

INSTITUTO BOTÂNICO DA UNIVERSIDADE DE COIMBRA

MEMÓRIAS
DA
SOCIEDADE BROTERIANA

VOLUME XXIV (1.ª parte)

-7. JUL. 1975

REDACTORES

PROF. DR. A. FERNANDES

Director do Instituto Botânico

DR. J. BARROS NEVES

Prof. Catedrático de Botânica



COIMBRA

1974

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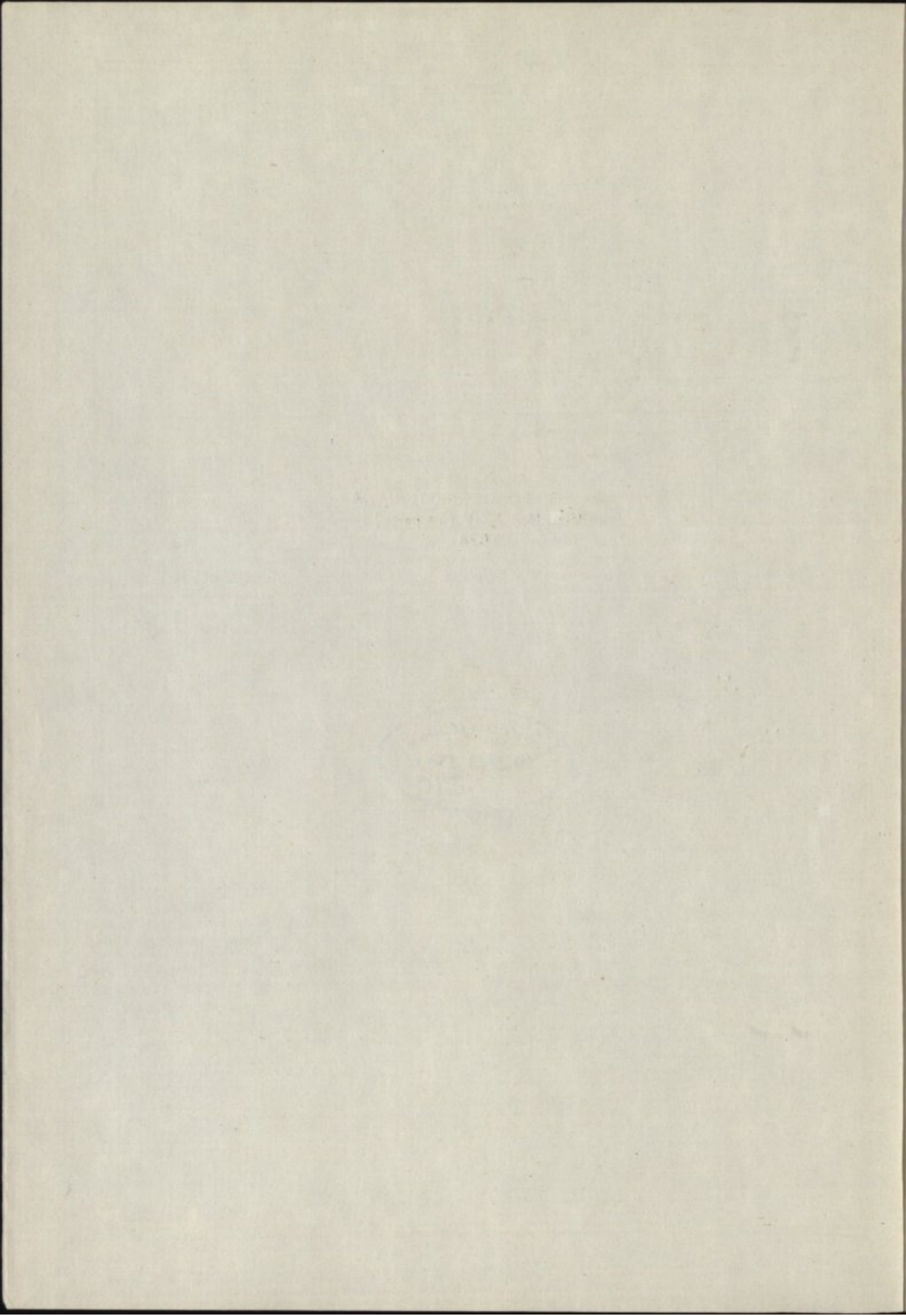
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EDITADO POR
O INSTITUTO BRASILEIRO DE HISTÓRIA E GEOGRAFIA



Composição e impressão das Oficinas da
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NOTA DA REDACÇÃO

Reservou-se o volume XXIV das Memórias da Sociedade Broteriana para a publicação dos «Floristic Reports» apresentados no VII Simpósio da Flora Europaea, realizado em Coimbra de 22 a 31 de Maio de 1972.

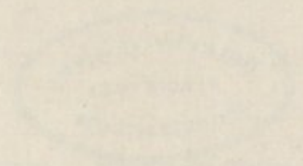
Devido à extensão de alguns desses «Reports», ao facto de alguns Autores demorarem muito a devolução das provas e ainda a dificuldades que surgiram na tipografia, tornou-se necessário dividir o volume em duas partes, a primeira das quais foi impressa em 1974, enquanto que a segunda só será iniciada em 1975.

A Redacção pede desculpa aos participantes do Simpósio por esta demora que não foi possível evitar.



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FLORISTIC REPORT FOR ALBANIA

BY

F. MARKGRAF

Universität, Zürich

PROFESSOR ILIA MITRUSHI of the State University of Tirana has been kind enough to send me details of botanical books published in Albania, and of recent botanical papers published by Albanian authors in Albanian scientific journals. They are listed below:

Books

K. PAPANISTO, XH. QOSJA, M. DEMIRI: *Flora e Tiranës*. Tiranