, 241-278.

Bernard, J.M.; Bernard, F.A. 1973. Winter biomass in *Typha glauca* Godr. and *Sparganium eurycarpum* Engelm. Bulletin of the Torrey Botanical Club 100, 125-131.

Bernard, J.M.; Macdonald Jr., J.G. 1974. Primary production and life history of *Carex lacustris*. In: Van Der Valk, A.G.; Davis, C.B. (eds.), Primary production of prairie glacial marshes; Canadian Journal of Botany 52, 117-122.

Bernard, J.M. 1974. Seasonal changes in standing crop and primary production in a sedge wetland and an adjacent dry old-field in central Minnesota. Ecology 55, 350-359.

*Bernard, J.M. et al. 1978. Life history aspects of primary production in sedge wetlands. In: Good, R.E.; Whigham, D.F.; Simpson, R.L. (eds.), 1978, Freshwater Wetlands: Ecological Processes and Management Potential, Academic Press, New York, p. 48.

Bernhard, F. 1970. Etude de la litiere et de sa contribution au cycle des elements mineraux en forest ambrophile de Cote d'Ivoire. Oecologia Plantarum, 5, 247-266.

*Bernhard-Reversat, F. 1972. Decomposition de la litiere de feuilles en forest ambrophile de basse Cote- d'Ivoire. Oecologia Plantarum 7, 279-300.

*Bernhard-Reversat, F.; Huttel, L.; Lemee, G. 1972. Some aspects of the seasonal ecologic periodicity and plant activity in an evergreen rain forest of the Ivory Coast. In: Golley, P.M.; Golley, F.B. (eds.), 1972, Papers from a Symposium on Tropical Ecology with an Emphasis on Organic Productivity. Athens, pp. 217-234.

*Bernhard-Reversat, F.; Huttel, C.; Lemee, G. 1975. Recherches sur l'écosystème de la forêt sub-équatoriale de Basse Côte d'Ivoire. In: Lieth, H.F.H. (ed.), 1978, Patterns of Primary Production in the Biosphere, Benchmark Papers in Ecology 8, Dowden, Hutchinson and Ross, Stroudsburg, Pennsylvania, p. 342.

Bernhard, J.M.; Hankinson, G.K. 1979. Seasonal changes in standig crop, primary production and nutrient levels in a *Carex rostrata* wetland. *Oikos* 32, 328-336.

*Bille, J.C. 1973. Recherches ecologiques sur une savanne sahélienne du Senegal septentrional: description de l'écosystème, biomasse végétale et production primaire. *Annales de l'Université d'Abidjan, Serie E, Tome VI*, 2.

*Bille, J.C. 1974. Recherches ecologiques sur une savanne sahélienne du ferlo septentrional, Senegal 1972, année sèche au Sahel. *La Terre et la Vie* 28, 5-20.

Bindiu, C. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, Dynamic Properties of Forest Ecosystems, IBP 23. Cambridge University Press, p. 614.

*Birk, E.M. 1979. Disappearance of overstory and understory litter in an open eucalypt forest. *Australian Journal of Ecology* 4, 207-222.

*Birk, E.M. 1979. Overstory and understory litter fall in a eucalypt forest: Spatial and temporal variability. *Australian Journal of Botany* 27, 145-156.

*Biskupsky, V.; Oszlanyi, J. 1975. The biomass of the timber component at the research site of Baeb. In: Biskupsky, V.; Research project BAB IBP progress report II. Bratislava, Publ. House of the Slovak Academy of Sciences 45, pp. 81-84.

*Bjerregaard, R.S. 1971. The nitrogen budget of two salt desert shrub communities of western Utah. In: Cooper, J.P.(ed.), 1975, Photosynthesis and Productivity in Different Environments. IBP 3. Cambridge University Press, p. 124.

Blackman, G.E.; Black, J.N. 1959. Physiological and ecological studies in the analysis of plant environment. 12. The role of the light factor in limiting growth. *Bot.* 23, 131-145.

*Blackman, G.E. 1965. The application of the concepts of growth analysis to the assessment of productivity. UNESCO Avs, Nr. 137, Copenhagen Symposium, Paper Nr. 15., Paris, pp. 243-259 (manuscript).

*Blair Rains, A.; McKay, A.D. 1968. The northern state lands, Botswana. In: Rutherford, M.C., Primary production ecology in southern Africa, In: Werger, M.J.A. (ed.), 1978, Biogeography and Ecology of Southern Africa, Dr.W.Junk Publ., The Hague, p. 632.

*Blasco, F.; Tassy. 1975. Etude d'un écosystème forestier montagnard du sud de l'Inde. *Bulletin of Ecological Research* 6, 525-539.

- Bliss, L.C. 1956. A comparison of plant development in microenvironments of arctic and alpine tundras. In: Rodin, L.E.; Bazilevich, N.I. (eds.), 1968, Production and Mineral Cycling in Terrestrial Vegetation, Oliver and Boyd, Edinburgh, Ecological Monographs 26, 303-337.
- Bliss, L.C. 1966. Plant productivity in alpine microenvironments on Mt. Washington, New Hampshire. Ecological Monographs 36, 125-155.
- *Bliss, L.C. 1970. Primary production within arctic tundra ecosystems, paper No. 7. Int. Union for Conservation of Nature and Nat. Resources, Morges, Switzerland: 126.
- *Bliss, L.C. 1972. Devon Island research 1971. In: Wielgolaski, F.E.; Rosswall, T. (eds.), 1972, Proc. IV Intl. Meeting on the Biological Productivity of Tundra, Leningrad, Oct. 1971. Tundra Biome Steering Committee, Stockholm, pp. 1-12.
- *Bliss, L.C. 1972. Net primary production of tundra ecosystems. In: Lieth, H.F.H. (ed.), Die Stoffproduktion der Pflanzendecke, Stuttgart 155, pp. 35-46.
- Bliss, L.C.; Wein, R.W. 1972. Plant community responses to disturbances in the western Canadian Arctic. Canadian Journal of Botany 50, 1097-1109.
- *Bliss, L.C.; Courtin, G.M.; Pattie, D.L.; Riewe, R.R.; Whitfield, D.W.A.; Widden, P. 1973. Arctic Tundra Ecosystems. Annual Review of Ecology and Systematics 4, 359-399.
- Bliss, L.C. 1975. Structure and function of tundra ecosystems. In: Rosswall, T.; Heal, O.W. (eds.), 1975, Structure and Function of Tundra Ecosystems, Ecological Bulletins No. 20, Swedish Natural Science Research Council, Stockholm, p. 46.
- *Blow, F.E. 1955. Quantity and hydrologic characteristics of litter under upland oak forests in eastern Tennessee. Journal of Forestry 53, 190-195.
- Blydenstein, J. 1962. Cambios en la vegetacion despues de proteccion contra el fuego Parte 1. Boletin de la Sociedad Venezolano de Ciencias Naturales 23, 233-244.
- Blydenstein, J. 1962. La sabana de Trachypogon del alto Llano. Boletin de la Sociedad Venezolano de Ciencias Naturales 23, 139-206.
- Bobritskaya, M.A. 1958. Ash composition of oak leaves of various ages in the forest zones of the Kamennaya Steppe. In: Rodin, L.E.; Bazilevich, N.I. (eds.), 1968, Production and Mineral Cycling in Terrestrial Vegetation, Oliver and Boyd, Edinburgh, 288 pp., Pochvovedenie (Moscow) 7, p. 168.
- *Boehmerle, K. 1906. Die Streuversuche im grossen Foehrenwalde. In: Bray, R.; Gorham, E. (eds.), 1964, Litter Production in Forests of the World. Cragg, London, New York, Academic Press 2, p. 22.
- *Bornebusch, C.H. 1937. Iagttagelser over rodgraneus nuulefald. Forstlige Forsoegsvaesen (Denmark) 14, 173-176.

- Botkin, D.B.; Malone, C.R. 1968. Efficiency of net primary production based on light intercepted during the growing season. *Ecology* 49, 439-444.
- *Botkin, D.B.; Woodwell, G.M.; Tempel, N. 1970. Forest productivity estimated from carbon dioxide uptake. *Ecology* 51, 1057-1060.
- Bourliere, F.; Hadley, M. 1970. Ecosystem structure and function, 3. The ecology of tropical savannas. In: Farnworth, E.G.; Golley, F.B. (eds.), 1974, *Fragile Ecosystems*. Springer-Verlag, New York. P. 258.
- Bourliere, F.; Hadley, M. 1970. The ecology of tropical savannas. *Annual Review of Ecology and Systematics* 1, 125-152.
- *Boyd, C.E.; Walley, W.W. 1972. Production and chemical composition of *Saururus cernuus* L. at sites of different fertility. *Ecology* 53, 927-932.
- *Boysen-Jensen, P. 1930. Undersogelser over Stoffproduktion i yugre Bevoksninger af Ask og Boeg II. *Forstlige Forsoegsvaesen (Denmark)* 10, 365-391.
- Boysen-Jensen, cited by Kira et al. 1967. Primary production and turnover of organic matter in different forest ecosystems of the western Pacific. *Japanese Journal of Ecology* 17, 70-87.
- *Bradbury, I.K.; Hofstra, G. 1976. Vegetation death and its importance in primary production measurements. *Ecology* 57, 209-211.
- *Brasell, H.M.; Unwin, G.L.; Stoecker, G.C. 1980. The quantity, temporal distribution and mineral-element content of litterfall in two forest types at two sites in tropical Australia. *Journal of Ecology* 68, 123-139.
- Braun, H.M.H. 1973. Primary production in the Serengeti: Purpose methods and some results of research. *Annales de l'Universite d'Abidjan, Toulouse* 6, 171-188.
- Bray, J.R.; Lawrence, D.; Pearson, L.C. 1959. Primary production in some Minnesota terrestrial communities for 1957. *Oikos* 10, 38-49.
- *Bray, J.R. 1963. Root production and the estimation of net productivity. *Canadian Journal of Botany* 41, 65-72.
- Bray, J.R.; Dudkiewicz, L.A. 1963. The composition, biomass and productivity of two *Populus* forests. *Bulletin of the Torrey Botanical Club* 90, 298-308.
- *Bray, J.R.; Gorham, E. 1964. Litter production in forests of the world. *Advances in Ecological Research* 2, 101-157.
- *Brehm, R.W.; Hulbert, L.C. 1980. Decomposition of litter in Kansas, USA, Bluestem Prairie. *Transactions of the Kansas Academy of Science* 83, 33-35.
- *Brinson, M.M. 1977. Decomposition and nutrient exchange of litter in an alluvial swamp forest. *Ecology* 58, 601-609.

*Brinson, M.M.; Bradshaw, H.; Holmes, R.N.; Elckins, J.B. 1980. Litterfall, stemflow, and throughfall nutrient fluxes in an alluvial swamp forest. *Ecology* 61, 827-835.

*Britton, C.M.; Dodd, J.D.; Weichert, A.T. 1976. Energy values of plant species and litter of an *Andropogon-Paspalum* grassland. *Journal of Biogeography* 3, 389-395.

*Broadfoot, W.M.; Pierre, W.H. 1939. Forest Soil studies: 1. Relation of rate of decomposition of tree leaves to their acid-base balance and other chemical properties. *Soil Science* 48, 329-348.

Brougham, R.W. 1959. The effects of season and weather on the growth rate of a ryegrass and clover pasture. *New Zealand Journal of Agricultural Research* 2, 283-296.

*Brown, J.; West, G.C. 1970. The structure and function of cold-dominated ecosystems. In: Bliss, L.C.; 1972, *Tundra Biome Research in Alaska*. U.S. IBP-Tundra Biome Report, pp. 70-71.

Bryan, W.W.; Sharpe, J.P. 1965. The effect of urea and cutting treatments on the production of Pangola grass in south-eastern Queensland. *Australian Journal of Experimental Agriculture and Animal Husbandry* 5, 433-441.

*Bulla, L.A.; Mida, R. 1978. A new method for the measurement of dead organic matter decomposition. *Bulletin de l'Academie Polonaise des Sciences, Serie des Sciences Biologiques* 26, 225-229.

*Bullock, J.A. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, *Dynamic Properties of Forest Ecosystems*, IBP 23. Cambridge University Press, p. 606.

*Bunce, R.G.H. 1968. Biomass and production of trees in a mixed deciduous woodland. *Journal of Ecology* 56, 759-775.

Bunt, J.S.; Boto, K.G.; Boto, G. 1979. A survey method for estimating potential levels of mangrove forest primary production. *Marine Biology* 52, 123-128.

*Burger, H. 1941. Holz, Blattmenge und Zuwachs. V. Fichten und Föhren verschiedener Herkunft auf verschiedenen Kulturarten. *Mitteilungen Schweiz. Centralanst. Forstl. Versuchsw.* 22, 10-62.

*Burger, H. 1945. Holz, Blattmenge und Zuwachs. VII. Die Laerche. *Mitteilungen Schweiz. Centralanst. Forstl. Versuchsw.* 24, 7-103.

*Burger, H. 1947. Holz, Blattmenge und Zuwachs. VIII. Die Eiche. *Mitteilungen Schweiz. Centralanst. Forstl. Versuchsw.* 25, 211-279.

*Burger, H. 1950. Holz, Blattmenge und Zuwachs. X. Die Buche. *Mitteilungen Schweiz. Centralanst. Forstl. Versuchsw.* 26, 419-468.

Burger, A.W.; Hittle, C.N. 1967. Yield, protein, nitrate, and prussic acid content of Sudangrass, Sudangrass hybrids, and pearl millets harvested at two cutting frequencies and two stubble heights. *Agronomy Journal* 59, 529-562.

*Burgess, R.L.; Kern, L.H. 1973. Progress report 1971-72, eastern deciduous forest biome. US-IBP EDFB-IBP-7, pp. 3-5.

Burgess, R.L.; O'Neill, R.V. (eds.). 1976. Photosynthate allocation and the significance of belowground progress in forest ecosystems. Progress report, Oak Ridge National Laboratory, Union Carbide Corporation for the ERDA, 871, p. 169.

*Burk, J.H.; Dick-Peddie, W.A. 1973. Comparative production of *Larrea Divaricata* Cav. on three geomorphic surfaces in southern New Mexico. *Ecology* 54, 1094-1102.

Burr, G.O.; Hartt, C.E.; Brodie, H.W.; Tanimoto, T.; Kortschak, H.P.; T Akashashi, D.; Ashton, F.M.; Coleman, R.E. 1957. The sugarcane plant. *Annual Review of Plant Physiology* 8, 275-308.

Burrows, W.H. 1972. Productivity of an arid zone shrub (*Eremophila gilesii*) community in south-western Queensland. *Australian Journal of Botany* 20, 317-329.

Burton, G.W.; Jackson, J.E.; Knox, F.E. 1959. The influence of light reduction upon the production, persistence and chemical composition of coastal Bermuda grass *Cynodon dactylon*. *Agronomy Journal* 51, 537-542.

Burton, G.W.; Jackson, J.E.; Hart, R.H. 1963. Effect of cutting frequency on yield in vitro digestibility, and protein, fibre and carotene content of coastal Bermuda grass. *Agronomy Journal* 55, 500-520.

Cabanettes, A.; Rapp, M. 1978. Biomass, mineral mass and productivity of an ecosystem with stone pine *Pinus pinea* of the mediterranean littoral. *Oecologia Plantarum* 13, 271-286.

*Cabanettes, A.; Rapp, M. 1981. Biomass, mineral mass and productivity of an ecosystem with stone pine *Pinus pinea* of the mediterranean littoral: 4. Production. *Oecologia Plantarum* 2, 381-394.

Cable, D.R. 1975. Influence of precipitation on perennial grass production in the semidesert southwest. *Ecology* 56, 981-986.

Cahoon, R.D. 1975. Net productivity of emergent vegetation at Horn Point salt marsh; In: Clark; Geeson (eds.), *Wetland Functions and Values: The State of Our Understanding*. Pro. Nat. Symp. on Wetlands, American Water Rec. Ass. Minneapolis, 1978.

Caldwell, M.M.; Camp, L.B. 1974. Belowground productivity of two cool desert communities. *Oecologia* 17, 123-130.

Caldwell, M.M.; De Puit, E.J.; Fernander, O.A.; Wiebe, H.H.; Camp, L.B.; Holthausen, R.S.; Neuber, H. 1975. Gas exchange, translocation, root growth and soil respiration of great basin plants. *Ecology* 3??, 57-102.

*Caldwell, M. 1975. Primary production of grazing lands. In: Cooper, J.P. (ed.), 1975, Photosynthesis and Productivity in Different Environments. IBP 3. Cambridge University Press, p. 715.

Cameron, G.N. 1972. Analysis of insect trophic diversity in two salt marsh communities. Ecology 53, 58-73.

*Carlisle, A.; Brown, A.F.; White, E.J. 1966. Litter fall, leaf production and the effects of defoliation by *Tortrix viridana* in a sessile oak (*Quercus petraea*) woodlands. Journal of Ecology 54, 65-85.

*Carlisle, A.; Brown, A.H.F. 1968. Biological flora of the British Isles, *Pinus sylvestris* L. Journal of Ecology 56, 269-307.

Caro-Costa, R.; Abruna, J.; Figarella, J. 1972. Effect of nitrogen rates, harvest interval and cutting heights on yield and composition of star grass in Puerto Rico. Journal of Agriculture of the University of Puerto Rico 56, 267-279.

*Carter, M.C.; White, E.H. 1971. Dry weight and nutrient accumulation in young stands of cottonwood, *Populus deltoides* Bartr. Auburn University, Auburn, Alabama, Agri. Expt. Sta. Cir. 190, 14.

Carter, M.R.; Bruns, L.A.; Cavinder, T.R.; Dugger, K.R.; Fore, P.L.; Hicks, D.B.; Revells, H.L.; Schmidt, T.W. 1973. Ecosystems analysis of the big cypress swamp and estuaries. US-EPA, region IV, south Florida ecological study: In: CONNER and DAY 1976, Productivity and Composition, p. 1362.

Cesar,; Lamotte,. 1972. Primary production of grazing lands. In: Cooper, J.P., 1975, Photosynthesis and Productivity in Different Environments. IBP 3. Cambridge University Press, p. 715.

*Chandler, R.F. 1941. The amount and mineral nutrient content of freshly fallen leaf litter in the hardwood forest of central New York. Journal of the American Society for Agronomy 33, 859-871.

*Chandler, R.F. 1944. Amount and nutrient content of freshly fallen needle litter of some northeastern conifers. Proceedings of the Soil Science Society of America 8, 409-411.

Chapman, S.B.; Hibble, J.; Rafael, C.R. 1975. Net aerial production by *Calluna vulgaris* on lowland heath in Britain. Journal of Ecology 69, 233-258.

*Chapman, V.J. 1977. Wet Coastal Ecosystems. Elsevier Scientific Publ. Company, Goodall, D.W., Elsevier, Amsterdam, Oxford, New York 29, p. 428.

Chaudhary, V.B. 1967. Seasonal changes in the standing crop, annual net production and energetics of *Dichantium annulatum* stands, Banaras Hindu University. In: Misra, R., 1972, Ph. D. Thesis, Banaras Hindu Univ., p. 287.

- *Chepurko, N.L.; Bazilevich, N.I.; Rodin, L.E.; Miroshnichenko, Y.M. 1972. Biogeochemistry and productivity of *Haloxylon amsudense* in South-Eastern Karakum Desert. International Symposium, USSR, June 7-19, 1972. Eco-Physiological Foundation of Ecosystems Productivity in Arid Zone. Publ. House "Nauka," USSR Academy of Science, Leningrad, pp. 198-203.
- *Chepurko, N.L. 1972. The biological productivity and the cycle of nitrogen and ash elements in the dwarf shrub tundra ecosystems of the Khibini mountains (Kola Peninsula). In: Wielgolaski, F.E.; Rosswall, T. (eds.), 1972, Proc. IV Intl. Meeting on the Biological Productivity of Tundra, Leningrad, Oct. 1971. Tundra Biome Steering Committee, Stockholm, pp. 236-247.
- Chew, R.M.; Chew, A.E. 1965. The primary productivity of a desert shrub. Ecological Monographs 35, 355-375.
- Choudhuri, G.N.; Varshney, S.P. 1979. A study on the aboveground biomass increment in *Pluchea lanceolata* in salty habitats. Comparative Physiology and Ecology (Jodhpur) 4, 232-234.
- Choudhuri, G.N.; Varshney, S.P. 1979. Productivity of the plant communities in salt affected areas of the Indo-Gangetic plains. Geo-Eco-Trop (Brussels) 3, 71-135.
- *Christensen, O. 1975. Wood litterfall in relation to abscission, environmental factors, and the decomposition cycle in a Danish oak forest. Oikos 26, 187-195.
- *Christensen, O. 1978. The dynamics of wood litter fall in a Danish oak forest. Nat. Jutlandica 20, 155-162.
- CIMMYT. 1971. Annual Report 1970-1. International Centre for Improvement of Maize and Wheat, Mexico. 115pp. In: Cooper, J.P. (ed.), 1975, Photosynthesis and Productivity in Different Environments. IBP 3. Cambridge University Press, p. 715.
- *Claudot, M. 1956. Influence de l'eucalyptus sur l'evolution des sols au Maroc. FAO, SCM/EU/7-B.
- *Coldwell, B.B.; Delong, W.A. 1950. Studies of the composition of deciduous forest tree leaves before and after partial decomposition. Scientific Agriculture (Ottawa) 30, 456-466.
- Coldea, G.; Plamada, E. 1978. Ecosystem processes in a stand of *Pinus mugo* Turra: I. Standing crop, dry matter production and litter fall. Flora 167, 249-256.
- *Cole, D.W.; Gessel, S.P.; Dice, S.F. 1967. Distribution and cycling of nitrogen, phosphorus, potassium and calcium in a second growth Douglas-fir ecosystem. College of Life Sci. and Agric., Ecol. Soc. of Amer., pp. 197-232.

*Cole, D.W.; Gessel, S.P. 1968. Productivity data for Thompson Research Center IBP site. Cedar River Research, Institute of Forest Products, College of Forest Resources, University of Washington, Contribution No. 4, 54 pp. In: Lieth, H.F.H. (ed.), 1978, Patterns of Primary Production in the Biosphere. Dowden, Hutchinson and Ross, Stroudsburg, Pennsylvania, p. 217.

*Collins, N.J. 1973. Productivity of selected bryophyte communities in the maritime Antarctic. In: Bliss, L.C.; Wielgolaski, F.E. (eds.), 1973, Primary Production and Production Processes, Tundra Biome, Tundra Biome Steering Committee/ Dept. of Botany, University of Alberta, Edmonton, Canada, pp. 177-183.

*Collins, N.M. 1977. Vegetation and litter production in southern Guinea Savanna, Nigeria. *Oecologia* 28, 163-175.

*Connor, W. 1968. Response of a coastal Queensland heath community to fertilizer application. *Australian Journal of Botany* 16, 117-123.

Conner, W.H.; Day, J.W. 1976. Productivity and composition of a baldcypress-water tupelo site and a bottomland hardwood site in a Louisiana Swamp. *American Journal of Botany* 63, 1354-1364.

*Cooper, J.P. 1969. Potential forage production. Occasional Symposium 5, British Grassland Society, 5-13 In: Cooper, J.P., Potential production and energy conversion in temperate and tropical grasses; Tab. 3.

*Cooper, J.P. 1970. Potential production and energy conversion in temperate and tropical grasses. *Herbage Abstracts* 40, 1-15.

Cooper, J.P. 1975. Photosynthesis and Productivity in Different Environments. In: Cooper, J.P. (ed.), 1975, Photosynthesis and Productivity in Different Environments. IBP 3. Cambridge University Press, p. 715.

Corley, R.H.; Gray, B.S.; Kee, N.S. 1971. Productivity of the oilpalm (*Elaeis guineensis* Jacq.) in Malaysia. *Experimental Agriculture* 7, 129-136.

Cornet, A. 1981. Measurement of the aerial herbaceous and net primary production of tree Grassland communities in the sahelian zone of Senegal. *Oecologia Plantarum* 2, 251-266.

*Costin, A.B. 1967. Alpine ecosystems of the Australasian region. In: Wright, H.E.; Osburn, W.H. (eds.), Arctic and Alpine Environments, Indiana University Press, pp. 55-87.

Coupland, R.T. 1973. Productivity of the Matador grasslands site. Proc. Canadian IBP/PP Synthesis Meeting, Guelph, Dec. 1972, in press.

*Cromack, Jr., K.; Monk, C.D. 1974. Litter production, decomposition, and nutrient cycling in a mixed hardwood watershed and a white pine watershed. In: Howell, F.G.; Gentry, J.B.; Smith, M.H. (eds.), 1975, Mineral Cycling in Southeastern Ecosystems. Proc. Symp. 740513, Tech. Inf. Center, US-ERDA, Oak Ridge, Tenn./ Springfield, Va., pp. 609-624.

- *Cromer, R.N.; Raupach, M.; Clarke, A.R.P.; Cameron, J.N. 1975. Eucalypt plantations in Australia-The potential for intensive production and utilization. *Appita Journal* (Melbourne) 29, 31-40.
- Crow, T.R. 1978. Biomass and production in three contiguous forests in northern Wisconsin. *Ecology* 59, 265-273.
- Crowder, L.V.; Michelin, A.; Bastidas, A. 1964. The response of Pangola grass (*Digitaria decumbens* Stent.) to rate and time of nitrogen application in Colombia. *Tropical Agriculture, Trinidad* 41, 21-30.
- Cuany, R.L.; Shafer, S.L.; Swink, J.F. 1972. Performance tests of corn hybrids grown in various regions of Colorado in 1971. Gen. Ser. 921, Fort Collins, Colorado State Univ. Expt. Sta.: 43 pp. In: Cooper, J.P. (ed.), 1975, *Photosynthesis and Productivity in Different Environments*, IBP 3, Cambridge University Press, p. 150.
- *Cuevas, V.C.; Sajise, P.E. 1978. Litterfall and leaf litter decomposition in a Philippine secondary forest. *Philippine Journal of Biology* 7 (2), 99-109.
- Dabādghao, P.M.; Shankarnarayan, K.A. 1970. Studies of Iseileman, Sehima, and Heteropogon communities on the Sehima-Dichantium zone. In: Norman, M.J.T. (ed.), *Proc. XI Intl. Grassland Congress, Brisbane, Watson Ferguson and Co.*, pp. 36-38.
- Dahlmann, R.C.; Kucera, C.L. 1965. Root productivity and turnover in native prairie. *Ecology* 46, 84-89.
- *Daly, G.T. 1966. Nitrogen fixation by modulated *Alnus rugosa*. *Canadian Journal of Botany* 44, 1607-1621.
- *Damman, A.W.H. 1971. Effect of vegetation changes on the fertility of a Newfoundland forest site. *Ecological Monographs* 41, 253-270.
- *Danckelmann, B. 1887. Streuertragstafel fuer Kiefernbestaende. *Zeitschrift fur Forst- und Jagdwesen* 19, 457-466.
- Danilov, D.N. 1958. Productivity of dwarf Arctic birch and willow beds in the east of the bol's hezenel'skaya tundra. In: Rodin, L.E.; Bazilevich, N.I. (eds.), 1968, *Production and Mineral Cycling in Terrestrial Vegetation*, Oliver and Boyd, Edinburgh, 288 pp., *Botaniceskii Zhurnal* (Leningrad) 43.
- *Daniel, M.J. 1975. Preliminary account of litter production in a New Zealand lowland podocarp-rata-broadleaf forest. *New Zealand Journal of Botany* 13, 173-187.
- Daubenmire, R. 1970. Steppe vegetation of Washington. *Washington Agricultural Experiment Stations - Technical Bulletin* 62, 129-130.
- Daubenmire, R. 1972. Standing crops and primary production in savanna derived from semideciduous forest in Costa Rica. *Botanical Gazette* 133 (4), 395-401.

- *Davis, R.C. 1980. Peat respiration and decomposition in Antarctic terrestrial moss communities. *Biological Journal of the Linnean Society* 14, 39-49.
- *Dawson, E.Y. 1962. Benthic marine exploration of Bahia de San Quintin, Baja California, 1960-61. Marine and marsh vegetation. *Pac. Nat.* 3, 275-280.
- *Day Jr., F.P. 1971. Vegetation structure of a hardwood watershed at Coweeta. In: Burgess, R.L. (ed.), *Eastern Deciduous Forest Biome, US-IBP, Progress Report 1971-72*, 50; *EDFB Memo Rpt.* 71-18, p. 145.
- *Day Jr., F.P. 1979. Litter accumulation in 4 plant communities in the Dismal Swamp, Virginia. *American Midland Naturalist* 102 (2), 281-289.
- *Dayton, B.R. 1972. Terrestrial ecology. *Biol. Field Station, Cooperstown, New York, 5th Ann. Rep. 1972, Biol. Dep., St. Univ. Col. at Oneonta*, pp. 62-67.
- *De Datta, S.K.; Moomaw, J.C.; Dayrit, R.S. 1966. Nitrogen response and yield potential of some rice varietal types in the tropics. In: De Vries (ed.), *Choice of food crops in relation to actual and potential production in the tropics*, *Newsletter* 15 (3), pp. 16-17.
- *De Las Salas, F.G. 1973. *Eigenschaften und Dynamik eines Waldstandortes im Grenzbereich des immergruenen tropischen Regenwaldes im mittleren Magdalenatal (Kolumbien)*. *Biogeographica* 7, 59-77.
- De La Cruz, A.A. 1974. Primary productivity of coastal marshes in Mississippi. *Gulf Research Report* 4, 351-356.
- De La Cruz, A.A.; Hackney, C.T. 1977. Energy value, elemental composition and productivity of the belowground biomass of a *Juncus* tidal marsh. *Ecology* 58, 1165-1170.
- *De Menezes, O.J.A. 1971. Estudo fitoecologico da regio do Mucupe e carta da vegetacao. *Sep. Bol. Inst. Invest. Cient. Ang.* 8, 7-54.
- *De Rham, P. 1969. L'azote dans quelques forets, savanes et terrains de culture d'Afrique tropicale humide. Thesis, University of Lausanne, Switzerland.
- De Vries, C.A.; Ferwerda, J.D.; Flach, M. 1967. Choice of food crops in relation to actual and potential production in the tropics. *Netherlands Journal of Agricultural Science* 15, 241-248.
- Dennis; Tieszen. 1972. In: Shaver, G.R.; Billings, W.D. (eds.), *Root production and root turnover in a wet tundra ecosystem, Barrow, Alaska*. *Ecology* 56, 401-409.
- *Department Of Agricultural Technical Services. 1975. Karoo Region, Annual Report 1975/76 (A.T.S. Pretoria). In: Werger, M.J.A. (ed.), 1978, *Biogeography and Ecology of Southern Africa*, Dr.W.Junk Publ., The Hague, p. 628.
- *Dimock, E.J. 1958. Litter fall in a young stand of Douglas-fir. *Northwest Science* 32, 19-29.

- Dix, R.L. 1960. The effects of burning on the mulch structure and species composition of grassland in western North Dakota. *Ecology* 41, 49-56.
- Djhalilov, K.G. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, *Dynamic Properties of Forest Ecosystems*, IBP 23. Cambridge University Press, p. 625.
- *Donaldson, C.H. 1967. The immediate effects of the 1964/66 drought on the vegetation of specific study areas in the Vryburg district. *Proceedings of the Grassland Society of South Africa* 2, 137-141.
- *Donaldson, C.H.; Kelk, D.M. 1970. An investigation of the veld problems of the Molopo area. 1. Early findings. *Proceedings of the Grassland Society of South Africa* 5, 50-57.
- Donita, N.; Bindu, C.; Mocanu, V. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, *Dynamic Properties of Forest Ecosystems*, IBP 23. Cambridge University Press. pp. 611-612.
- Doss, B.D.; Ashley, D.A.; Bennett, O.L.; Patterson, R.M. 1966. Interactions of soil moisture, nitrogen content of Coastal Bermuda grass. *Agronomy Journal* 58, 510-512.
- Doyle, G.J. 1973. Primary production estimates of native blanket bog and meadow vegetation growing on reclaimed plat at Glenamoy, Ireland. In: Bliss, L.C.; Wielgolaski, F.E. (eds.), 1973, *Primary Production and Production Processes, Tundra Biome*, Tundra Biome Steering Committee/ Dept. of Botany, University of Alberta, Edmonton, Canada, pp. 141-151.
- Drozдов, A.V. 1971. The productivity of zonal terrestrial plant communities and the moisture. *Soviet Geography. Review and translation*, New York 12, 54-60.
- *Du Plessis, G.J.; Van Wyk, J.J.P. 1969. 'n Vergelyking tussen agt verskillende insaaitegnieke ter verbetering van natuurlike veld. *Proceedings of the Grassland Society of South Africa* 4, 116-125.
- *Du Toit, P.F. 1972. Acacia Karroo intrusion: The effect of burning and sparing. *Proceedings of the Grassland Society of South Africa* 7, 23-27.
- Duckworth. 1975. In: Loomis, R. S.; Gerakis, P. A., *Productivity of agricultural ecosystem*. In: Cooper, J.P. (ed.), 1975, *Photosynthesis and Productivity in Different Environments*. IBP 3. Cambridge University Press, p. 151.
- Durand, J.B.; Nadeau, R.J. 1972. Water Resources in the Mullica River Basin. Part I. Biological evaluation of Mullica River, Great Bay Estuary. New Jersey Water Resources Research Institute, Rutgers University, p. 138.
- Duvigneaud, P. 1968. Apercu sur la biomase, la productivite et les cycles des elements biogenes. *Bulletin de la Societe Royale de Botanique de Belgique (Brussels)* 101, 111-127.
- Duvigneaud, P. et al. 1969. Biomasse, productivite, turn-over de la matiere organique et cycle des elements biogenes. *Bulletin de la Societe Royale de Botanique de Belgique (Brussels)* 102.

*Duvigneaud, P.; Froment, A. 1969. Elements biogenes de l'edaphotope et phytocenose forestiere. Bull. Inst. Sci. Nat. Belg, p. 45.

Duvigneaud, P. 1971. Productivity of Forest Ecosystems. In: Duvigneaud, P. (ed.), 1971, Productivity of Forest Ecosystems. Proceedings of the Brussels Symposium, October 1969. UNESCO, Paris, p. 707.

Dykyjova, D. 1971. Productivity and solar energy conversion in reedswamp stands in comparison with outdoor mass cultures of algae in the temperate climate of central Europe. Photosynthetica 5, 329-340.

Dylis, N. 1971. Primary production of mixed forests. In: Duvigneaud, P. (ed.), 1971, Productivity of Forest Ecosystems. Proceedings of the Brussels Symposium, October 1969. UNESCO, Paris. pp. 227-232.

*Dzens-Litovskaya, N.N. 1960. Mineral composition of vegetation and soil formation in the Crimean foothill forests. Vest. Leningr. Gos. Univ. Ser. Geol. Geogr. 2, 110-126.

*Dzhafarov, B.A. 1960. Alteration of the ash composition of beech and hornbeam leaves in relation to the height in which they grow. In: Rodin, L.E.; Bazilevich, N.I. (eds.), 1968, Production and Mineral Cycling in Terrestrial Vegetation, Oliver and Boyd, Edinburgh, 288 pp., Dokl. Akad. Nauk Azerb SSR 16.

*Dzhafarov, B.A. 1961. Effects of beech forests in altering the process of soil formation and productivity of soils in the Zakatali reservation. In: Rodin, L.E.; Bazilevich, N.I. (eds.), 1968, Production and Mineral Cycling in Terrestrial Vegetation, Oliver and Boyd, Edinburgh, Authors abstracts of thesis, Baku.

*Dziadowiek, H.; Kwiatkowska, A. 1980. Mineralization and humification of plant fall in mixed forest stand of the reserve "Las Piwnicki" near Torun. Ekologia Polska (Warsaw) 28, 111-128.

*Ebermayer, E. 1876. Die gesamte Lehre der Waldstreu mit Ruecksicht auf die chemische Statik des Waldbauers. Springer, Berlin, p. 116.

Edmonds, R.L. 1978. Productivity data for H.J. Andrews IBP site. In: Lieth, H.F.H. (ed.), 1978, Patterns of Primary Production in the Biosphere, Benchmark Papers in Ecology 8, Dowden, Hutchinson and Ross, Stroudsburg, Pennsylvania, p. 218.

*Edmonds, R.L. 1979. Decomposition and nutrient release in Douglas-fir needle litter in relation to stand development. Canadian Journal of Forest Research 9, 132-140.

*Edmonds, R.L. 1980. Litter decomposition and nutrient release in Douglas-fir, red-alder, western hemlock, and Pacific silver fir ecosystem in western Washington. Canadian Journal of Forest Research 10, 327-337.

*Edwards, P.J. 1966. Veld replacement by improved grasslands in Natal. Proceedings of the Grassland Society of South Africa 1, 63-67.

*Edwards N.T.; Dodson. 1971. Litter input and decomposition in a *Liriodendron* forest, US-IBP. EDFB, Memo Report 764, p. 22.

Edwards, P.J. 1977. Studies of mineral cycling in a montane forest in New Guinea. II. The production and disappearance of litter. *Journal of Ecology* 65, 971-992.

Egunjobi, J.K. 1967. A comparison of primary productivity and chemical element cycling in gorse and pasture ecosystems. In: Egunjobi, J.K, 1969, Primary productivity and nutrient cycling in terrestrial ecosystems., Ph.D. Thesis, Victoria Univ., Wellington, New Zealand. pp. 49-66.

*Egunjobi, J.K. 1969. Primary productivity and nutrient cycling in terrestrial ecosystems. *Tuatara* 17, 49-66.

Egunjobi, J.K. 1978. Dry matter production by *Terminalia superba*. *Tropical Ecology* 19, 111-116.

*Egunjobi, J.K.; Bada, S.O. 1979. Biomass and nutrient distribution in stands of *Pinus caribaea* L. in the dry forest zone of Nigeria. *Biotropica* 11, 130-135.

*Egunjobi, J.K.; Onweluzo, B.S. 1979. Litterfall, mineral turnover and litter accumulation in *Pinus caribaea* stands at Ibadan, Nigeria. *Biotropica* 11, 251-255.

*Ehwald, E. 1957. Ueber den Naehrstoffkreislauf des Waldes. *Deutsch. Akad. Landwirtschaftswissenschaften* 6, 1-56.

*Ehwald, E.; Grunert, F.; Schulz, W.; Vetterlein, E. 1961. Zur Oekologie von Kiefern-Buchen-Mischbestaenden. *Arch. Forstw. FAO Nos.*, pp. 4-6.

Elkington, T.T.; Jones, B.M.G. 1974. Biomass and primary productivity of birch (*Betula pubescens*) in south-west Greenland. *Journal of Ecology* 62, 821-830.

Ellenberg, H. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, Dynamic Properties of Forest Ecosystems, IBP 23. Cambridge University Press. pp. 666-671.

*Elliot, R.C.; Folkertsen, K. 1961. Seasonal changes in composition and yields of veld grass. *Rhodesia Agricultural Journal* 58, 186-187.

*Enright, N.J. 1979. Litter production and nutrient partitioning in rainforest near Bulolo, Papua, New Guinea. *Malaysian Forester* 42, 202-207.

Enyi, A.B.C. 1972. Effect of shoot number and time of planting on growth, development and yield of cassava (*Manihot esculenta* Crant.). *Journal of Horticultural Science* 47, 457-466.

*Esmekanova, A.A. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, Dynamic Properties of Forest Ecosystems, IBP 23. Cambridge University Press. pp. 623-624.

- *Ewel, J.J. 1968. Dynamics of litter accumulation under forest succession in eastern Guatemala lowlands. In: Lugo, A. (ed.), 1974, Trop. ecosystem structure and function, Section 3., Unpublished M.S. Thesis Univ. of Florida, Gainesville.
- *Ewel, J.J. 1971. Biomass changes in early tropical succession. *Turrialba* 21, 110-112.
- Fiala, K. 1979. Estimation of annual increment of underground plant biomass in a grasslands community (*Polygalo Nardetum*). *Folia Gebotamica et Phytotaxonomica* (Prague) 14, 1-10.
- Fisher, F.L.; Caldwell, A.G. 1959. The effects of continued use of heavy rates of fertilizers on forage production and quality of coastal bermudagrass. *Agronomy Journal* 51, 99-102.
- *Fittkau, E.J.; Klinge, H. 1973. On biomass and trophic structure of the Central Amazonian rain forest ecosystem. *Biotropica* 5, 2-14.
- *Floret, C. 1971. Recherches phytoecologiques entreprises par le CNRS sur le Biome "Zone Aride" en Tunisie. CEPE Doc., Restricted, Montpellier, 57. In: Houerou, H.N. (ed.) 1972, An Assesment of the Primary and Secondary Production of the Arid Grazing Lands Ecosystems of North Africa. Ecophysiological Foundation of Ecosystem Productivity in Arid Zone. USSR Academy of Science, Leningrad, pp. 168-172.
- *Foelster, H.; De Las Salas, G.; Khanna, P. 1976. A tropical evergreen forest site with perched water table, Magdalena Valley, Colombia, biomass and bioelement inventory of primary and secondary vegetation. *Oecologia Plantarum* 11, 297-320.
- Ford, E.D.; Newbould, P.J. 1977. The biomass and production of ground vegetation and its relation to tree cover through a deciduous woodland cycle. *Journal of Ecology* 65, 201-212.
- Forrest, G.I. 1971. Structure and production of North Pennine blanket bog vegetation. In: Chapman, S.B.; Hibble, J.; Rafael, C.R., 1975, Net aerial production by *Calluna vulgaris* in lowland heath in Britain. *Journal of Ecology* 63, 233-258.
- *Foster, W.A. 1968. Studies on the distribution and growth of *Juncus roemerianus* in Southeastern Brunswick Country, North Carolina. Thesis, North Carolina State University, Raleigh, N.C., U.S.A., p. 72.
- *Fourie, J.H.; Roberts, B.R. 1976. A comparative study of three veld types of the nothern Cape: Species evaluation and yield. *Proceedings of the Grassland Society of South Africa* 11, 79-85.
- *Fox, B. J.; Fox, M.D.; Mckay, G.M. 1979. Litter accumulation after fire in an eucalypt forest. *Australian Journal of Botany* 27, 157-166.
- *Franken, M.; Irmmler, U.; Klinge, H. 1979. Litterfall in inundation, riverine and terra firme forests of Central Amazonia. *Tropical Ecology* 20, 225-235.
- *Freson, R. 1973. Contribution a l'etude de l'ecosysteme foret claire (Miembo). Note 13. Apercu de la biomasse et de la poductivitee, de la strate herbacee en miombo de la Luiwishi. *Annales de l'Universite d'Abidjan. Serie E.* 6, 265-277.

- Fribourg, H.A.; Edwards, N.C.; Barth, K.M. 1971. In vitro dry matter digestibility at several levels of N fertilization. *Agronomy Journal* 63, 786-788.
- *Fujimori, T.; Kawanabe, S.; Saito, H.; Grier, C.C.; Shidei, T. 1976. Biomass and primary production in forest of three major vegetation zones of the northwestern United States. *Journal of the Japanese Forestry Society* 58, 360-373.
- *Gabriel, B.C.; De La Cruz, A.A. 1974. Species composition, standing stock, and net primary production of a salt marsh community in Mississippi. *Chesapeake Science (Solomons, Maryland)* 15, 72-77.
- Gallagher, J.L.; Reimold, R.J.; Linthurst, R.A.; Pfeiffer, W.J. 1980. Aerial production, mortality, and mineral accumulation-export dynamics in *Spartina alterniflora* and *Juncus roemerianus* plant stands in a Georgia salt marsh. *Ecology* 61, 303-312.
- *Gamble, J.F.; Popenoe, H. 1967. Bioenvironmental and radiological-safety feasibility studies Atlantic-Pacific Interoceanic canal. Phase I, Final Report, Agricultural Ecology, Columbus, Ohio.
- *Garg, R.K.; Vyas, L.N. 1975. Litter production in deciduous forest near Udaipur (south Rajasthan), India. In: Golley, F.B.; Medina, E. (eds.), 1975, *Tropical Ecological Systems: Trends in Terrestrial and Aquatic Research*. Ecological Studies 11. Springer, New York, pp. 131-135.
- *Gaur, J.P.; Pandey, H.N. 1978. Litter production in two tropical deciduous forest communities at Varanasi, India. *Oikos* 30, 570-575.
- *Gessel, S.P.; Turner, J. 1974. Litter production by red alder in western Washington. *Forest Science* 20, 325-330.
- Gessel, S.P. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, *Dynamic Properties of Forest Ecosystems*, IBP 23. Cambridge University Press, p. 662.
- Gholz, H.L. 1980. Structure and productivity of *Juniperus occidentals* in Central Oregon. *American Midland Naturalist* 103, 251-261.
- *Gibbon, D.; Holliday, R.; Mattei, F.; Luppi, G. 1970. Crop production potential and energy conversion efficiency in different environments. *Experimental Agriculture* 6, 197-204.
- Gillet, H. 1960. Etude des paturages du ranch de l'ouadi Rime (Tschad). *Journal d'Agriculture Tropical et de Botanique Appliquee (Paris)* 7, 465-529.
- Gillet, H. 1967. Essai d'evaluation de le biomase vegetale en zone sahelienne (vegetation annuelle). *Journal d'Agriculture Tropical et de Botanique Appliquee (Paris)* 14, 123-258.
- *Ginzo, H.D.; Collantes, M.; Caso, O.H. 1982. Fertilization of a native grassland in the depression of the Rio Salado, Province of Buenos Aires, herbage dry matter accumulation and botanical composition. *Journal of Range Management* 35, 35-39.

- *Gloaguen, J.C.; Touffet, J.; Forgeard, F. 1980. Vitesse de decomposition et evolution minerale des litières sous climat atlantique: II. Les principales espèces des landes de Bretagne (France). *Oecologia Plantarum* 1, 257-273.
- *Goffinet, G.; Freson, R. 1972. Recherches synecologiques sur la pedofaune de l'écosystème forêt claire (Miombo). *Bull. Soc. Ecol.* 3, 138-150.
- *Golley, F.B. 1960. Energy dynamics of a food chain of an old field community. In: Jordan, C.F. (ed.), *Ecological Monographs* 30, 187-206.
- Golley, F.B.; Odum, T.H.; Wilson, K. 1962. The structure and metabolism of a Puerto Rican red mangrove forest in May. *Ecology* 43??
- *Golley, F.B. 1965. Structure and function of an old field broomsedge community. *Ecological Monographs* 35, 113-137.
- *Golley, F.B. 1969. Final report. Terrestrial ecology, ecosystem structure and function. In: Farnworth, E.G.; Golley, F.B. (eds.), 1974, *Fragile Ecosystems. International Symposium, USSR June 7-19, 1972, Ecophysiological foundation. Springer-Verlag, New York, p. 258.*
- *Golley, F.B.; Misra, R. 1972. *Tropical Ecology. Papers from a symposium on tropical ecology with an emphasis on organic productivity, Athens, p. 418.*
- *Golley, F.B. et al. 1973. La biomasa y la estructura mineral de algunos bosques de Darien, Panama. *Turrialba* 21, 189-196. In: Klinge, 1976, *Bilanzierung von Hauptnaehrstoffen im Oekosystem tropischer Regenwaelder (Manaus), Biogeographica* 7, 59-77.
- *Golley, F.B.; McGinnis, J.T.; Clements, R.G.; Child, G.J.; Duever, M.J. 1975. Mineral Cycling in a Tropical Moist Forest Ecosystem. University of Georgia Press, Athens, p. 248.
- Golubev, V.N. 1972. Ecological and biological specificity and primary productivity of the Crimea upland meadow steppe ecosystem. *International Symposium, USSR, 1972, Ecophysiological Foundation of Ecosystem Productivity in Arid Zone, USSR Academy of Science, Leningrad, 218-222.*
- *Good, R.E. 1965. Salt marsh vegetation Cape May, New Jersey. *New Jersey Academy of Science - Bulletin* 10, 1-11.
- *Gorchakovsky, P.L.; Andreyashkina, N.J. 1972. Productivity of some shrub, dwarf shrub and herbaceous. In: Wielgolaski, F.E.; Rosswall, T. (eds.), 1972, *Communities of Forest Tundra: 113-116; Wielgolaski, F.E.; Rosswall, T. (eds.), 1972, Proc. IV Intl. Meeting on the Biological Productivity of Tundra, Leningrad, Oct. 1971. Tundra Biome Steering Committee, Stockholm, p. 320.*
- *Gordon, A.G. 1979. Productivity and Nutrient Cycling in Natural Forest. *Canada MAB Report* 12, pp. 34-49.
- Gordon, A.G. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, *Dynamic Properties of Forest Ecosystems, IBP 23. Cambridge University Press. pp. 576-579.*

- Goryshina, T.K. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, Dynamic Properties of Forest Ecosystems, IBP 23. Cambridge University Press. pp. 626-627.
- Gosz, J.R. 1980. Biomass distribution and production budget for a monaggrading forest ecosystem. *Ecology* 61, 507-514.
- *Gosz, J.R.; Likens, G.E.; Bormann, F.H. 1972. Nutrient content of litter fall on the Hubbard Brook Experimental Forest, New Hampshire. *Ecology* 53, 769-784.
- Grabherr, G.; Brzoska, W.; Hofer, H. 1980. Energiebindung u. Wirkungsgrad der Nettoprimaerproduktivitaet in einem Krummseggenrasen (*Caricetum curvulae*) der Oertztaler Alpen, Tirol. *Oecologia Plantarum* 15, 307-316.
- Gray, J.T.; Schlesinger, W.H. 1981. Biomass production and litterfall in the coastal sage scrub of southern California. *American Journal of Botany* 68, 24-33.
- *Greenland, D.J.; Kowal, J.M.L. 1960. Nutrient content of the moist tropical forest of Ghana. *Plant and Soil* 12, 154-174.
- *Grier, C.C. 1978. A *Tsuga heterophylla* - *Picea sitchensis* ecosystem of coastal Oregon, decomposition and nutrient balance of fallen logs. *Canadian Journal of Forest Research* 8, 198-206.
- Grier, C.C.; Vogt, K.A.; Keyes, M.R.; Edmonds, R.L. 1981. Biomass distribution and aboveground and below-ground production in young and mature *Abies amabilis* zone ecosystems of the Washington Cascades, USA. *Canadian Journal of Forest Research* 11, 155-167.
- *Grigal, D.F.; Mccoll, J.G. 1975. Litter fall after wildfire in virgin forests of northeastern Minnesota. *Canadian Journal of Forest Research* 5, 655-661.
- *Groves, R.H.; Specht, R.L. 1965. Growth of heath vegetation: I. Annual growth curves of two heath ecosystems in Australia. *Australian Journal of Botany* 13, 261-280.
- *Grubb, P.J. 1963. A comparision of montane and lowland rain forest in Ecuador. I. The forest structure, physiognomy, and floristics. *Journal of Ecology* 51, 567-601.
- *Grunow, J.O.; Pienaar, A.J.; Breytenbach, C. 1970. Long term nitrogen application to veld in South Africa. *Proceedings of the Grassland Society of South Africa* 5, 75-90.
- Guitard, A.A.; Taylor, R.L.; Brinsmade, J.C.; Gilbey, J.A.; Newman, J.A.; Tsukamoto, J.Y. 1965. Growth of spring cereals in Northwestern Canada and Alaska. *Can. Dept. Agr. Publ.*, p. 1220.
- *Gupta, R.K.; Saxena, S.K.; Sharma, S.K. 1972. Aboveground productivity of three promising desert grasses at Jodhpur under different rainfall conditions. In: Rodin, L.E. (ed.), *Ecophysiological foundation of ecosystem productivity in arid zone*. USSR Academy of Science, Publ. House Nauka, Leningrad, pp. 134-137.

Gupta, S.R.; Mishra, G.P. 1979. Seasonal variation in belowground biomass and annual increment of the Theme da quadrivalvis type of grassland. *Sylvatrop* 4, 69-75.

Guy, P.R. 1981. Changes in the biomass and productivity of woodlands in the Sengwa wildlife research areas, Zimbabwe. *Journal of Applied Ecology* 18, 507-509.

Haag, R.W. 1974. Nutrient limitations to plant production in two tundra communities. *Canadian Journal of Botany* 52, 103-116.

*Haines, B.; Foster, R.B. 1977. Energy flow through litter in a Panamanian forest. *Journal of Ecology* 65, 147-155.

*Hannon, N.J. 1958. The status of nitrogen in the Hawkesbury sandstone soils and their plant communities in the Sydney district. II. The distribution and accumulation of nitrogen. *Proceedings of the Linnean Society of New South Wales (Sydney)* 83, 65-85.

*Harper, R.M. 1918. Some dynamic studies of Long Island vegetation. *Plant World* 21, 38-46.

Harris, W.F.; Kinerson, R.S.; Edwards, N.T. 1973. Comparison of belowground biomass of natural deciduous forest and loblollypine plantation. In: Marshall, J.K. (ed.), *The Belowground Ecosystem: A Synthesis of Plant-Associated Processes*, US-IBP Interbiome Symposium, Science Series No. 26, Range Science Department, Colorado State University, Fort Collins, p. 351.

*Harrington, G. 1979. Estimation of aboveground biomass of trees and shrubs in a *Eucalyptus populus* F. Muell. woodland by regression of mass on trunk diameter and plant height. *Australian Journal of Botany* 27, 135-144.

*Hatch, A.B. 1955. The influence of plant litter on the Jarrah forest soils of the Dwellingup region, western Australia. *Leaf. For. Bur.* 70, p. 18.

*Hatiya, K.; Doi, K.; Kobayashi, R. 1965. Analyses of the growth in Japanese red pine (*Pinus densiflora*) stands a report on the matured plantation in Iwate Prefecture. *Bull. Gov. For. Exp. Sta.* 176, 75-88.

*Havas, P. 1971. The IBP forest projects in Finland. In: Rosswall, T. (ed.), 1971, *Systems Analysis in Northern Coniferous Forests - IBP Workshop*. Swedish Natural Science Research Council, Stockholm; *Bulletin from the Ecological Research Committee* 14, pp. 33-38.

Havas, P. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, *Dynamic Properties of Forest Ecosystems*, IBP 23. Cambridge University Press, p. 582.

*Heald, E.J. 1969. The production of organic detritus in a south Florida Estuary. Thesis, University of Miami, USA. 29, p. 110.

Heal, O.W. 1972. A brief review of progress in the studies at Moor House (UK). In: Wielgolaski, F.E.; Rosswall, T. (eds.), 1972, Proc. IV Intl. Meeting on the Biological Productivity of Tundra, Leningrad, Oct. 1971. Tundra Biome Steering Committee, Stockholm, pp. 295-305.

*Hegy, F. 1972. Dry matter distribution in Jack Pine stands in northern Ontario. For. Chron. 45, 193-197.

*Heilmann, P.E. 1961. Effects of nitrogen fertilization on the growth and nitrogen nutrition of low-site Douglas fir stand., Ovington, J.D., Quantitative Ecology and the Woodland Ecosystems Concept. Academic Press, London, New York, 203 pp. Ph. D. Thesis, University of Washington.

*Heller, H. 1971. Studies on primary production of spruce forests in IBP-areas in Germany. Bull. Ecol. Res. Committee 14, pp. 39-43.

*Hendricks, D.; Macgregor, A.N.; Lendell, E. 1971. Validation studies at Tuscon, Arizona. Desert Biome, Report of Progress 1971, Vol. 1.

Henzell, E.F. 1963. Nitrogen fertilizer responses of pasture grasses in south-eastern Queensland. Australian Journal of Experimental Agriculture and Animal Husbandry 3, 290-299.

Henzell, E.F. 1968. Sources of nitrogen for Queensland pastures. Tropical Grasslands 2, 1-17.

*Heyward, F.; Barnette, R.M. 1936. Field characteristics and partial chemical analyses of the humus layer of longleaf pine forest soils. Bull. Fla. Agric. Exp. Sta. 302, p. 27.

*Ho, Y.B. 1979. Shoot development and production studies of *Phragmites australis* (Cav.) Trin. ex Steudel in Scottish lochs. Hydrobiologia 64, 215-222.

*Hodgkinson, K.C.; Johnson, P.S.; Norton, B.E. 1976. Estimation of function root biomass and root and shoot response of *Atriplex confertifolia* to summer rain. In: Desert Biome, IBP Reports of 1975 Progress, Ecosystem Analysis Studies U.S., International Programm 3, pp. 116-124.

Holmen, H. 1964. Forest Ecological Studies on Drained Peatland in the Province of Uppland, Sweden. Studia Forestalia Suecica, Stockholm, p. 16.

Hopkins, B. 1965. Observations on savanna burning in the Olokemeji Forest Reserve, Nigeria. Journal of Applied Ecology 2, 367-381.

Hopkinson, C.S.; Gosselink, J.G.; Parrondo, R.T. 1978. Aboveground production of seven marsh plant species in coastal Louisiana. Ecology 59, 760-769.

*Howard, T.M. 1973. Studies in the ecology of *Nothofagus cunninghamii* Oerst. Australian Journal of Botany 21, 79-92.

- *Hozumi, K.; Yoda, K.; Kokawa, S.; Kira, T. 1969. Production ecology of tropical rain forest in Southwestern Cambodia, I. Plant biomass. In: Kira, T.; Iwata, K. (eds.), *Nature and Life in Southeast Asia*, J. Soc. for the Promotion of Science 6, pp. 1-51.
- Hughes, M.K. 1970. Investigations of the ecosystem energetics of English woodland. Ph.D. Thesis, University of Durham, UK, 1976.
- Hughes, M.K. 1971. Tree biocontent, net production and litter fall in a deciduous woodland. *Oikos* 22, 62-73.
- *Hughes, M.K. 1975. Ground vegetation net production in a Danish beech wood. *Oecologia* 18, 251-258.
- *Humbert, R.P. 1972. Mechanization of sugarcane harvesting. *Outlook on Agriculture* 7, 10-13.
- Hunter, R.B. 1975. Responses and interactions in desert plants as influenced by irrigation and nitrogen application. US-IBP Desert Biome Research Memo 75-13, Utah State University, Logan, Ecology Center, 3, pp. 137-150.
- *Hurd, R.M. 1971. Annual tree litter production by successional forest stands, Juneau, Alaska. *Ecology* 52, 881-884.
- *Huttel, C. 1969. Rapport d'activite de l'annee 1968. *Tropical Ecology*, 14 (1), 1973.
- *Huttel, C.; Bernhard-Reversat, F. 1975. Recherches sur l'ecosysteme de la foret subequatoriale de basse Cote-d'Ivoire. V. Biomasse vegetale et productivite primaire Cycle de la matiere organique. *La Terre et la Vie*, pp. 203-228.
- *Huttel, C. 1975. Root distribution and biomass in three Ivory Coast rain forest plots. In: Golley, F.B.; Medina, E. (eds.), 1975, *Tropical Ecology Systems: Trends in Terrestrial and Aquatic Research*. Ecological Studies 11. Springer, New York, pp. 123-130.
- Hytteborn, H. 1975. Deciduous woodland at Andersby, eastern Sweden. Above ground tree and shrub production. *Acta Phytogeographica Suecica* (Uppsala) 61, 1-92.
- *Ignatenko, I.V.; Knorre, A.V.; Lovelius, N.V.; Norin, B.N. 1972. Standing crop in plant communities at the station Ary-Mas. In: Wielgolaski, F.E.; Rosswall, T. (eds.), 1972, *Proceedings IV Intl. Meeting on the Biological Productivity of Tundra*, Leningrad, Oct. 1971. Tundra Biome Steering Committee, Stockholm, pp. 140-149.
- *Ikushima, I. 1964. Flora and plant communities of Tanzania Mountains. *Rep. Sci. Tanzania, Mountains Kanagawa Pref.*, 106-125.
- Irving, R.S.; Brenholts, S.; Foti, T. 1980. Composition and net primary production of native prairies in eastern Arkansas. *American Midland Naturalist* 103, 298-309.
- Isayev, Y.M. 1957. Wormwood scrub of winter pastures in Azerbaydzhan. *Trudy Inst. Bot.* 20, 5-20.

- *Iwaki, H.; Monsi, M.; Midorikawa, B. 1966. Dry matter production of some herb communities in Japan. In: Jordan, C.F. (ed.), 1971, Productivity of a tropical forest and its relation to a world pattern of energy storage. Pacif. Sci. Congr., Tokyo, 1-15, Journal of Ecology 59, 127-142.
- *Jacobs, M.R. 1936. The primary and secondary leaf-bearing systems of the eucalypts and their silvicultural significance. Commonwealth For. Bur. Bull., Canberra, Australia 18, p. 78.
- Jain, S.K.; Mishra, G.P. 1972. Changes in underground biomass and annual increment in a upland grassland of Sagar. Tropical Ecology 13, 131-138.
- Jain, S.K. 1980. Total phytomass, net community productivity and system transfer functions in sub-humid grasslands at Sagar (M. P.), India. Flora 170, 251-260.
- *Jakrlava, J. 1970. Flooded meadow communities: An analysis of productivity in a dry year. Folia Geobotanica et Phytotaxonomica (Prague) 5, 221-460.
- Jakucs, P. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, Dynamic Properties of Forest Ecosystems, IBP 23. Cambridge University Press, p. 586.
- Jankowska, K. 1971. Net primary production during a three-year succession on an unmowed meadow of the *Arrhenatheretum elatioris* plant association. Bulletin de l'Academie Polonaise des Sciences 19, 789-794.
- *Jaro, Z. 1958. Alomanenuyisegek a magyar erdoekben. Erdeszettu Domanyi Koelemeuyek 1, 151-162.
- *Jefferies, R.L. 1976. Plant communities of muddy shores of arctic North America. In: Chapman, V.J. (ed.), 1977, Wet Coastal Ecosystems, Ecosystems of the World 1, [Reimold, R.J., Mangals and salt marshes of Eastern United States.] Elsevier Scientific Publ., Amsterdam, p. 428.
- *Jefferies, R.L. 1977. The vegetation of salt marshes at some coastal sites in arctic North America. Journal of Ecology 65, 661-672.
- *Jenkin, J.F.; Ashton, D.H. 1970. Productivity studies in Macquarie Island vegetation. In: Holdgate, M.W. (ed.), 1970, Antarctic Ecology, Academic Press, London, pp. 851-863.
- *Jenny, H. 1948. Great soil groups in the equatorial regions of Columbia, South America. Soil Science 66, 5-28.
- *Jenny, H. 1950. Causes of the high nitrogen and organic matter content of certain tropical forest soils. Soil Science 69, 63-69.
- *Jensen, V. 1974. Decomposition of angiosperm tree leaf litter. In: Dickinson, C.H.; Pugh, G.J.F. (eds.), 1974, Biology of Plant Litter Decomposition, Academic Press, London, pp. 69-100.

- *Jensen, A. 1980. Seasonal changes in near infrared reflectance ratio and standing crop biomass in a salt marsh community dominated by *Halimione portulacoides*. *New Phytologist* 86, 57-67.
- *Jervis, R.A. 1964. Primary production in a freshwater marsh ecosystem. Thesis, Rutgers University, New Brunswick, N.J., U.S.A., p. 79.
- Jervis, R.A. 1969. Primary production in the freshwater marsh ecosystem of Troy meadows, New Jersey. *Bulletin of the Torrey Botanical Club* 96, 209-231.
- John, D.M. 1973. Accumulation and decay of litter and net production of forest in tropical West Africa. *Oikos* 24, 430-435.
- Johnson, M. 1970. Preliminary report on species composition, chemical composition, biomass and production of marsh vegetation in the upper Patuxent Estuary, Maryland. Chesapeake Biological Laboratory, Solomons, Maryland; Reference Nr. 70, pp. 165-178.
- Johnson, P.L.; Kelly, J.J. 1970. Dynamics of carbon dioxide and productivity in an arctic biosphere. *Ecology* 51, 73-80.
- *Johnstone, W.D. 1971. Total standing crop and tree component distributions in three stands of 100-year-old lodgepole-pine. *Forest Biomass Studies, INFRO (Intern. Uni. Forest Research organiz.) XI. INFRO Congress, Uni. Florida, Gainesville, Florida, pp. 81-89.*
- *Jokela, E.; Ylaenen, J. 1956. Koivikoiden lehtisadon maaeraestae. *Metsaet. Aikakausi.* 73, 131-132.
- Jones, R. 1968. Estimating productivity and apparent photosynthesis from differences in consecutive measurements of total living plant parts of on Australian heathland. *Australian Journal of Botany* 16, 590-602.
- Jones, R.L.; Griffiths Davies, J.G.; Waite, R.B.; Fergus, I.F. 1968. The production and persistence of grazed irrigated pasture mixtures in south-eastern Queensland. *Australian Journal of Experimental Agriculture and Animal Husbandry* 8, 177-189.
- *Jordan, C.F.; Uhl, C. 1978. Biomass of a "tierra firme" forest of the Amazon Basin. *Oecologia Plantarum* 13, 387-400.
- *Jordan, C.F.; Escalante, G. 1980. Root productivity in an Amazonian rain forest. *Ecology* 61, 14-18.
- *Jorgensen, J.R.; Wells, C.G.; Metz, L.J. 1975. The nutrient cycle. *Journal of Forestry* 73, 400-403.
- *Kabaya, H.; Ikushima, I.; Numata, M. 1964. Growth and thinning of *Pinus thaubergii* stand. *Ecological studies of coastal pine forest. Bull. Marin Lab., Chiba Univ.* 6, 1-26.

- *Kallio, P.; Kaerenlampi, L. 1971. A review of the stage reached in the Kevo IBP in 1970. In: Heal, O.W. (ed.), Proceedings of the Tundra Biome, Working Meeting on Analysis of Ecosystems, Kevo Finland., Tundra Biome Steering Committee, London, p. 297.
- Kallio, P. 1975. Kevo, Finland. In: Rosswall, T.; Heal, O.W. (eds.), 1975, Structure and Function of Tundra Ecosystems, Ecological Bulletins No. 20, Swedish Natural Science Research Council, Stockholm, pp. 193-223.
- *Kan, M.; Shidei, T.; Tsutsumi, T. 1962. On the productivity of evergreen broad leaved forest (Preliminary report on *Castanopsis* stands). In: Tadaki, Y.; Yoshiya, (eds.), 1966, Some Discussion of the Leaf Biomass of Forest Stands and Trees. Bulletin of the Government Forest Experiment Station, Tokyo, 184 Rec. 72th Meet. Jap. For. Soc., pp. 249-250.
- *Karayev, I.B. 1969. Inter-relationships between soils and stands of pure and mixed Persian ironwood forests in the Lenkoran zone of Azerbaydzhan. In: Rodin, L.E.; Bazilevich, N.I. (eds.), 1968, Production and Mineral Cycling in Terrestrial Vegetation, Oliver and Boyd, Edinburgh, 288 pp., Author's Abstract of Thesis, Baku 1962.
- Karpov, V.G. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, Dynamic Properties of Forest Ecosystems, IBP 23. Cambridge University Press, p. 628.
- *Kartashov, Y.D. 1961. Features of the effect of pine and Dahurian larch litter fall and litter on the soil in the basin of the Alekma, Yakut ASSR. Dokl. Mosk. Sel.-khoz., Akad. K. A. Timiyazeva, p. 72.
- *Kawanabe, S.; Shidei, T.; Iwatsubo, G. 1962. Organic matter production of pine stands in Pakistan and Japan. In: Tadaki, Y., 1966, Some discussions on the leaf biomass of forest stands and trees. Bulletin of the Government Forest Experiment Station, Tokyo, p. 184.
- Kazimirow. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, Dynamic Properties of Forest Ecosystems, IBP 23. Cambridge University Press. pp. 629-645.
- Keefe, C.W.; Boynton, W.R. 1973. Standing crop of salt marshes surrounding Chincoteague Bay, Maryland, Virginia. Chesapeake Science (Solomons, Maryland) 14, 117-123.
- *Kellman, M.C. 1970. Secondary plant succession in tropical montane Mindanao. Research School of Pacific Studies, Dept. of Biogeography and Geomorphology Publication BG/2, Aust. National Univ. Canberra, p. 174.
- *Kelly, J.M.; Henderson, G.S. 1978. Effects of nitrogen and phosphorus additions on deciduous litter decomposition. Soil Science Society of America Journal 42, 972-976.
- Kestemont, P. 1970. Etude de la biomasse et de la productivite de trois peuplements en taillis simple. Bull. Inst. Roy. Sci. Nat. Belg. 46, 1-14.
- Kestemont, P. 1971. Biomasse et productivite aeriennes d'un taillis de chenes et bouleaux riche en ronces, en plateau de Robiet (Vresse). Bulletin de la Societe Royale de Botanique de Belgique (Brussels) 104, 103-113.

Kestemont, P. 1971. Note sur la biomasse et la productivite d'une vegetation forestiere consecutive a la coupe d'un taillis simple d'Ardenne Occidentale. Bulletin de la Societe Royale de Botanique de Belgique (Brussels) 104, 281-290.

Kestemont, P. 1971. Productivite primaire des taillis simples et concept de necromasse. In: Duvigneaud, P. (ed.), 1971, Productivity of Forest Ecosystems. Proceedings of the Brussels Symposium, October 1969. UNESCO, Paris. pp. 271-279.

Kestemont, P. 1973. Production primaire de la strate arboree d'une hetraie a fetuques. Bulletin de la Societe Royale de Botanique de Belgique (Brussels) 106, 305-414.

Keyes, M.R.; Grier, C.C. 1981. Aboveground and belowground net production in 40-year-old Douglas fir (*Pseu dotsuga menziesii*) stands on low and high productivity sites. Canadian Journal of Forest Research 11, 599-605.

*Killingbeck, K.T.; Wali, M.K. 1978. Analysis of North Dakota gallery forests, nutrient, trace elements and productivity relations. Oikos 30, 29-60.

*Kimmins, J.P.; Hawkes, B.C. 1978. Distribution and chemistry of fine roots in a white spruce-subalpine fir stand in British Columbia: Implications for management. Canadian Journal of Forest Research 8, 265-279.

Kimura, M. 1960. Primary production of the warm temperate laurel forest in the southern part of Osumi Peninsula, Kyushu, Japan. Miscellaneous Reports of the Research Institute for Natural Resources (Tokyo), pp. 52-53.

*Kimura, M. 1963. Dynamics of vegetation in relation to soil development in northern Yatsugatake Mountains. Japanese Journal of Botany 18, 255-287.

*Kira, T.; Ogawa, K.; Yoda, K.; Ogino, K. 1964. Primary production by a tropical rain forest of southern Thailand. Botanical Magazine, Tokyo 77, 428-429.

*Kira, T.; Ogawa, H.; Yoda, K.; Ogino, K. 1967. Comparative ecological studies on three main types of forest vegetation in Thailand. IV. Dry matter production with special reference to the Khao Chong rain forest. In: Kira, T.; Iwato, K. (eds.), Nature and Life in Southeast Asia., Fauna and Flora Research Society 5, pp. 149-174.

Kira, T.; Shidei, T. 1967. Primary Production and Turnover of Organic Matter in Different Forest Ecosystems of the Western Pacific. Japanese Journal of Ecology 17, 70-87.

*Kira, T. 1977. Community architecture and organic matter dynamics in tropical lowland rainforest of southern Asia, with special reference to Pasoh Forest, West Malaysia. In: Tomlinson, P.B.; Zimmermann, M.H. (eds.), Tropical Trees as Living Systems IVth. Cabot Symposium, Harvard, Cambridge Univ. Press, London.

Kira, T. 1978. Community architecture and organic matter dynamics in tropical lowland rainforests of Southern Asia. In: Lieth, H.F.H. (ed.), 1978, Patterns of Primary Production in the Biosphere, Benchmark Papers in Ecology 8, Dowden, Hutchinson and Ross, Stroudsburg, Pennsylvania, p. 342.

- *Kirby, C.J. 1971. The annual net primary production and decomposition of salt marsh grass *Spartina alterniflora* in the Barataria Bay estuary of Louisiana. Ph.D. Thesis. Louisiana State University, p. 74.
- Kirby, C.J.; Gosselink, J.G. 1976. Primary production in a Louisiana gulf coast *Spartina alterniflora* marsh. *Ecology* 57, 1052-1059.
- *Kirita, H. 1965. Supply and breakdown of soil organic matter in a primeral laural forest. *Japanese Journal of Ecology* 17, 70-87.
- *Kitazawa, Y.; Kimura, M.; Tezuka, Y.; Kurasawa, H.; Sakamoto, M.; Yoshino, M. 1959. Plant ecology of the southern part of Osumi peninsula. *Miscellaneous Reports of the Research Institute for Natural Resources (Tokyo)* 49, 19-36.
- Kitazawa, Y. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, *Dynamic Properties of Forest Ecosystems*, IBP 23. Cambridge University Press, p. 603.
- *Kittredge, J. 1940. A comparison of forest floors from plantations of the same age and environment. *Journal of Forestry* 38, 729-731.
- *Kittredge, J. 1944. Estimation of the amount of foliage of trees and shrubs. *Journal of Forestry* 42, 905-912.
- *Kjelvik, S. 1971. Brief report on IBP biomass studies in a mountain birch zone at Maurseth, Hardangervidda, Norway. In: Rosswall, T. (ed.), 1971, *Systems Analysis in Northern Coniferous Forests - IBP Workshop*. Swedish Natural Science Research Council, Stockholm; Bulletin from the Ecological Research Committee 14, pp. 33-38.
- *Kjelvik, S.; Kaerenlampi, L. 1975. Plant biomass and primary production of Fennoscandian subarctic and subalpine forest and of alpine willow and heath ecosystems. In: Wielgolaski, F.E. (ed.), 1975, *Fennoscandian Tundra Ecosystems, Part 1, Plant and Microorganisms*, Springer, New York, pp. 111-120.
- *Klemmenson, J.O.; Barth, R.C. 1974. Distribution and balance of biomass and nutrients in desert shrub ecosystems. *US-IBP Desert Biome, Reports of 1974 Progress, Res. 3*, 75-85.
- *Klinge, H. 1968. Litter production in an area of Amazonian terra firme forest. I. Litter-fall, organic carbon and total nitrogen contents of litter. *Amazoniana* 1, 287-302.
- *Klinge, H.; Rodrigues, W.A. 1973. Biomass estimation in a central Amazonian rain forest. *Acta Cientifica Venezolana* 24, 225-237.
- *Klinge, H. 1973. Root mass estimation in lowland tropical rain forest of central Amazonia, Brazil. II. Coarse root mass of trees and palms in different height classes. *Anais da Academia Brasileira de Ciencias* 45, 596-609.

- *Klinge, H.; Rodrigues, W.A.; Brunig, E.; Fittkau, E.J. 1975. Biomass and structure in a Central Amazonian Rain Forest. In: Golley, F.B.; Medina, E. (eds.), 1975, Tropical Ecological Systems: Trends in Terrestrial and Aquatic Research. Ecological Studies 11. Springer, New York, pp. 115-122.
- *Klinge, H. 1976. Bilanzierung von Hauptnaehrstoffen im Oekosystem tropischer Regenwaelder (Manaus). Biogeographica 7, 59-77.
- *Klinge, H. 1977. Fine litter production and nutrient return to the soil in three natural forest stands of Eastern Amazonia. Geo-Eco-Trop (Brussels) 1, 159-167.
- *Klinge, H. 1977. Preliminary data on nutrient release from decomposing leaf litter in a neotropical rain forest. Amazoniana 6, 193-202.
- *Klinge, H.; Herrera, R. 1978. Biomass studies in Amazon Caatinga forest in southern Venezuela. I. Standing crop of composite root mass in selected stands. Tropical Ecology 19, 93-109.
- *Klinge, H. 1978. Litter production in tropical ecosystems. Malayan Nature Journal 30, 415-422.
- Klopatek, J.M. 1975. The role of emergent macrophytes in mineral cycling in a freshwater marsh. In: Howell, F.G.; Gentry, J.B.; Smith, M.H. (eds.), 1975, Mineral Cycling in Southeastern Ecosystems. Proc. Symp. 740513, Tech. Inf. Center, US-ERDA, Oak Ridge, Tenn./Springfield, Va., pp. 367-391.
- *Klug-Puempel, B. 1981. Streufall und Streuschwund in einem *Caricetum curvulae*. Flora 171, 39-54.
- *Knudsen, F.; Mauritz-Hannson, H. 1939. On produktionen av lovfoerna och denuus sammau saettnig i ett mellausvenskt bjoerkbestaend. Svenska Skogsvardsfoereningens Tidskrift (Stockholm) 37, 339-347.
- *Koerper, G.J.; Richardson, C.J. 1980. Biomass and net primary production for *Populus grandidentata* on three sites in northern lower Michigan. Canadian Journal of Forest Research 10, 92-101.
- *Kotowski, W. 1979. Comparison of the decomposition rate of wood litter fall in different forest ecosystems. Ekologia Polska (Warsaw) 27, 427-436.
- *Kreh, R.E.; Vasey, R.B.; Madwick, H.A.I. 1978. Litter production in naturally seeded Virginia pine (*Pinus virginiana* Mill.). American Midland Naturalist 100, 237-239.
- *Krueger, F.J. 1977. A preliminary account of aerial plant biomass in fynbos communities of the Mediterranean type climate zone of the Cape Province. Bothalia 12, 301-307.
- *Kruttsch, H. 1869. Untersuchungen ueber die Waldstreu. Tharander Forstliches Jahrbuch (Dresden) 19, 193-227.

- *Kubicek, F. 1973. Overall organic matter fall in the oak-hornbeam ecosystem. In: Bishupsky, V. (ed.), Research project Bab IBP Progress Report II, Bratislava, pp. 133-146.
- *Kubicek, F. 1981. Production of litter fall in beech forests. *Biologia* 36, 851-857.
- Kucera, C.L.; Dahlmann, R.C.; Koelling, M.R. 1967. Total net productivity and turnover on an energy basis for all tallgrass prairie. *Ecology* 48, 536-541.
- *Kul'tiasov, M.V. 1925. Materials for the study of evaporation and the root system of an association of vernal ephemerals. *Byulleten Sredneaz. Gos. Univ.*, Tashkent 10, p. 184.
- *Kumar, A.; Joshi, M.C. 1972. The effects of grazing on the structure and productivity of the vegetation near Pilani, Rajasthan, India. *Journal of Ecology* 60, 665-674.
- *Kunkel-Westphal, I.; Kunkel, P. 1979. Litter fall in a Guatemalan primary forest, with details of leaf-shedding by some common tree species. *Journal of Ecology* 67, 665-685.
- Kuramoto, R.T.; Bliss, L.C. 1970. Ecology of subalpine meadows in the Olympic Mountains, Washington. *Ecological Monographs* 40, 317-347.
- *Kurochkina, L.Y.; Osmanova, L.T.; Borovskaya, T.A. 1972. Bio-ecological characteristics and productivity of *Psammophilous* communities in the southern Balkhash area. In: Rodin, L.E. (ed.), *Eco-physiological foundation of ecosystem Prod. in arid zone*, Int. Symp. USSR 1972, USSR Acad. of Sci., Leningrad, pp. 132-134.
- *Lagunova, Y.P. 1955. The role of vegetation in altering the alkaline and saline soils in the southeast of the shrivan' steppe. *Trudy Pochvovedenie Inst. Akad. Nauk SSR*, p. 47.
- Lang, G.E. 1974. Litter dynamics in a mixed oak forest on the New Jersey Piedmont. *Bulletin of the Torrey Botanical Club* 101, 277-286.
- *Lang, G.E.; Cronan, C.S.; Reiners, W.A. 1981. Organic matter and major elements of the forest floors and soils in subalpine balsam fir (*Abies balsamea*) forest. *Canadian Journal of Forest Research* 11, 388-399.
- *Larcher, W.; Schmidt, L.; Grabherr, G.; Cernusca, A. 1973. Plant biomass and production of alpine shrub heaths at Mt. Patscherkofel, Austria. In: Bliss, L.C.; Wielgolaski, F.E., (eds.), 1973, *Primary Production and Production Processes, Tundra Biome, Tundra Biome Steering Committee/ Dept. of Botany, University of Alberta, Edmonton, Canada*, pp. 65-73.
- *Larcher, W.; Cernusca, A.G.; Schmidt, L.; Grabheherr, G.; Noetzel, E.; Smeets, N. 1975. Mt. Patscherkofel, Austria. In: Rosswall, T.; Heal, O.W. (eds.), 1975, *Structure and Function of Tundra Ecosystems, Ecological Bulletins No. 20, Swedish Natural Science Research Council, Stockholm*, pp.125-139.
- Larcher, W. 1977. Ergebnisse des IBP-Projektes "Zwergstrauchheide Patscherkofel". *Sitzungsberichte der Oesterr. Akademie der Wissenschaften, Math. nat. Kl. Abt. I* 186, pp. 309-328.

- *Laudelot, H.; Meyer, J. 1954. Les cycles d'elements mineraux et de matiere organique en foret equatoriale Congolaise. Actes et Comptes-rendus, Transaction (Bruxelles) 4, 267-272.
- *Lazenby, A.; Rogers, H.H. 1965. Selection criteria in grass breeding. 5. Performance of *Lolium perenne* genotypes grown at different nitrogen levels and spacings. Journal of Agricultural Science 65, 79-89.
- *Le Houerou, H.N. 1972. An assessment of the primary and secondary production of the arid grazing lands ecosystems of North Africa. Ann. Alg. Pogr. 3, 1-27.
- *Le Roux, C.J.G. 1973. Grazing Problems in the Etosha National Park: Carrying Capacity of Andoni vlakte/ Gemsbokvlakte/Charitsaubvlakte/Leeubron Adamax Area. Progress Reports 1972/73, Department of Nature Conservation and Tourism, Windhoek.
- *Leblois, A.; Van Damme, . 1971. Progress Report. Restricted. Plant Prod. Div., FAO, Rome. In: Rodin, L.E. (ed.) 1972, Ecophysiological foundation of ecosystem productivity in arid zone. In: Le Houerou, H.N., An Assessment of the Primary and Secondary Production of the Arid Grazing Lands Ecosystems in North Africa, USSR Academy of Science, pp. 168-172.
- *Lee, K.E.; Correll, R.L. 1978. Litter fall and its relationship to nutrient cycling in a south Australian dry sclerophyll forest. Australian Journal of Ecology 3, 243-252.
- *Leigh, E.G. 1975. Structure and climate in tropical rain forest. Annual Review of Ecology and Systematics 6, 67-86.
- *Lemee, G.; Bernhard-Reservat, F.; Huttel, L. 1975. Recherches sur l'ecosysteme de la foret subequatoriale de basse cote d'Ivoire. La Terre et la Vie 29, 169-264.
- Lemee, G. 1978. Recherches sur les ecosystemes de la hetraie naturelle en foret de Fontaine bleau. In: Lieth, H.F.H. (ed.), 1978, Patterns of Primary Production in the Biosphere, Benchmark Papers in Ecology 8, Dowden, Hutchinson and Ross, Stroudsburg, Pennsylvania, p. 342.
- Lemee, G. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, Dynamic Properties of Forest Ecosystems, IBP 23. Cambridge University Press, pp. 583, 598, 599.
- *Leonardi, S.; Maugeri, G.; Linser-Bourdellon, A. 1977. Valeur energetique de la litiere d'un bois de *Quercus ilex* l. (Station de Monte-Minardo, Etna). Oecologia Plantarum 12, 301-304.
- *Lespeyres. 1898. Der Einfluss der Streunutzung auf den Holzwuchs in den Kiefernbestaenden des nordoestlichen Flachlandes. Zeitschrift fur Forst- und Jagdwesen 30, 521-537.
- *Levina, V.I. 1960. Determination of the amount of annual litter fall in two types of pine forest on the Kola peninsula. Botaniceskii Zhurnal (Leningrad) 45, 418-423.

Lieth, H.; Osswald, D.; Martens, H. 1965. Stoffproduktion, Spross-Wurzel-Verhaeltnis, Chlorophyllgehalt und Blattflaeche von Jungpappeln. Mitteilungen des Vereins fuer forstliche Standortkunde und Forstpflanzenzuechtung 15, 70-74.

*Lieth, H. 1978. Patterns of Primary Production in the Biosphere. Dowden, Hutchinson and Ross, Stroudsburg, Pennsylvania, p. 342.

*Lindquist, B. 1938. Dalby Soederskog. Acta Phytogeographica Suecica (Uppsala) 10, p. 273.

*Lindberg, S.; Normin, H. 1943. On the production of needle litter and its composition in a spruce stand near Stockholm. Svenska Skogsvardsfoereningens Tidskrift (Stockholm) 4, 353-360.

Lindgren, L.; Nihlgard, B. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, Dynamic Properties of Forest Ecosystems, IBP 23. Cambridge University Press. pp. 619, 621.

Linhurst, R.A.; Reimold, R.J. 1978. Estimated net primary productivity for selected estuarine angiosperms in Maine, Delaware, and Georgia. Ecology 59, 945-55.

Little, S.; Vicente, J.; Abruna, F. 1959. Yield and protein content of irrigated napier grass, guines grass and pangola grass as affected by nitrogen fertilization. Agronomy Journal 51, 111-113.

Litvinova, N.P. 1972. Productivity of high mountain deserts (Pamir). In: Rodin, L.E. (ed.), 1972, Eco-Physiological Foundation of Ecosystems Productivity in Arid Zone, Int. Symposium 1972, USSR Academie of Sci. Leningrad, pp. 143-148.

Longton, R.E. 1970. Growth and productivity of the moss *Polytrichum alpestre* Hoppe in Antarctic region. Antarctic Ecology 2, 818-836.

Loomis, R.E.; Williams, W.A. 1963. Maximum crop productivity—An estimate. Crop Science 3, 67-72.

Loomis, R.S.; Worker, G.F. 1963. Responses of the sugar beet to low soil moisture at two levels of nitrogen nutrition. Agronomy Journal 55, 509-615.

Lossaint, P.; Rapp, M. 1971. Repartition de la matiere organique, productivite et cycle des elements mineraux dans des ecosystemes de climax mediterraneen. UNESCO, Productivite des ecosystemes forestri.

Loucks, O.L.; Lawson, G.J. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, Dynamic Properties of Forest Ecosystems, IBP 23. Cambridge University Press, pp. 663-664.

Louw, A.J. 1968. Bemesting van natuurlike veld op rooileemgrond van die Springbokvlakte. II. Invloed van ammoniumsulfaat-en super fosfaatbemesting op lug droemateriaalopbrengs en die minerale-inhoudaarvan. South African Journal of Agricultural Science 11, 629-636.

- *Lugo, A.; Brinson, M.; Vivas, M.C.; Gist, G.; Inger, R.; Jordan, C.; Smyth E, N.; Snedaker, S.; Lieth, H.; Milstead, W.; Murphy, P. 1974. Tropical ecosystem structure and function, Section 3. In: Farnworth, E.G.; Golley, F.B. (eds.), 1974, *Fragile Ecosystems*. Springer-Verlag, New York, pp. 67-112.
- *Lunt, H.A. 1951. Liming and twenty years of litter raking and baraing under red (and white) pine. *Proceedings of the Soil Science Society of America* 15, 381-390.
- *Maclean, D.A.; Wein, R.W. 1978. Weight loss and nutrient changes in decomposing litter and forest floor material in New Brunswick forest stands. *Canadian Journal of Botany* 56, 2730-2749.
- *MacMahon, J.A. 1976. Curlew Valley Validation Site Report. Desert Biome, Reports of 1975 Progress, Ecology Center Utah State University, Logan 3, pp. 1-38.
- *MacMillan, P.C. 1981. Log decomposition in Donaldson's Woods, Spring Mill State Park, Indiana, USA. *American Midland Naturalist* 106, 335-344.
- Madgwick, H.A.J. 1968. Seasonal changes in biomass and annual production of on old-field *Pinus virginiana* stand. *Ecology* 49, 149-152.
- *Madgwick, H.A.I.; Jackson, D.S.; Knight, P.J. 1978. Above ground dry matter, energy, and nutrient contents of trees in an age series of *Pinus radiata* plantations. *New Zealand Journal of Forestry Science* 7, 445-468.
- Mahall, B.E.; Park, R.B. 1976. The ecotone between *Spartina foliosa* Trin. and *Salicornia virginia* L. in salt marshes of northern San Francisco Bay, I. Biomass and Production. *Journal of Ecology* 64, 421-433.
- Maier, R.; Sieghardt, H. 1978. Studies on primary production in the Green Belt of the lake of Neusiedler. II. *Phragmites communis* Trin. *Polish Archives of Hydrobiology* 24, 245-258.
- *Malaisse, F.; Freson, R.; Goffinet, G.; Malaisse-Mousset.M. 1975. Litter fall and litter breakdown in Miombo. In: Golley, B.; Medina, E. (eds.), 1975, *Tropical Ecological Systems: Trends in Terrestrial and Aquatic Research*. Ecological Studies 11, Springer, New York, pp. 137-152.
- Malaisse, F. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, *Dynamic Properties of Forest Ecosystems*, IBP 23. Cambridge University Press, p. 672.
- *Mall, R.E. 1969. Soil-water-salt relationships of waterflow food plants in the Suisum Marsh of California. *California Department of Fish and Game, WildC. Bull.* 1, pp. 1-59.
- *Mall, L.P.; Billore, S.K.; Misra, C.M. 1974. Relation of ecological efficiency with photosynthetic structure in some herbaceous stands. School of Studies in Botany, Vikram Univ. VJJAIN 456010, India. (manuscript).

- *Manakov, K.N. 1961. Absorption of mineral elements and nitrogen from the soil by vegetation in the forests of the Kola Peninsula. In: Rodin, L.E.; Bazilevich, N.I. (eds.), 1968, Production and Mineral Cycling in Terrestrial Vegetation, Oliver and Boyd, Edinburgh, p. 288, Pochvovedenie (Moscow), 8.
- *Manakov, K.N. 1962. Characteristics of the plant litter fall in some forest plantations of the Murmansk Province. Botaniceskii Zhurnal (Leningrad) 47.
- *Mann, K.H. 1972. Macrophyte production and detritus food chains in coastal waters. Memorie dell'Istituto Italiano di Idrobiologia 29, 353-383.
- *Marchenko, A.I.; Karpov, Y.M. 1961. Study of plant mass reserves in spruce and green moos forests of the Northern Taiga. Botaniceskii Zhurnal (Leningrad) 46.
- *Marchenko, A.I.; Karpov, Y.M. 1962. Mineral exchange in spruce forests of the northern Taiga and the forest-tundra of the Archangel Province. In: Rodin, L.E.; Bazilevich, N.I. (eds.), 1968, Production and Mineral Cycling in Terrestrial Vegetation, Oliver and Boyd, Edinburgh, 288 pp., Pochvovedenie (Moscow) 7.
- Margaris, N.S. 1978. Structure and dynamics in a phryganic ecosystem. In: Lieth, H.F.H. (ed.), 1978, Patterns of Primary Production in the Biosphere, Benchmark Papers in Ecology 8, Dowden, Hutchinson and Ross, Stroudsburg, Pennsylvania, p. 342.
- Marshall, D.E. 1970. Characteristics of Spartina marsh which is receiving treated municipal wastes. Institute of Marine Science, University of North Carolina, Ann. Rep. 70, pp. 317-385.
- *Maruyama, I.; Satoo, T. 1953. Estimation of the amount of foliage of trees and stands. Report 1. On the Akamatu of Iwate District. Bull. For. Exp. Sta. Meguro 65, 1-10.
- *Mason, C.F. 1970. Snail population, beech litter production and the role of snails in litter decomposition. Oecologia 5, 215-239.
- Mason, C.F.; Bryant, R.J. 1975. Production, nutrient content and decomposition of *Phragmites communis* Trin. and *Typha angustifolia* L. Journal of Ecology 63, 71-95.
- Mathews, C.P.; Westlake, D.F. 1969. Estimation of production by populations of higher plants subject to high mortality. Oikos 20, 156-160.
- Matreyeva, N.V.; Parinkina, O.M.; Chernbv, Y.J. 1975. Maria Pronchitsheva Bay, USSR. In: Rosswall, T.; Heal, O.W. (eds.), 1975, Structure and Function of Tundra Ecosystems, Ecological Bulletins No. 20, Swedish Natural Science Research Council, Stockholm, pp.61-72.
- *Mattei, F.; Gibbon, D.; Abd El-Rahman, A.A. 1972. Crop potential productivity and energy conversion efficiency in semi-arid climates. In: Rodin, L.E. (ed.), 1972, Eco-Physiological Foundation of Ecosystems Productivity in Arid Zone. Int. Symposium USSR 1972, USSR Acad. of Scie. Leningrad, pp. 207-211.

- Maurya, A.N. 1970. Ecology of Varanasi Grasslands with reference to two common species. In: Choudhuri, G.N.; Varshnev, S.P. (eds.), 1979, Productivity of the Plant Communities in Salt Affected Areas of the Indo-Gangetic Plains., Geo-Eco-Trop. 3, 119-135.
- *Medina, E. 1968. Bodenatmung und Streuproduktion verschiedener tropische Pflanzengemeinschaften. Berichte der Deutschen Botanischen Gesellschaft 81, 159-168.
- Medina, E.; Zelwer, M. 1972. Soil respiration in tropical plant communities. In: Golley, P.M.; Golley, F.B. (eds.), 1972, Papers from a Symposium on Tropical Ecology with an Emphasis on Organic Productivity. Athens, pp. 245-267.
- *Medwecka-Kornas, A. 1967. Estimation of primary production as a basis for studies of secondary production. In: Petruszewicz, K. (ed.), Secondary Productivity of Terrestrial Ecosystems: Principles and Methods, Panstwowe Wydawn, Warsaw, pp. 83-95.
- *Medwecka-Kornas, A.; Tomnicki, A.; Bandstaciolczyk, E. 1974. Energy Flow in the Oak-Hornbeam Forest (IBP Projekt "Ispina). Bulletin de l'Academie Polonaise des Sciences, Serie des Sciences Biologiques 22, 563-567.
- Medwecka-Kornas, E. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, Dynamic Properties of Forest Ecosystems, IBP 23. Cambridge University Press, p. 609.
- *Melin, E. 1930. Biological decomposition of some types of litter from North American forests. Ecology 11, 72-101.
- Menaut, J.-C.; Cesar, J. 1979. Structure and primary productivity of Lamto savannas, Ivory Coast. Ecology 60, 1197-1210.
- Mendelsohn, I.A.; Marcellus, K.L. 1976. Angiosperm production of three Virginia marshes in various salinity and soil nutrient regimes. Chesapeake Science (Solomons, Maryland) 17, 15-23.
- *Meredith, D.; Scott, J.D.; Rose, C.J. 1955. The preservation and utilisation of grassland products. In: Meredith, D. (ed.), The grasses and pastures of South Africa, pp. 672-684.
- Merzoev, O.G. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, Dynamic Properties of Forest Ecosystems, IBP 23. Cambridge University Press. pp. 622-623.
- *Metz, L.J. 1952. Weight and nitrogen and calcium content of the annual litter fall of forests in the south Carolina Piedmont. Proceedings of the Soil Science Society of America 16, 38-41.
- *Mikola, P. 1960. Comparative experiment on decomposition rates of forest litter in southern and northern Finland. Oikos 11, 161-166.
- *Miles, J. 1976. The growth of *Narthecium ossifragum* in some southern English mires. Journal of Ecology 64, 849-858.

*Miller, R.B.; Hurst, F.B. 1957. The quantity and nutrient content of hard beech litter. New Zealand Forestry Research Notes 8, p. 14.

Miller, R.B. 1963. Plant nutrients in hard beech. III The cycle of nutrients. New Zealand Journal of Science 6, 388-413.

Miller, R.B. 1971. Forest productivity in the temperate humid zone of the southern hemisphere. In: Duvigneaud, P. (ed.), 1971, Productivity of Forest Ecosystems. Proceedings of the Brussels Symposium, October 1969. UNESCO, Paris. p. 229.

*Miller, H.G.; Cooper, J.M.; Miller, J.D. 1976. Effect of nitrogen supply on nutrients in litter fall and crown leaching in a stand of corsican pine. Journal of Applied Ecology 13, 233-248.

Miller; Watson. 1978. Heather productivity and its relevance to the regulation of red grouse populations. In: Heal, O.W.; Perkins, R.F. (eds.), 1978, Production ecology of some British moors and montane grasslands, Springer-Verlag, Berlin, pp. 277-285.

*Miller, P.C.; Mangan, R.; Kummerow, J. 1982. Vertical distribution of organic matter in eight vegetation types near Eagle Summit, Alaska. Holarctic Ecology 5, 117-124.

*Milton, S.J.; Siegfried, W.R. 1981. Above-ground biomass of Australian Acacias in the southern Cape, South Africa. Journal of South African Botany 47, 701-716.

*Mina, V.N. 1955. The nitrogen and ash element cycle in the oak woods of the forest-steppe. Pochvovedenie (Moscow) 6,.

Miroshnitchenko. 1970. Primary production of grazing lands. In: Cooper, J.P. (ed.), 1975, Photosynthesis and Productivity in Different Environments. IBP 3. Cambridge University Press, p. 61.

Misra, R.; Singh, J.S.; Singh, K.P. 1967. Preliminary observations on the production of dry matter by sal (*Shorea robusta* Linn. f.). Tropical Ecology 8, 94-104.

Misra, R. 1970. Primary production of Chakia forests and the IBP/PT, Study of organic productivity and nutrient cycling in monsoon forests, grasslands and croplands. IUCN Publication new series (Eleventh Technical Meeting) New Delhi, 17, pp. 230-239.

Misra, R. 1972. A comparative study of net primary productivity of dry deciduous forest and grassland of Varanasi, India. In: Golley, P.M.; Golley, F.B. (eds.), 1972, Papers from a Symposium on Tropical Ecology with an Emphasis on Organic Productivity. Athens, pp. 229-293.

*Mitchell, H.L. 1936. Trends in the nitrogen, phosphorus, potassium and calcium content of the leaves of some forest trees during the growing season. Black Rock Forest Papers (Cornwall-on-the-Hudson, N.Y.) 1, 30-44.

- Mitsch, W.J. 1975. Systems analysis of nutrient disposal in cypress wetlands and lake ecosystems in Florida. In: Conner; Day (eds.), 1976, Productivity and Composition, Ph.D. Thesis, Univ. of Florida, p. 1362.
- *Miyata, I.; Shiomi, T. 1965. Ecological studies on the vegetation of Akiyoshidai limestone plateau. 1. Structure of the forest community of Chojagamori. Japanese Journal of Ecology 15, 29-34.
- *Moeller, C.M. 1946. Untersuchungen ueber Laubmenge, Stoffverlust und Stoffproduktion des Waldes. Forstlige Forsoegsvaesen (Denmark) 17, 1-287.
- *Moeller, C.M. 1947. The effect of thinning, age and site on foliage, increment and loss of dry matter. Journal of Forestry 45, 393-404.
- Moeller, C.M.; Mueller, D.; Nielsen, J. 1954. Respiration in stem and branches of beech. Forstlige Forsoegsvaesen (Denmark) 21, 273-301.
- Moeller, C.M.; Mueller, D.; Nielsen, J. 1954. The dry matter production of European beech. Forstlige Forsoegsvaesen (Denmark) 21, 253-335.
- Moir, W.H. 1969. Steppe communities in the foothills of the Colorado front range and their relative productivities. American Midland Naturalist 81, 331-340.
- *Moll, E.J.; Woods, D.B. 1971. The rate of forest tree growth and a forest ordination at Xumeni. Natal. Bothalia 10, 451-460.
- *Molloy, L.F.; Bridger, B.A.; Cairns, A. 1979. Studies on a climasequence of soils in tussock grasslands: 15. Litter decomposition, weight losses and changes in of contents of total XI and organic constituents. New Zealand Journal of Science 21, 265-276.
- *Molotovskiy, Y.I. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, Dynamic Properties of Forest Ecosystems, IBP 23. Cambridge University Press, p. 646.
- *Monk, C.D.; Child, G.I.; Nicholson, S.A. 1970. Biomass, litter and leaf surface estimates of on oak-hickory forest. Oikos 21, 138-141.
- Monk, C.D. 1973. Terrestrial mineral cycling and modeling. Coweeta Site FY 71-72 overview, Eastern deciduous forest biome memo report, pp. 72-169.
- *Montague, K.A.; Day, F.P. 1980. Belowground biomass in four plant communities of the great dismal Swamp, Virginia. American Midland Naturalist 103, 83-87.
- *Mooloy, L.F.; Blakemore, L.C. 1974. Studies on a clinosequence of soils in tussock grasslands, 1. Introduction, sites and soils. New Zealand Journal of Science 17, 233-255.
- Mooney, H.A. 1981. Primary production in mediterranean-climate regions. In: Di Castri, F; Goodall, D.W.; Specht, R.L. (eds.), 1981, Mediterranean Type Shrublands, Ecosystems of the World 11, Elsevier Scientific Publ., Amsterdam, pp. 249-255.

Mooney, H.A. 1981. The producers-their resources and adaptive response. In: Di Castri, F; Goodall, D.W.; Specht, R.L. (eds.), 1981, Mediterranean Type Shrublands, Ecosystems of the World 11, Elsevier Scientific Publ., Amsterdam, pp. 175-201.

*Moore, P.H.; Bhadresa, R. 1978. Population structure, biomass and pattern in a semi-desert shrub, *Zygophyllum eurypterum*, in the Turan biosphere reserve of north eastern Iran. Journal of Applied Ecology 15, 837-846.

*Morel, G.; Bourliere, F. 1962. Relations ecologiques des avifaunes sedentaires et migratrices dans une savane sahelienne du bas senegal. La Terre et la Vie 16, 371-93.

Morgan, M.H. 1961. Angiosperm production on a salt marsh. M.S. Thesis, University of Delaware, U.S.A., p. 34.

Morgan, M.H. 1961. Annual angiosperm production of a salt marsh. In: Chapman, V.J. (ed.), 1977, Wet Coastal Ecosystems, Ecosystems of the World 1, [Reimold, R.J., Mangals and salt marshes of Eastern United States.] Elsevier Scientific Publ., Amsterdam, p. 163: Thesis, University of Delaware, Newark, Del. 33.

*Mork, E. 1942. Om stroefallet i vare skoger. Meddelelser fra Norske Skogforsoksvesen (Kristiana) 29, 297-365.

*Mudie, P.J. 1970. A survey of the coastal wetland vegetation of north San Diego Bay. California Department of Fish and Game Contr. W. 26, D25-51, 79.

Mueller, D.; Nielsen J. 1965. Production brute, pertes par respiration et production nette dans la foret ombrophile tropicale. Forstlige Forsoegsvaesen (Denmark) 29, 73-160.

Nihlgard, B. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, Dynamic Properties of Forest Ecosystems, IBP 23. Cambridge University Press. pp. 617-618.

Nilsson, J. 1970. Notes on the biomass and productivity of belowground organs of a south Swedish hay-meadow. Botaniska Notiser (Lund) 123, 183-194.

*Nixon, S.W.; Oviatt, C.A. 1973. Analysis of local variation in the standing crop of *Spartina alterniflora*. Botanica Marina (Hamburg) 16, 103-109.

Noble, I.R. 1977. Long-term biomass dynamics in an arid chenopod shrub community at Koonamore, South Australia. Australian Journal of Botany 25, 639-653.

*Nomoto, N. 1964. Primary productivity of beech forest in Japan. Japanese Journal of Botany 3, 385-421.

*Nomura, Y.; Sato, H. 1963. Vegetation of Triomoto Island. Sci. Rep. Osaka City Univ. Exp. Yaeyama Archipel, pp. 177-196.

Nordfeldt, S. 1951. Studies of napier grass, 1. Nutritive values, 2. Optimum feeding level. Technical Bulletin 12 - University of Hawaii Agricultural Experiment Station, 8.

- *Norin, B.N.; Ignateuko, I.V. 1975. Ary-mas, USSR. In: Rosswall, T.; Heal, O.W. (eds.), 1975, Structure and Function of Tundra Ecosystems, Ecological Bulletins No. 20, Swedish Natural Science Research Council, Stockholm, pp.183-191.
- Norman, M.J.T. 1963. The pattern of dry matter and nutrient content changes in native pastures at Katherine, N. T. Australian Journal of Experimental Agriculture and Animal Husbandry 3, 119-124.
- *Norton, B.E. 1974. I.B.P. studies in the desert biome. Bulletin of the Ecological Society of America 55, 6-10.
- Numata, M. 1975. Ecological studies in Japanese grasslands. University of Tokyo Press, JIBP Synthesis 13, pp. 219-210.
- *Numata, M. 1979. Primary producers in meadows. In: Coupland, R.T. (ed.), 1979, Grassland Ecosystems of the World: Analysis of Grasslands and Their Uses, IBP 18, Cambridge University Press, pp. 127-138.
- *Nye, P.H. 1958. The plant importance of fallows and soils in storing plant nutrients in Ghana. In: Rodin, L.E.; Bazilevich, N.I. (eds.), 1968, Production and Mineral Cycling in Terrestrial Vegetation, Oliver and Boyd, Edinburgh, p. 288, J. C. W. Afr. Sci. Assoc. 4.
- Nye, P.H.; Greenland, D.J. 1960. The soil under shifting cultivation. Technical Communication of the Commonwealth Bureau of Soil Science 51, 1-156.
- *Nykvist, N. 1971. The effect of clear felling on the distribution of biomass and nutrients. In: Rosswall, T. (ed.), 1971, Systems Analysis in Northern Coniferous Forests - IBP Workshop. Swedish Natural Science Research Council, Stockholm; Bulletin from the Ecological Research Committee 14, pp. 166-178.
- O'Brien, B.J.; Scott, J.D. 1978. Movement and turnover of soil organic matter as indicated by carbon isotope measurements. Soil Biology and Biochemistry 10, 309-318.
- *Odum, E.P. 1959. Fundamentals of Ecology. Saunders, Philadelphia, p. 546.
- *Odum, E.P. 1961. The role of tidal marshes in estuarine production. New York State Conservationist (Albany) 15, 12-35.
- *Odum, E.P. 1965. Organic production and turnover in old field succession. Ecology 41, 34-49.
- *Odum, E.P.; Fanning, M.E. 1973. Comparison of the productivity of *Spartina alterniflora* and *S. cynosuroides* in Georgia coastal marshes. Bulletin of the Georgia Academy of Sciences (Atlanta) 31, 1-12.
- *Ogawa, H.; Yoda, K.; Kira, K.; Ogino, K.; Shidei, T.; Ratanawongse, D.; Apasutaya, C. 1965. Comparative ecological studies on three main types of forest vegetation in Thailand. I. Structure and floristic composition. Nature and Life in Southeast Asia (Tokyo) 4, pp. 13-48.

*Ohmasa, M.; Mori, K. 1937. The amount and fall and decomposition in the leaf litter of the forest trees of Japan. Bull. For. Exp. Sta. Tokyo-Fu 3, 39-101.

Old, S.M. 1969. Microclimates, fire and plant production in an Illinois prairie. Ecological Monographs 39, 355-384.

Onuf, C.P.; Quammen, M.L.; Shaffer, G.P.; Peterson, C.H.; Chapman, J.W., Cermak, J.; Holmes, R.W. 1978. An analysis of the values of central and southern California coastal wetlands. In: Wetland Functions and Values: The State of Our Understanding. American Water Resources Association, pp. 186-199.

*Orndorff, K.A.; Lang, G.E. 1981. Leaf litter redistribution in a west Nigerian hardwood forest. Journal of Ecology 69, 225-235.

*Oshima, Y.; Kimura, M.; Iwaki, H.; Kuroiwa, S. 1958. Ecological and physiological studies on the vegetation of Mt. Shimagare. I. Preliminary survey of the vegetation of Mt. Shimagare. Botanical Magazine, Tokyo 71, 289-301.

*Ovchinnikov, P.N. et al. 1972. Phytomass productivity in Pamirs-Alay Mountains as related to its distribution according to vegetation types and zones. International Symposium, USSR, June 7-19, 1972, Ecophysiological Foundation of Ecosystem Productivity in Arid Zone, USSR Academy of Science, Leningrad, pp. 137-142.

*Ovington, J.D.; Pearsall, W.H. 1956. Production ecology, II. Estimates of average production by trees. Oikos 7, 202-205.

Ovington, J.D. 1956. The form, weights and productivity of tree species grown in close stands. New Phytologist 55, 289-304.

*Ovington, J.D. 1957. Dry matter production by *Pinus sylvestris* L. Annals of Botany N. S. 21, 287-314.

Ovington, J.D.; Heitkamp, D.; Lawrence, D.B. 1963. Plant biomass and productivity of prairie, savanna, oakwood, and maize field ecosystems in central Minnesota. Ecology 44, 52-63.

*Owen, T.H. 1954. Observations on the monthly litter-fall and nutrient content of sitka spruce litter. Forestry 27, 7-15.

P'yavchenko, N.I. 1960. Biological cycle of nitrogen and ash elements in waterlogged forests. In: Rodin, L.E.; Bazilevich, N.I. (eds.), 1968, Production and Mineral Cycling in Terrestrial Vegetation, Oliver and Boyd, Edinburgh, p. 288, Pochvevedenie (Moscow), No. 6.

*Pandaya, S.C. 1974. Dynamics of primary productivity of grazing land and forest ecosystems in western India. In: A.J. Cave (ed.), 1974, Structure, Functioning and Management of Ecosystems, Proc. 1st. Intl. Congress on Ecology, The Hague, September 1974. Pudoc, Wageningen. pp. 46-51.

*Pandey, A.N. 1978. Aboveground standing-crop determination of a grassland community by density and quadrat methods. *Indian Journal of Ecology* 5, 203-213.

Pandey, H.N.; Gaur, J.P.; Singh, R.N. 1980. Litter input and decomposition in tropical dry deciduous forest, grassland and abandoned crop field communities at Varanasi, India. *Oecologia Plantarum* 1, 317-323.

Pandey, D.D.; Sant, H.R. 1980. The plant biomass and net primary production of the protected and grazed grasslands of Varanasi. *Indian Journal of Ecology* 7, 77-83.

Papp, L.B. 1979. Die Nettoproduktion der Baeume eines Quercetum-petraeae-cerris Waldes auf der Probeflaeche von Sikokut (Nord Ungarn). *Acta Botanica Academiae Scientiarum Hungaricae* 25, 113-123.

*Parfenova, Y.I. 1941. A study of mineral exchange between the soil and the plant. *Problems of Contemporary Soil Science* 12.

Parker, G.R.; Schneider, G. 1975. Biomass and productivity of an alder swamp in northern Michigan. *Canadian Journal of Forest Research* 5, 403-409.

Parshevnikov, A.I. 1957. Effects of replacement of spruce by birch on the properties of peaty humus soils. In: Rodin, L.E.; Bazilevich, N.I. (eds.), 1968, *Production and Mineral Cycling in Terrestrial Vegetation*, Oliver and Boyd, Edinburgh, p. 288, *Young Forestry Workers on the 40th Anniversary of the October Revolution*, Moscow.

Parshevnikov, A.L. 1962. The nitrogen and ash element cycle in relation to alternation of tree species in the forests of the Central Taiga. In: Rodin, L.E.; Bazilevich, N.I. (eds.), 1968, *Production and Mineral Cycling in Terrestrial Vegetation*, Oliver and Boyd, Edinburgh, p. 288, *Trudy Inst. Lesa Drev. Sib. Otd.* 52.

Pastor, J.; Bockheim, J.G. 1981. Biomass and production of an aspen-mixed hardwood-spodosol ecosystem in northern Wisconsin, USA. *Canadian Journal of Forest Research* 11, 132-138.

Paterson, D.D. 1938. Further experiments with cultivated tropical fodder crops. *Empire Journal of Experimental Agriculture* 6, 323-40.

Patten, D.T. 1975. Phenology and function of Sonoran desert annuals in relation to environmental changes. *US-IBP Desert Biome Res. Memo. 76-11.*, Reports of 1975 Progress, Vol. 3 Process Studies, Ecology Center, Utah State University, Logan, Utah, pp. 21-56.

Pearsall, W.H.; Newbould, P.J. 1957. Production ecology, IV. Standing crops of natural vegetation in the shrub artic. *Journal of Ecology* 45, 593-599.

Pearson, L.C. 1965. Primary productivity in a northern desert area. *Oikos* 15, 211-228.

Pearson, L.C. 1965. Primary production in grazed and ungrazed desert communities in eastern Idaho. *Ecology* 46, 278-85.

Penafiel, S.R. 1979. Net primary productivity and vegetation characteristics of a *pinus*-grass community. *Sylvatrop. Laguna* 4, 167-177.

*Perina, V.; Vintrova, E. 1958. The effect of fallen pine-needles on the humus conditions of the pinewoods on the Pleistocene sands. *Sbornik Ceskoslovenske Akademie Zemedelske (Annals of the Czechoslovak Academy of Agricultural Sciences, Prague)* 4, 673-688.

*Perry, R.A. 1970. The effects on grass and browse production of various treatments on a mulga community in Central Australia. In: Norman, M.J.T. (ed.), *Proc. XI Intl. Grassland Congress, Brisbane, Watson Ferguson and Co.*, pp. 63-66.

*Pershina, M.N.; Yakovleva, M.Y. 1960. Biological cycle of ash elements in the arid steppe zone of the USSR. In: Rodin, L.E.; Bazilevich, N.I. (eds.), 1968, *Production and Mineral Cycling in Terrestrial Vegetation*, Oliver and Boyd, Edinburgh, p. 288, *Reports of Soviet Soil Sci. 7th Int. Congr. of Soil Sci., Madison, Moscow*.

*Persson, H. 1975. Deciduous woodland at Andersby, eastern Sweden: Field layer and below ground production. *Acta Phytogeographica Suecica (Uppsala)* 62.

*Peterson, E.B.; Chan, Y.H.; Cragg, J.B. 1970. Aboveground standing crop, leaf area and caloric value in an aspen clone near Calgary, Alberta. *Canadian Journal of Botany* 48, 1459-1469.

Pollard, D.F.W. 1971. Above-ground drymatter production in three stands of trembling aspen. *Canadian Journal of Forest Research* 2, 27-33.

Polozova, T.G.; Shamurin, V.F. 1970. Unpublished data from a paper for the Finland Tundra Biome Meeting. In: Bliss, L.C., 1972.

Popesch-Zeletin, I. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, *Dynamic Properties of Forest Ecosystems, IBP 23*. Cambridge University Press, p. 613.

*Pospelova, E.B. 1972. Vegetation of the Agapa Station and productivity of the main plant communities. In: Wielgolaski, F.E.; Rosswall, T. (eds.), 1972, *Proc. IV Intl. Meeting on the Biological Productivity of Tundra, Leningrad, Oct. 1971*. Tundra Biome Steering Committee, Stockholm, pp. 204-208.

*Post, L.J. 1970. Dry-matter production of mountain maple and balsam fir in northwestern New Brunswick. *Ecology* 51, 548-550.

*Potts, S.F. 1939. A method for determining the quantity of foliage per acre of woodland. *Journal of Forestry* 37, 922-923.

Prine, G.M.; Burton, G.W. 1956. The effect of nitrogen rate and clipping frequency upon the yield, protein content and certain morphological characteristics of coastal Bermuda grass. *Agronomy Journal* 48, 296-301.

Puempel, B. 1977. Bestandesstruktur, Phytomassevorrat und Produktion verschiedener Pflanzengesellschaften im Glocknergebiet. *Oecologia Plantarum* 13, 227-251.

- *Puszhar, L.; Traczyk, T.; Wojcik, Z. 1972. Primary production of the herb layer and plant fall in the *Vaccinio myrtillo-pinetum* forest association in the Pisz Forest (northeast Poland). *Ekologia Polska* (Warsaw) 20, 253-285.
- Quinnald, C.L.; Cosby, H.E. 1958. Relicts of climax vegetation on two mesas in western North Dakota. *Ecology* 39, 29-32.
- Rains, A.B. 1963. Grassland research in northern Nigeria, 1952-62. In: Bourliere, F.; Hadley, M., 1970, *The Ecology of Tropical Savannas*, Annual Review of Ecology and Systematics 1, 125-152.
- *Rakhmaniana. 1966. Arctic tundra ecosystems. In: Bliss, L.C. et al., (eds.) Tab. 1, p. 368.
- Ralston, C.W. 1973. Annual primary productivity on a loblolly pine plantation. IUFRO Biomass Studies (S. 4.01) Mensuration, Growth and Yield, University of Maine, Orono, pp. 105-118.
- Rao, A. 1970. The role of *Desmodium triflorum* in the production and nitrogen economy of grasslands at Varanasi. In: Golley, P.M.; Golley, F.B. (eds.), 1972, *Papers from a Symposium on Tropical Ecology with an Emphasis on Organic Productivity*. Athens, p. 118.
- *Rapp, M. 1969. Production de litiere et apport au sol d'elements mineraux dans deux ecosystemes mediterraneens: La foret de *Quercus ilex* L. et la garrigue de *Quercus coccifera* L. *Oecologia Plantarum* 4, 377-410.
- Rapp, M. 1971. Cycle de la matiere organique et des elements mineraux. Caracteristiques Pedologiques en Climat Mediterranee et Tempere, Editions du Centre National de la Recherche Scientifique, Paris.
- Rapp, M.; Lossaint, P. 1981. Some aspects of mineral cycling in the garrigue of southern France. In: Di Castri, F.; Goodall, D.W.; Specht, R.L. (eds.), 1981, *Mediterranean Type Shrublands, Ecosystems of the World* 11, Elsevier Scientific Publ., Amsterdam, pp. 289-301.
- *Reader, R.J. 1978. Primary production in northern bog marshes. In: Good, R.E.; Whigham, D.F.; Simpson, R.L., (eds.), 1978, *Freshwater Wetlands: Ecological Processes and Management Potential*, Academic Press, New York, pp. 53-61.
- Redmann, R.E. 1968. Productivity and distribution of grassland plant communities in western North Dakota. Ph.D. Thesis, University of Illinois, Urbana, p. 153.
- *Rehder, H. 1976. Nutrient turnover studies in alpine ecosystems. I. Phytomass and nutrient relations in four mat communities of the northern calcareous Alps. *Oecologia* 22, 411-423.
- Reichle, D.E. 1981. *Dynamic Properties of Forest Ecosystems*, IBP 23. Cambridge University Press, p. 683.
- *Reimold, R.J.; Gallagher, J.L.; Thompson, D.E. 1972. Coastal mapping with remote sensors. *Proc. Coastal Mapping Symp.*, American Society of Photogrammetry, pp. 99-112.

- Reimold, R.J.; Gallagher, J.L.; Linthurst, R.A.; Pfeiffer, W.J. 1975. Detritus production in coastal Georgia salt marshes. In: Cronin, L.E. (ed.), 1975, Estuarine Research, Academic Press, New York, pp. 217-228.
- *Reiners, W.A.; Reiners, N.M. 1970. Energy and nutrient dynamics of forest floors in three Minnesota forests. *Journal of Ecology* 58, 497-519.
- Reiners, W.A. 1972. Structure and energetics of three Minnesota forests. *Ecological Monographs* 42, 71-94.
- *Reiners, W.A. 1974. Foliage production by *Thuja occidentalis* L. from biomass and litter fall estimates. *American Midland Naturalist* 92, 340-345.
- Reitz, L.P. 1967. Wheat distribution and import of wheat. In *Wheat and Wheat Improvement*. In: Cooper, J.P. (ed.), 1975, Photosynthesis and Productivity in Different Environments. IBP 3. Cambridge University Press. pp. 145-172.
- *Remezov, N.P.; Bykova, L.N. 1953. Uptake and cycle of nitrogen and ash elements in aspen stands. *Pochvovedenie* (Moscow) 8, 28-41.
- *Remezov, N.P. 1956. The role of the biological cycle of elements in soil formation beneath the forest canopy. *Pochvovedenie* (Moscow) 7.
- Remezov, N.P.; Rodin, L.E.; Bazilevich, N.I. 1963. Instructions for the study of the biological cycle of ash elements and nitrogen in terrestrial plant associations in the main natural zones of the temperate zone. *Botaniceskii Zhurnal* (Leningrad) 46.
- Remezov, N.P. 1964. Carbon cycles and temperate and woodlands partial organic matter budget of green plants in Voronezh oak forest. *Ecological Studies* 1, 226-241.
- *Remezov, N.P.; Bykova, L.N.; Smirnova, K.M. 1969. Uptake and cycle of nitrogen and ash elements in the forests of European Russia, Moscow 1959. In: Rodin, L.E.; Bazilevich, N.I. (eds.), 1968, Production and Mineral Cycling in Terrestrial Vegetation, Oliver and Boyd, Edinburgh, p. 288.
- *Rencz, A.N.; Auclair, A.N.D. 1978. Biomass distribution in an subarctic *Picea mariana-Cladonia alpestris* woodland. *Canadian Journal of Forest Research* 8, 168-176.
- *Rethman, N.F.G.; Beukes, B.H. 1973. Overseeding of *Eragrostis curvula* on northeastern sandy Highveld. *Proceedings of the Grassland Society of South Africa* 8, 57-59.
- *Rice, E.L.; Parenti, R.L. 1979. Causes of decreases in productivity in undisturbed tall grass prairie. *American Journal of Botany* 65, 1091-1097.
- Richardson, C.J.; Wentz, W.A.; Chamie, J.P.M.; Kadeec, J.A.; Tilton, D.L. 1976. Plant growth, nutrient accumulation and decomposition in a central Michigan peatland used for effluent treatment. In: Tilton, D.L.; Kadlec, R.H.; Richardson, C.J. (eds.), *Freshwater Wetlands and Sewage Effluent Disposal*, Univ. Michigan, Ann Arbor, Michigan, pp. 77-117.

*Rickard, W.H. 1975. Litterfall in a Douglas fir forest near the Trojan nuclear power station, Oregon. Northwest Science 49, 183-189.

*Rieley, J.O.; Richards, P.W.; Bebbington, A.D.L. 1979. The ecological role of bryophytes in a North Wales woodland. Journal of Ecology 67, 497-527.

Robinson. 1970. J.O. Grunow, pers. comm. In: Bourliere, F.; Hadley, M., 1970, The ecology of tropical savannas, Annual Review of Ecology and Systematics 1, 125-152.

Rochow, J.J. 1974. Estimates of above-ground biomass and primary productivity in a Missouri forest. Journal of Ecology 62, 567-577.

Rochow, J.J. 1974. Litter fall relations in a Missouri forest. Oikos 25, 80-85.

Rodin, L.E.; Bazilevich, N.I. 1956. The minor biological cycle and the evolution of takyr landscapes. In: Rodin, L.E.; Bazilevich, N.I. (eds.), 1968, Production and Mineral Cycling in Terrestrial Vegetation, Oliver and Boyd, Edinburgh, p. 288, In: West Turkmenian Takyr and Their Agricultural Utilization, Moscow.

*Rodin, L.E. 1961. Dynamics of desert vegetation. In: Rodin, L.E.; Bazilevich, N.I. (eds.), 1968, Production and Mineral Cycling in Terrestrial Vegetation, Oliver and Boyd, Edinburgh, p. 288.

*Rodin, L.E. 1963. Vegetation of the deserts of west Turkmenia. In: Rodin, L.E.; Bazilevich, N.I. (eds.), 1968, Production and Mineral Cycling in Terrestrial Vegetation, Oliver and Boyd, Edinburgh, p. 288.

Rodin, L.E.; Bazilevich, N.I. 1968. Production and mineral cycling in terrestrial vegetation. In: Rodin, L.E.; Bazilevich, N.I. (eds.), 1968, Production and Mineral Cycling in Terrestrial Vegetation, Oliver and Boyd, Edinburgh, p. 288.

Rodin, L.E.; Bazilevich, N.J.; Miroshnichenko, Y.M. 1972. Productivity and biogeochemistry of *Artemisieta* in the mediterranean area. In: Rodin, L.E. (ed.), Internationales Symp. USSR in arid zone, USSR Academy of Sci., Eco./Physiol. Found. Ecosyst. Product. Leningrad, pp. 193-198.

*Rogers, H.H. 1967. Breeding for maximum production. Occasional Symposium 3, British Grassland Society, pp. 66-73.

*Roland, J.C. 1967. Recherches ecologiques dans la savane de lamto (cote d'ivoire): Donnees preliminaires sur le cycle annuel de la vegetation herbacee. La Terre et la Vie 21, 228-248.

*Rosswall, T. 1972. Progress in the Swedish tundra project 1971. In: Wielgolaski, F.E.; Rosswall, T. (eds.), 1972, Proc. IV Intl. Meeting on the Biological Productivity of Tundra, Leningrad, Oct. 1971. Tundra Biome Steering Committee, Stockholm, pp. 291-294.

*Rothacker, J.S.; Blow, F.E.; Potts, S.M. 1954. Estimating the quantity of tree foliage in oak stands in the Tennessee Valley. Journal of Forestry 52, 169-173.

Rousyaeva, G.G. 1972. Dynamics of the aboveground plant biomass in *Artemisia vachanica* communities at the western Pamirs. In: Rodin, L.E. (ed.), International Symposium, USSR June 7-9, 1972. Ecophysiological Foundation of Ecosystem Productivity in Arid Zone, USSR Academy of Science, Leningrad, pp. 148-151.

*Rozanova, I.M. 1960. The ash element cycle and alternation of the physico-chemical properties of leached chernozems beneath coniferous and broad-leaved stands. Trudy Laboratorii Lesovedeniia (Leningrad) 1.

Rozanov, B.G.; Rozanova, I.M. 1964. The biological cycle of nutrient elements of bamboo in the tropical forest of Burma. Botaniceskii Zhurnal (Leningrad) 49.

Rudneva et al. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, Dynamic Properties of Forest Ecosystems, IBP 23. Cambridge University Press, p. 622.

Runge, M. 1973. Energieumsaetze in den biozogenen terrestrischen oekosystemen. Scripta Geobotanica 4, p.77, In: Lieth, H.F.H. (ed.), 1978, Patterns of Primary Production in the Biosphere, Benchmark Papers in Ecology 8, Dowden, Hutchinson and Ross, Stroudsburg, Pennsylvania, p. 213.

*Rustamov, I.G. 1972. Phytomass quantitative characteristics and productivity of subshrub communities of the Krasnovocsk plateau. In: Rodin, L.E. (ed.), Ecophysiological Foundation of Ecosystems Productivity in Arid Zone, USSR Academy of Sci., Publ. House Nauka, Leningrad, p. 232.

*Rutherford, M.C. 1978. Karoo-fynbos biomass along an elevational gradient in the western cape. In: Rutherford, M.C., Primary Production Ecology in Southern Africa, In: Werger, M.J.A. (ed.), 1978, Biogeography and Ecology of Southern Africa, Dr.W. Junk Publ., The Hague, p. 628.

*Rutherford, M.C. 1978. Primary production in southern Africa. Biogeography and Ecology of Southern Africa, Dr. W. Junk, Publishers, The Hague, pp. 621-659.

*Rutherford, M.C. 1979. Aboveground biomass subdivisions in woody species of the savanna ecosystem project study area, Nylsvley. South African National Scientific Programmes Report 36, pp. 1-17.

*Sabhasri, S.; Khemnark, C.; Aksornkoe, S.; Ratisoonthorn, P. 1968. Primary production in dry evergreen forests at Sakarat, Amphoe Pax Thong Chai, Changwat Nakhon Ratchasima. I. Estimation of biomass and distribution among various organs. Cooperative Research Program, Tropical Environmental Data (Trend) Ecosystem Study of Tropical Dry Evergreen Forest, Bangkok Asrct 27, pp. 1-38.

Sahai, R., Asthana, M.; Srivastava, V.C. 1975. Effect of clipping on the energy budget of grassland ecosystems at Gorakhpur. Tropical Ecology 16, 65-68.

Sakai, A.; Yoshida, S.; Saito, M. 1979. Biomass and productivity of *Betula papyrifera* near its climatic limit in northwestern Canada. Low Temperature Science, Series B (Japan) 37, 33-38.

Satchell, J.E. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, Dynamic Properties of Forest Ecosystems, IBP 23. Cambridge University Press, p. 647.

*Sato, H. 1963. Dry matter production by *Abies sachalinensis* forest in Hokkaido. M.Sc. Thesis, Osaka City University, Japan.

Satoo, T. 1968. Primary prod. and distribution of produced dry matter in a plantation of *Cinnamomum camphosa*, Materials for the studies of growth in stands. Bull. Tokyo Univ. For. 64, 241-275.

Satoo, T. 1969. Primary production relation of coniferous forests in Japan. UNESCO, 1971, Productivity of Forest Ecosystems, PORC. Brussels Symp., 1969, Ecology and Conservation 4, pp. 191-209.

Satoo, T. 1970. Primary production in a plantation of Japanese Larch, *Larix leptolepis*: A summarized report of JPTF-66 Koiwaii. Journal of the Japanese Forestry Society 52, 154-158.

Satoo, T. 1971. Primary production relations in plantations of Norway spruce in Japan: Materials for the studies of growth in stand 8. Bull. Tokyo Univ. For. 65, 125-141.

*Satoo, T. 1979. Leaf-litter production in plantations of *Chamaecyparis obtusa* near an electric power plant in Owase, Mie. Japanese Journal of Ecology 29, 205-208.

*Satoo, T. 1979. Loss of canopy biomass due to thinning - A comparison of two young stands of *Cryptomeria japonica* of cutting and seedling origins. Journal of the Japanese Forestry Society Tokyo 61.

Satoo, T. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, Dynamic Properties of Forest Ecosystems, IBP 23. Cambridge University Press. pp. 600-602.

*Satoo, T.; Nakamura, K.; Senda, M. 1955. Materials for the studies of growth in stands. 1. Young stands of Japanese red pine of various density. Bull. Tokyo Univ. For. 48, 63-90.

*Satoo, T.; Kunugi, R.; Kumekawa, A. 1956. Materials for the studies of growth in stands. 3. Amount of leaves and production of wood in an aspen (*Populus davidiana*) second growth in Hokkaido. Bull. Tokyo Univ. For. 52, 33-58.

*Satoo, T.; Senda, M. 1958. Materials for the studies of growth in stands. 4. Amount of leaves and production of wood in a young plantation of *Chamaecyparis obtusa*. Bull. Tokyo Univ. For. 54, 71-100.

*Satoo, T.; Negeshi, K.; Senda, M. 1959. Materials for the studies of growth in stands. 5. Amount of leaves and growth in plantation of *Zelkova serrata* applied with crown thinning. Bull. Tokyo Univ. For. 55, 101-123.

Satoo, T.; Negisi, K.; Yagi, K. 1974. Primary production relations in plantations of *Thujaopsis dolabrata* in the Peninsula: Materials for the studies of growth in forest stands 12. Bull. Tokyo Univ. For. 66, 139-151.

- *Satoo, T.; Imoto, H. 1979. Modelling crown canopy of an even-aged stand of *Cryptomeria japonica* from measurement of leaf mass - A new approach to the morphology of forest crown. *Journal of the Japanese Forestry Society* 61, 127-134.
- *Schamurin, V.F.; Polozova, T.G.; Khodachek, E.A. 1972. Plant biomass of main plant communities at the Tareya station (Taimyr). In: Wielgolaski, F.E.; Rosswall, T. (eds.), 1972, *Proc. IV Intl. Meeting on the Biological Productivity of Tundra*, Leningrad, Oct. 1971. Tundra Biome Steering Committee, Stockholm, pp. 163-181.
- Schlesinger, W.H. 1978. Community structure, dynamics and nutrient cycling in the Okefenokee Cypress swamp-forest. *Ecological Monographs* 48, 43-65.
- Schlesinger, W.H. 1978. On the relative dominance of shrubs in Okefenokee Swamp. *American Naturalist* 112, 949-954.
- Schlesinger, W.H.; Gill, D.S. 1980. Biomass, production and changes in the availability of light, water and nutrients during the development of pure stands of the chaparral shrub, *Ceanothus megacarpus* after fire. *Ecology* 61, 781-789.
- *Schlesinger, W.H.; Hasey, M.M. 1981. Decomposition of Chaparral shrub foliage: Losses of organic matter and inorganic constituents from deciduous and evergreen leaves. *Ecology* 62, 762-774.
- Schmidt, L. 1977. Phytomassevorrat und Nettoprimaerproduktivitaet alpiner Zwergstrauchbestaende. *Oecologia Plantarum* 12, 195-213.
- *Scott, D.R.M. 1955. Amount and chemical composition of the organic matter contributed by overstory and understory vegetation to forest soil. *Yale University School of Forestry - Bulletin (New Haven)* 62, p. 73.
- *Scott, D.; Billings, W.D. 1964. Effects of environmental factors on standing crop and productivity of an alpine tundra. *Ecological Monographs* 34, 243-70.
- Sears, P.D. 1948. The effect of sheep droppings on yield, botanical composition, and chemical composition II. Results. In: Egunjobi, J.K. (ed.) 1969, *Primary productivity and nutrient cycling in terrestrial ecosystems*. Ph.D. thesis, Victoria University, Wellington, New Zealand. pp. 49-66.
- *Senda, M.; Satoo, T. 1956. Materials for the study of growth in stands. 2. White Pine (*Pinus strobus*) stands of various densities in Hokkaido. *Bull. Tokyo Univ. For.* 52, 15-31.
- *Seth, S.K.; Kaul, O.N.; Sharma, D.C. 1972. Potential productivity of Indian forests. In: Golley, P.M.; Golley, F.B. (eds.), 1972, *Papers from a Symposium on Tropical Ecology with an Emphasis on Organic Productivity*. Athens, pp. 271-277.
- *Shalyt, M.S. 1950. The underground portion of certain meadow, steppe and desert plants and phytocenoses. 1. Herbaceous plants and semishrubs and phytocenoses of the forest, meadow and steppe zones. *Trudy Bot. Inst. Akad. Nauk. SSR, Ser. 3, Geobotanika*, V6.

- *Shalyt, M.S. 1952. The underground portion of certain meadow, steppe and desert plants and phytocoenoses. Trudy Bot. Inst. Akad. Nauk. SSR, Ser. 3, Geobotanika, V8.
- *Shamsutdinon, Z.S. 1972. Productivity of artificial black saxaust plantings in arid zone of Uzbekistan. In: Rodin, L.E. (ed.), 1975, Ecophysiological Foundation of Ecosystems Productivity in Arid Zone. Publ. House Nauka, Leningrad.
- Shamsiev, A. 1972. Radiation conditions and biological productivity of plants in southern Tajikistan. In: Rodin, L.E. (ed.), 1975, Ecophysiological Foundation of Ecosystems Productivity in Arid Zone. Int. Symp., Leningrad, pp. 112-113.
- Shankar, V.; Velayudhan, K.C.; Kanodia, K.C. 1978. Primary productivity, compartment transfers and systems transfer function in *Chrysopogon fulvus* grasslands. Annals of Arid Zone (Jodhpur) 17, 30-41.
- Shankar, V.; Velayudhan, K.C. 1979. Primary productivity, compartment transfers and systems transfer function in *Iseilema laxum* grasslands. Annals of Arid Zone (Jodhpur) 18, 143-152.
- *Sharma, V.K. 1976. Biomass estimation of *Shorea robusta* and *Buchanania lanzan* by regression technique in natural dry deciduous forest. In: Young, H.E. (ed.), Oslo Biomass Studies, XVI. Intl. Congress IUFRO, Oslo, pp. 131-142.
- Shaw, N.H.; Elich, T.W.; Haydock, K.P.; Waite, R.B. 1965. A comparison of seventeen introductions of *Paspalum* species, and naturalized *P. dilatatum* under cutting at Samford, south-eastern Queensland. Australian Journal of Experimental Agriculture and Animal Husbandry 5, 423-432.
- *Shibamoto, T. 1951. Productivity of forest soil in Japan and fertilizer for plantation. Midori 3, 9-16.
- *Shidei, T. 1960. Studies on the productivity of the forest. 1. Essential needle-leaved forests of Hokkaido. Kokusaku Pulp. Ind. Co. Tokyo, p. 100.
- *Shidei, T. 1963. Productivity of Haimatsu (*Pinus pumila*) community growing in alpine zone of Tateyama-range. Journal of the Japanese Forestry Society 45, 169-173.
- *Shidei, T. 1964. Studies on the productivity of the forest. 2. Larch (*Larix leptolepsis*) forests of Shinshu district. Jpn. For. Techn. Assoc. Tokyo, p. 61.
- Shidei, T. 1971. On the productivity of subarctic coniferous forest ecosystems in the Japanese Island. In: Rosswall, T. (ed.), 1971, Systems Analysis in Northern Coniferous Forests - IBP Workshop. Swedish Natural Science Research Council, Stockholm; Bulletin from the Ecological Research Committee 14, pp. 44-48.
- Shidei, T. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, Dynamic Properties of Forest Ecosystems, IBP 23. Cambridge University Press, p. 601.

- *Sibma, L. 1968. Growth of closed green crop surfaces in the Netherlands. *Netherlands Journal of Agricultural Science* 16, 211-216.
- *Simonovic, V. 1978. A quantitative study of roots in the forest ecosystem. *Biologica* 37, 543-550.
- *Sims, I.H. 1932. Litter deposition and accumulation in the pine-oak type of the southern Appalachians. *Journal of Forestry* 30, 90-91.
- Sims, P.L.; Singh, J.S. 1971. Herbage dynamics and net primary production in certain ungrazed and grazed grasslands in North America. In: French, N.R. (ed.), *Preliminary Analysis of Structure and Function in Grasslands*, Range Science Department, Science Series No. 10, Colorado State University, Fort Collins, pp. 59-124.
- Sims, P.L.; Singh, J.S. 1978. The structure and function of ten western North American grasslands: III. Net primary production, turnover and efficiencies of energy capture and water use. *Journal of Ecology* 66, 573-597.
- *Sims, R.A.; Steward, J.M. 1981. Aerial biomass distribution in an undisturbed and disturbed subarctic bog. *Canadian Journal of Botany* 59, 782-786.
- Singh, J.S. 1967. Seasonal variations in composition, plant biomass and net primary productivity in grassland at Varanasi. *Geo-Eco-Trop (Brussels)* 3, 119-135.
- *Singh, K.P. 1968. Litter production and nutrient turnover in deciduous forest of Varanasi. *International Society for Tropical Ecology, Varanasi, Tropical Ecology*, pp. 655-665.
- Singh, J.S.; Misra, R. 1969. Diversity, dominance, stability, and net production in the grasslands at Varanasi, India. *Canadian Journal of Botany* 47, 425-27.
- Singh, J.S. 1970. Progress Report C. S. J. R. Grant No. 38 (73) 69 G A VII. Kurukshetra University. In: Golley, P.M.; Golley, F.B. (eds.), 1972, *Papers from a Symposium on Tropical Ecology with an Emphasis on Organic Productivity*. Athens, p. 287.
- Singh, J.S.; Yadava, P.S. 1974. Seasonal variations in composition, plant biomass, and net primary productivity of a tropical grassland at Kurukshetra, India. *Ecological Monographs* 44, 351-376.
- *Singh, R.P.; Sharma, V.K. 1976. Biomass estimation in five different aged plantations of *Eucalyptus tereticornis* in western Uttar Pradesh. In: Young, H.E. (ed.), *Oslo Biomass Studies, XVI. Intl. Congress IUFRO, Oslo*, pp. 143-161.
- *Singh, A.K.; Ambasht, R.S.; Misra, K.N. 1979. Weight-loss and energy release of decomposing grass litter in a savanna ecosystem. *Japanese Journal of Ecology* 29, 369-374.
- Singh, R.; Joshi, M.C. 1980. Caloric content, standing crop of energy and energy capture efficiency of the sand dune herbaceous vegetation at Narhar near Pilani, Rajasthan, India. *Indian Journal of Ecology* 7, 196-206.

*Singh, S.P.; Pandey, V.N.; Tewary, C.K. 1980. Ecology Laboratory; Progress Report 1 July 1976 - 30 April 1980. Ecology Research Circle, Department of Botany, Kumaun Univ., Naini Tal 26300, India Vol. 2, pp. 4-8.

*Sjoers, H. 1954. Slaetteraengar i Graugaerde Finnmark. Acta Phytogeographica Suecica (Uppsala) 34, p. 135.

Smalley, A.E. 1958. The role of two invertebrate populations, *Littorina irrorata* and *Orchelimum fidicinum* in the energy flow of a salt marsh ecosystem. (Dissertation, Univ. of Georgia, Athens). In: Chapman, V.J. (ed.), 1977, Wet Coastal Ecosystems, Ecosystems of the World 1, [Reimold, R.J., Mangals and salt marshes of Eastern United States.] Elsevier Scientific Publ., Amsterdam, p. 428.

Smirnova, K.M.; Gorodentseva, G.A. 1958. Nutrient uptake and cycle in a birch wood. In: Rodin, L.E.; Bazilevich, N.I. (eds.), 1968, Production and Mineral Cycling in Terrestrial Vegetation, Oliver and Boyd, Edinburgh, p. 288, Bull. Mosk. Obshch. Ispyt, Priv. V. 13, No. 2.

Smirnova, K.M.; Gorodentseva, G.A. 1958. The consumption and rotation of nutritive elements in birch woods. Bull. Soc. Nat. Moscou (Biol.) 62, 135-147.

*Smith, L.; Walton, D.W.H. 1975. South Georgia, Subantarctic. In: Rosswall, T.; Heal, O.W. (eds.), Structure and Function of Tundra Ecosystems, Ecological Bulletins No. 20, 399-423.

Smith, L.L. 1979. Productivity and nutrient uptake in a tropical *Scirpus/Brachiaa Marsh*. Tropical Ecology 20, 49-55.

*Snedaker, S. 1970. Tropical ecosystem structure and function. Ecological studies on tropical moist forest succession in eastern lowland Guatemala. In: Farnworth, E.G.; Golley, F.B., (eds.), 1974, Fragile Ecosystems. Springer-Verlag, New York. pp. 67-111.

Sochava, V.; Lipatova, V.; Gorshkova, A. 1962. An attempt to calculate the total productivity of the above-ground portion grasses. Botaniceskii Zhurnal (Leningrad) 47, No. 4.

Sollins, P.; Reichle, D.E.; Olson, J.S. 1973. Organic matter budget and model for a southern Appalachian *Liriodendron* forest. US-AEC Report EDFB-IBP 73, Oak Ridge National Laboratory, Tennessee.

*Sonn, S.W. 1960. Der Einfluss des Waldes auf die Boeden Gustav Fischer Verlag, Jena, p. 166.

*Spain, A.V. 1973. Litter fall in a New South Wales conifer forest: A multivariate comparison of plant nutrient element status and return in four species. Journal of Applied Ecology 10, 527-556.

*Specht, R.L. 1958. Dark Island Heath. Australian Journal of Botany 6, 59-88.

*Specht, R.L. 1963. Dark Island Heath. VII. The effect of fertilizers on composition and growth. Australian Journal of Botany 11, 67-94.

Specht, R.L. 1966. The growth and distribution of mallee-broombush and heath vegetation near Dark Island Soak. Australian Journal of Botany 14, 361-371.

Specht, R.L. 1969. A comparison of the sclerophyllous vegetation characteristic of mediterranean type climates in France, California, and southern Australia. II. Dry matter, energy, and nutrient accumulation. Australian Journal of Botany 17, 293-308.

*Specht, R.L.; Brouwer, Y.M. 1975. Seasonal shoot growth of *Eucalyptus* spp. in the Brisbane area of Queensland. Australian Journal of Botany 23, 459-474.

*Specht, R. L. 1979. The *sclerophyllous* (heath) vegetation of Australia: The eastern and central states. In: Specht, R.L. (ed.), 1979, Heathlands and Related Shrublands, Ecosystems of the World 9A, Elsevier Scientific, Amsterdam, pp. 125-210.

Specht, R.L. 1981. Mallee ecosystems in southern Australia. In: Di Castri, F; Goodall, D.W.; Specht, R.L. (eds.), 1981, Mediterranean Type Shrublands, Ecosystems of the World 11, Elsevier Scientific Publ., Amsterdam, pp. 203-231.

*Squires, E.R.; Good, R.E. 1974. Seasonal changes in the productivity, caloric content, and chemical composition of a population of salt-marsh cord-grass (*Spartina alterniflora*). Chesapeake Science (Solomons, Maryland) 15, 1-32.

Stanhill, G. 1962. The effect of environmental factors on the growth of alfalfa in the field. Netherlands Journal of Agricultural Science 10, 247-53.

*Stanyukovich, K.V. 1963. Productivity of various types of vegetation of Tadzhikistan. In: Rodin, L.E.; Bazilevich, N.I., (eds.), 1969, Potential intensity and productivity photosynthesis in the plants of Pamirs. Tadzhik Academy of Sci. Department of plant physiology and biophysics, Subject Symposia 2, Dushanbe.

Stanyukovich, K.V.; Shukorov, A.S.; Stanyukovich, M.B. 1972. Biological productivity of various types of Tajirustan vegetation as related to humidity and altitude. In: Rodin, L.E., (ed.), Eco-physiological foundation of ecosystems productivity in arid zone. Int. Symp. Leningrad, 142.

*Steever, E.Z. 1972. Productivity and vegetation studies of a tidal salt marsh in Stonington, Cottrell marsh. In: Chapman, V.J. (ed.), 1977, Wet Coastal Ecosystems, Ecosystems of the World 1, [Reimold, R.J., Mangals and salt marshes of Eastern United States.] Elsevier Scientific Publ., Amsterdam, p. 428, Thesis, Connecticut College, New London, 56.

*Stewart, H.T.L.; Flinn, D.W.; Aeberli, B.C. 1979. Above-ground biomass of a mixed eucalypt forest in eastern Victoria. Australian Journal of Botany 27, 725-740.

*Stiles, W.; Williams, T.E. 1965. The response of a ryegrass white clover sward to various irrigation regimes. Journal of Agricultural Science 65, 351-364.

- *Stoate. 1958. Silvicultural and soils research. Karri Silviculture. Rep. For. Dep. W. Austral, p. 25.
- *Stroud, L.M.; Cooper, A.W. 1968. Color infrared aerial photographic interpretation and net primary productivity of a regularly-flooded North Carolina salt marsh. University of North Carolina Water Resource Research Institute, Report No. 14, p. 86.
- *Strojan, C.L.; Turner, F.B.; Castetter, R. 1979. Litter fall from shrub in the northern Mojave desert. Ecology 60, 891-900.
- *Strugnell, R.G.; Pigott, C. 1978. Biomass, shoot production and grazing of two grasslands in the Rwenzori National Park, Uganda. Journal of Ecology 66, 73-96.
- *Subba Rao, B.K.; Dabral, B.G.; Pande, S.K. 1972. Litter production in forest plantations of chir (*Pinus roxburghii*), teak (*Tectona grandis*) and sal (*Shorea robusta*) at new forest, Dehra Dun. Tropical Ecology, 235-243.
- *Suckling, F.E.T. 1960. Productivity of pasture species on Hill Country. New Zealand Journal of Agricultural Research 3, 579-591.
- *Sveshnikova, V.M. 1952. The root systems of plants in the Pamirs. Trudy Instituta Botaniki, Stalinabad, V 4.
- *Sviridova, L.K. 1961. Role of improvement cuttings in raising forest soil fertility. Soviet Soil Science, pp. 401-405.
- *Swift, M.J.; Russell-Smith, A.; Perfect, T.J. 1981. Decomposition and mineral-nutrient dynamics of plant litter in a regenerating bush-fallow in sub-humid tropical Nigeria. Journal of Ecology 69, 981-995.
- *Sykes, J.M.; Bunce, R.G.H. 1970. Fluctuations in litter-fall in a mixed deciduous woodland over a three-year period 1966-68. Oikos 21, 326-329.
- *Syvertsen, J.P.; Cunningham, G.L. 1978. Primary production and carbon allocation in creosotebush: The effect of leaf age on net gas exchange capacity. Desert Biome 3, pp. 39-44.
- *Tadaki, Y. 1963. Studies on production structure of forest. 4. Some studies on leaf-amount of stands and individual trees. Journal of the Japanese Forestry Society 45, 249-256.
- Tadaki, Y. 1965. Studies on production structure of forest. 7. The primary production of a young stand of *Castanopsis cuspidata*. Japanese Journal of Ecology 15, 142-147.

- *Tadaki, Y. 1966. Seasonal system of litterfall in young stands of *Castanopsis cuspidata*. Read at the 13th annual meeting of the Ecological Society of Japan, Osaka, 1966. Unpublished. In: Kira, T.; Sheidi, T. (eds.), 1967, Primary production and turnover of organic matter in different forest ecosystems of the western Pacific. Japanese Journal of Ecology 17, 70-87.
- *Tadaki, Y. 1966. Some discussion on the leaf biomass of forest stands and trees. Bull. Gov. For. Exp. Sta., Tokyo 184, 135-161.
- Tadaki, Y. 1968. Studies on the production structure of forest. 14. The third report on the primary production of a young stand of *Castanopsis cuspidata*. Journal of the Japanese Forestry Society 50, 60-65.
- *Tadaki, Y.; Shidei, T. 1960. Studies on productive structure of forest. 1. The seasonal variation of leaf amount and the dry matter production of deciduous sapling stand (*Ulmus pravifolia*). Journal of the Japanese Forestry Society 42, 427-434.
- *Tadaki, Y.; Shidei, T.; Sakasegawa, T.; Ogino, K. 1961. Studies on productive structure of forest. 2. Estimation of standing crop and some analyses on productivity of young birch stand (*Betula platyphylla*). Journal of the Japanese Forestry Society 43, 19-26.
- *Tadaki, Y.; Ogata, N.; Takagi, T. 1962. Studies on production structure of forest. 3. Estimation of standing crop and some analyses on productivity of young stands of *Castanopsis cuspidata*. Journal of the Japanese Forestry Society 44, 129-139.
- *Tadaki, Y.; Ogata, N.; Nagatomo, Y. 1965. The dry matter productivity in several stands of *Cryptomeria japonica* in Kyushu. Bull. Gov. For. Exp. Sta., Tokyo 173, 45-66.
- *Tadaki, Y.; Kawasaki, Y. 1966. Studies on production structure of forest. 9. Primary productivity of a young *Cryptomeria* plantation with excessively high stand density. Journal of the Japanese Forestry Society 48, 54-60.
- Tadaki, Y.; Ogata, N.; Nagatomo, Y. 1967. Studies on the production structure of forest. 11. Primary productivities of 28-year old plantations of *Cryptomeria* cuttings and seedlings origin. Bull. Gov. For. Exp. Stat., Tokyo 199, 47-65.
- Tadaki, Y.; Hatiya, K.; Tochiaki, K. 1969. Studies on the production structure of forest. 15. Primary productivity of *Fagus crenata* in plantation. Journal of the Japanese Forestry Society 51, 331-339.
- Tadaki, Y.; Itaiya, K.; Tochiaki, K.; Miyauchi, H.; Matsuda, U. 1970. Studies on the production structure of forest. 16. Primary productivity of *Abies veluchii* forests in subalpine zone of Mt. Fuji. Bull. Gov. For. Exp. Stat., Tokyo 229, 1-22.
- Tadmor, N.H.; Eyal, E.; Benjamin, R. 1972. Primary and secondary production of arid grassland. In: Rodin, L.E. (ed.), International Symposium USSR June 7-19, 1972, Ecophysiological Foundation of Ecosystem Productivity in Arid Zone. USSR Academy of Science, Publ. House Nauka, Leningrad, pp. 173-177.

- *Tainton, N.M.; Booysen, P.; Scott, J.D. 1970. Response of tall grass veld to different intensities, seasons and frequencies of clipping. *Proceedings of the Grassland Society of South Africa* 5, 32-41.
- *Tamm, C.O.; Carbonnier, C. 1961. Vaextnaeringen som skoglig produktionsfaktor, *Kungl. Skogs och Lantbruksademiens Sammantraede Tidskrift* 100, 95-124.
- *Tamm, C.O. 1975. Plant nutrients as limiting factors in ecosystem dynamics. In: *Productivity of World Ecosystems, Proceedings of a Symposium, Seattle 1972*, National Academy of Sciences, Washington, p. 128.
- *Tanner, E.V.J. 1977. Mineral cycling studies in montane forest in Jamaica. Ph.D. Thesis, University of Cambridge, p. 296.
- Tanner, E.V.J. 1980. Litterfall in montane rain forests of Jamaica and its relation to climate. *Journal of Ecology* 68, 833-848.
- *Tanner, E.V.J. 1981. The decomposition of leaf litter in Jamaica montane rain forest. *Journal of Ecology* 69, 263-275.
- *Tappeiner, J.C.; John, H.H. 1973. Biomass and nutrient content of hazel undergrowth. *Ecology* 54, 1342-1348.
- *Tappeiner, J.C.; Alm, A.A. 1975. Undergrowth vegetation effects on the nutrient content of litterfall and soils in red pine and birch stands in northern Minnesota. *Ecology* 56, 1193-1200.
- Tesarova, M. 1976. Litter production and disappearance in some alluvial meadows (preliminary results). *Folia Geobotanica et Phytotaxonomica (Prague)* 11, 63-74.
- *Thames, J.L. 1974. Tuscon basin validation site. Desert Biome, Reports of 1973 Progress in the Volumes Research Memorandum 74-3, pp. 1-33.
- Thamdrup, H.M. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, *Dynamic Properties of Forest Ecosystems*, IBP 23. Cambridge University Press, p. 581.
- Tieszen, L.L. 1972. Photosynthesis in relation to primary production. In: Wielgolaski, F.E.; Rosswall, T. (eds.), 1972, *Proceedings IV Intl. Meeting on the Biological Productivity of Tundra*, Leningrad, Oct. 1971. Tundra Biome Steering Committee, Stockholm, pp. 52-62.
- Tieszen, L.L. 1972. The seasonal course of aboveground production and chlorophyll distribution in a wet arctic tundra at Barrow, Alaska. *Arctic and Alpine Res.* 4, 307-324.
- Togari, Y.; Murata, Y.; Saeki, T. 1970. PP: Photosynthesis and utilization of solar energy level I. Experiments. Report II (1967 Data). JIBP/PP-Photosynthesis, Local Productivity Group, Tokyo, p. 83.
- *Traczyk, T. 1967. Studies on herb layer production estimate and the size of plant fall. *Ekologia Polska (Warsaw) Seria A* 47, 838-865.

- *Traczyk, H.; Traczyk, T. 1967. Tentative estimation of the production of herb layer. *Ekologia Polska* (Warsaw) Seria A, 15.
- Tripati, J.S. 1970. Monthly variation in the standing crop biomass, net production, nutrient content of the species and plant decomposition in a grassland of Varanasi. *Geo-Eco-Trop* (Brussels) 3, 119-135.
- Trivedi, B.K., Mishra, G.P. 1979. Seasonal variations in species composition, plant biomass and net community productivity of two grasslands in Sehima-Dichanthium cover type. *Tropical Ecology* 20, 114-125.
- *Tsutsumi, T. 1963. Influence of the development of forest vegetation and clear cutting on some properties of forest soil. 1. Soil changes with the development of forest vegetation. *Bull. Kyoto Univ. For.* 34, 37-64.
- *Tumidajowicz, D. 1973. The dynamics of biomass and primary production of herb layer plants in the deciduous Tilio-Carpinetum association of the Niepolomice forest. *Bulletin de l'Academie Polonaise des Sciences* 21, No. 2.
- Turner, F.B.; Mcbrayer, J.F. 1974. Rock Valley Validation Site. Desert Biome Reports of 1973 Progress, Vol. II. Ecosystem Analysis Studies U.S. Intern, Biological Programm, Ecology Center, Utah State University, Logan, pp. 1-64.
- *Turner, R.E.; Gosselink, J.G. 1975. A note on standing crop of *Spartina alternifolia* in Texas and Florida. *Contributions in Marine Science* 19, 113-118.
- Tyler, G.; Gullstrand; Holmquist, K.; Kjellstraud, A. 1973. Primary production and distribution of organic matter and metal elements in two heath ecosystems. *Journal of Ecology* 61, 251-268.
- *Udell, H.F.; Zarndsky, J.; Doheny, T.E. 1969. Productivity and nutrient values of plants growing in the salt marshes of the town of Hempstead, Long Island. *Bulletin of the Torrey Botanical Club* 96, 42-51.
- *Van Cleve, K.; Verech, L.A.; Schlenfeld, R.L. 1971. Accumulation of nitrogen in alder (*Alnus*) ecosystems near Fairbanks, Alaska. *Arctic and Alpine Research* 3, 101-114.
- Van Cleve, K. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, Dynamic Properties of Forest Ecosystems, IBP 23. Cambridge University Press. pp. 648-650.
- Van Cleve, K.; Barney, R.; Schlentner, R. 1981. Evidence of temperature control of production and nutrient cycling in 2 interior Alaskan (USA) black spruce (*Picea mariana*) ecosystems. *Canadian Journal of Forest Research* 11, 258-273.
- Van der Drift, J. 1981. IBP Woodlands Data Set. In: Reichle, D.E. (ed.), 1981, Dynamic Properties of Forest Ecosystems, IBP 23. Cambridge University Press, p. 607.
- *Van Hook, R.I. 1971. Energy and nutrient dynamics of spider and orthopteran populations in a grassland ecosystem. *Ecological Monographs* 41, 1-24.

- *Van Lear, D.H.; Goebel, N.B. 1976. Leaf fall and forest floor characteristics in loblolly pine plantations in South Carolina Piedmont. *Soil Science Society of America Journal* 40, 116-119.
- *Vaychis, M.V. 1958. Concerning the effect of European larch in altering sod-podzolic soils. *Pochvovedenie (Moscow)* 5.
- Verschuren. 1970. pers. comm. In: Bourliere, F.; Hadley, M., 1970, The ecology of tropical savannas, *Annual Review of Ecology and Systematics* 1, 125-152.
- Vicente-Chandler, J.; Silva, S.; Figarella, J. 1959. The effect of nitrogen fertilization and frequency of cutting on the yield and composition of three tropical grasses. *Agronomy Journal* 51, 202-206.
- Vicente-Chandler, J.; Caro-Costas, R.; Pearson, R.W.; Abruna, F.; Figarella, J.; Silve, S. 1964. The intensive management of tropical forages in Puerto Rico. *Bulletin of the University of Puerto Rico Agricultural Experiment Station* 187, p. 152.
- *Vickery, P.J. 1972. Grazing and net primary production of a temperate grassland. *Journal of Applied Ecology* 9, 307-314.
- *Viro, P.J. 1955. Investigations on forest litter. *Communications Instituti Forestalis Fenniae (Helsinki)* 45, p. 65.
- *Vollmer, A.T.; Bamberg, S.A.; Wallace, A.; Cha, J.W. 1974. Plant productivity and nutrient interrelationships of perennials in the Mojave desert. *US-IBP Desert Biome Res. Memo 75-5. Report of 1974 Progress, Utah Vol. 3*, pp. 36-55.
- *Vorster, L.F.; Mostert, J.W.C. 1968. Veldbemestingstendense oor'n dekade in die sentrale organic-Vrystaat. *Proceedings of the Grassland Society of South Africa* 3, 111-119.
- *Vyas, L.N.; Agarwal, S.K.; Garg, R.K. 1972. Biomass production by *Erythrina suberosa roxb.* In: Golley, P.M.; Golley, F.B. (eds.), 1972, *Papers from a Symposium on Tropical Ecology with an Emphasis on Organic Productivity*. Athens, pp. 195-201.
- Vyskot, M. 1976. Biomass production of tree layer in a floodplain forest near Lednice. In: Young, H.E. (ed.), *Oslo Biomass Studies, XVI. Intl. Congress IUFRO, Oslo*, pp. 175-202.
- *Waits, E.D. 1967. Net primary productivity of an irregularly-flooded North Carolina salt marsh. In: Chapman, V.J. (ed.), 1977, *Wet Coastal Ecosystems, Ecosystems of the World 1*, [Reimold, R.J., *Mangals and salt marshes of Eastern United States.*] Elsevier Scientific Publ., Amsterdam, p. 428.
- *Walker, D. 1968. A reconnaissance of the non-arboreal vegetation of the Pindaunde catchment, Mount Wilhelm, New Guinea. *Journal of Ecology* 56, 445-466.
- Wallentinus, H.G. 1973. Above-ground primary production of a *Juncetum gerardi* on a Baltic seashore meadow. *Oikos* 24, 200-219.

- *Ward, H.K.; Cleghorn, W.B. 1970. The effects of grazing practices on tree regrowth after clearing indigenous woodland. *Rhod. J. Agric. Res.* 8, 57-65.
- Warren-Wilson, J. 1957. Arctic plant growth. *Advancement of Science (London)* 13, 383-88.
- *Wass, M.L.; Wright, T.D. 1969. Coastal wetlands of Virginia. Interim report of the governor and general assembly. Special Report in Applied Marine Science and Ocean Engineering, Virginia in *St. Mar. Sci.*, Gloucester Point, Va. 10, p. 154.
- Watkins, J.M.; Lewy Van Severen, M. 1951. Effect of frequency and height of cutting on the yield, stand and protein content of some forages in El Salvador. *Agronomy Journal* 43, 291-296.
- *Weaver, G.T. 1976. A comparison of models for estimating production of oak and hickory branches. In: Young, H.E. (ed.), *Oslo Biomass Studies, XVI. Intl. Cong. IUFRO*, pp. 232-250.
- *Webb, L.J. 1956. Note of the studies of rain forest vegetation in Australia. Study of Tropical Vegetation. *Proc. Kandy Symposium. Kandy, Ceylon. UNESCO, Paris, 1958.* pp. 171-173.
- *Webb, L.J.; Tracey, J.G.; Williams, W.T.; Lance, G.N. 1969. The pattern of mineral return in leaf litter of three subtropical Australian forests. *Australian Forester (Perth)* 33, 99-110.
- *Webber, P.J. 1974. Tundra primary productivity. In: Ives, J.D.; Barry, R.G. (eds.), 1974, *Arctic and Alpine Environments*, Methuen, London, pp. 445-473.
- Weber, C.R.; Shibles, R.M.; Byth, D.E. 1966. Effect of plant population and row spacing on soy bean development and production. *Agronomy Journal* 58, 99-102.
- *Weetman, G.F.; Harland, R. 1964. Foliage and wood production in unthinned black spruce in Northern Quebec. *Forest Science* 10, 80-88.
- Wein, R.W.; Bliss, L.C. 1974. Primary production in Arctic cotton grass Tussock Tundra communities. *Arctic and Alpine Res.* 6, 261-274.
- *Welbourn, M.L.; Stone, E.L. 1981. Distribution of net litter inputs with respect to slope position and wind direction. *Forest Science* 27, 651-659.

*Westlake, D.E. 1966. The biomass and productivity of *Glyceria maxima*. 1. Seasonal changes in biomass. *Journal of Ecology* 54, 745-753.

West. 1970. pers. comm. In: Bourliere, F.; Hadley, M., 1970, The ecology of tropical savannas, *Annual Review of Ecology and Systematics* 1, 125-152.

*Westman, W.E.; Rogers, R.W. 1977. Biomass and structure of a subtropical *Eucalyptus* forest, north Stradbroke Island. *Australian Journal of Botany* 25, 171-191.

*Whigham, D.; Simpson, R. 1977. Growth, mortality and biomass partitioning in freshwater tidal wetland populations of wild rice (*Zizania aquatica* var. *aquatica*). *Bulletin of the Torrey Botanical Club* 104, 347-351.

Whittaker, R.H. 1966. Forest dimensions and production in the Great Smoky Mountains. *Ecology* 47, 103-121.

*Whittaker, R.H.; Niering, W.A. 1975. Vegetation of the Santa Catalina Mountains, Arizona. V. Biomass, production and diversity along the elevation gradient. *Ecology* 56, 771-790.

Wiegert, R.G.; Evans, F.C. 1964. Primary production and the disappearance of dead vegetation on an old field in south eastern Michigan. *Ecology* 45, 49-63.

*Wiegert, R.G.; Monk, C.D. 1972. Litter production and energy accumulation in three plantations of longleaf pine (*Pinus palustris* mill). *Ecology* 53, 949-953.

Wiegert, R.G.; McGinnis, J.T. 1975. Annual production and disappearance of detritus on three South Carolina old fields. *Ecology* 56, 129-140.

Wielgolaski, F.E. 1972. Production energy flow and nutrient cycling through a terrestrial ecosystem at a high altitude area in Norway. In: Wielgolaski, F.E.; Rosswall, T. (eds.), 1972, *Proceedings IV Intl. Meeting on the Biological Productivity of Tundra*, Leningrad, Oct. 1971. Tundra Biome Steering Committee, Stockholm, pp. 283-290.

Wielgolaski, F.E. 1978. Primary production of alpine communities in Norway estimated by CO₂-exchange and harvesting techniques. In: Hall, D.O. et al. (eds.), 1978, *Proc. IV International Congress on Photosynthesis*, Reading, September 1977, Biochemical Society Publ., London, pp. 245-257.

Wight, J.; Black, A.L. 1972. Energy fixation and precipitation - use efficiency in a fertilized rangeland ecosystem of the Northern Great Plains. *Journal of Range Management* 25, 376-380.

*Will, G.M. 1959. Nutrient return in litter and rainfall under some exotic conifer stands in New Zealand. *New Zealand Journal of Agricultural Research* 2, 719-734.

Will, G.M. 1964. Dry matter production and nutrient uptake by *Pinus radiata* in New Zealand. *Commonwealth Forestry Review* 43, 57-70.

Will, G.M. 1966. Root growth and dry matter production in a high-producing stand of *Pinus radiata*. New Zealand Forestry Research Notes 44, 2-16.

*Williams, P.A. 1977. Growth biomass, and net productivity of tall Tussock (*Chionochloa*) grasslands, Canterbury, New Zealand. New Zealand Journal of Botany 15, 399-441.

*Williams, R.B.; Murdock, M.B. 1968. Compartmental analysis of production and decay of *Juncus roemerianus*. Assoc. Southeastern Bid. Bull. 15, p. 59.

Williams, R.B.; Murdock, M.B. 1969. The potential importance of *Spartina alterniflora* in conveying zinc, manganese and iron into estuarine food chains. Proc. 2nd. Natl. Symposium on Radio-Ecology, pp. 431-439.

Williamson, P. 1976. Above-ground primary production of chalk grassland allowing for leaf death. Journal of Ecology 64, 1059-1075.

*Willems, J.A. 1980. Observations on northwest European limestone grassland communities: V. A. an experimental approach to the study of species diversity and aboveground biomass in chalk grassland. Botany Proceeding C. 83, pp. 279-295.

Wise, E.S. 1970. A study energy fixation and net production of plant communities in salt marshes of Back River, Virginia. In: Geeson; Clark; Clark (eds.), 1978, Wetland functions and values: The state of our understanding. Amer. Water Resources Ass., Minneapolis, 126. Ph.D. Thesis, Dissertation, Univ. Illinois Urbana, Champaign, p. 134.

*Witkamp, M.; Van Der Drift. 1961. Breakdown of forest litter in relation to environmental factors. Plant and Soil 15, 295-311.

Wollner, H.; Castillo, J.L. 1968. The effect of different levels of N on the yield of pangota (*Digitaria decumbens* stent). Revista Cub. Cienc. Agric. 2, 227-32.

*Woods, F.W.; Gauegos, C.M. 1970. Litter accumulation in selected forests of the Republic of Panama. Biotropica 2, 46-50.

Worker, G.F.; Marble, V.L. 1968. Comparison of sorghum forage types as to yield and chemical composition. Agronomy Journal 60, 669-672.

*Wright, T.W. 1957. Some effects of thinning on the soil of a Norway spruce plantation. Forestry 30, 123-133.

*Wright, T.W.; Will, G. M. 1958. The nutrient content of Scots and Corsican pines growing on sand dunes. Forestry 31, 13-25.

- *Yamada, M.; Maruyama, K. 1962. Ecological studies on beech stands. Rec. 72nd Meet. Japan For. Soc., pp. 245-248.
- *Yamada, J. 1976. Forest ecological studies of the montane forest of Mt. Pangrango, West Java. 3. Litterfall of the tropical montane forest near Cibscilas. South East Asian Studies, Kyoto 14, pp. 194-229.
- *Yoda, K. 1967. Comparative ecological studies in three main types of forest vegetation in Thailand. III. Communit Respiration. In: Kira, T.; Iwata, K. (eds.), Nature and Life in Southeast Asia, Kyoto, Japan 5, p. 87.
- *Yoda, K. 1968. A preliminary survey of the forest vegetation of eastern Nepal. III. Plant biomass in the sample plots chosen from different vegetation zones. Journal of the College of Arts and Science, Chiba University 5.
- *Yoda, K.; Kira, T. 1969. Comparative ecological studies on three main types of forest vegetation in Thailand. V. Accumulation and turnover of soil organic matter with notes on the altitudinal soil sequence on Khao (Mt.) Luang, Peninsular Thailand. Nature and Life in Southeast Asia (Tokyo) 6, pp. 83-109.
- Young, O.R.; Butchart, D.H. 1963. Irrigated sugar beet production in Hawaii. Hawaii Agricultural Experiment Station Technical Bulletin 52, p. 36.
- *Young, H.E. 1967. Symposium on primary productivity and mineral cycling in natural ecosystems. Ecological Society of America, New York, pp. 1-245.
- *Zavitkovski, J.; Newton, M. 1971. Litterfall and litter accumulation in red alder stands in "Western Oregon." Plant and Soil 35, 257-268.
- Zavitkovski, J.; Stevens, R.D. 1972. Primary production of red alder ecosystems. Ecology 53, 235-242.
- *Zavitkovski, J. 1976. Ground vegetation biomass, production, and efficiency of energy utilization in some northern Wisconsin forest ecosystems. Ecology 57, 694-706.
- Zavitkovski, J.; Jeffers, R.M.; Nienstaedt, H.; Strong, T.F. 1981. Biomass production of several jack pine (*Pinus banksiana*) provenances at 3 Lake States (USA) locations. Canadian Journal of Forest Research 11, 441-447.
- Zedler, J.; Winfield, T.; Mauricello, D. 1978. Primary productivity in a southern California estuary. Coastal Zone 1978, Symp. on Technical Environmental, Socioeconomic, and Regulatory Aspects of Costal Zone, Management, Americ. Soc. of Civil Engineers, New York 11, pp. 649-662.
- *Zemljanickii, L.T. 1954. Quantity and ash composition of litter in artificial forest plantations in the zone of chestnut soils. Pochvovedenie (Moscow) 12, 30-35.

*Zonn, S.V.; Li Cheng-Kwei. 1962. Dynamics of the decomposition of litter and seasonal variations of their ash composition in two types of tropical biogeocoenoses. *Soobshcheniia Laboratoriia Lesovedeniia* (Moscow) 21.

*Zonn, S.V.; Karpachevskiiy, L.O.; Stefin, V.V. 1963. The forest soils of Kamchatka. In: Rodin, L.E.; Bazilevich, N.I. (eds.), Moscow.

*Zonnefeld, I.S. 1980. Some consequences of the mutual relationship between climate and vegetation in the Sahel and Sudan. *ITC-Journal* 2, pp. 255-296.

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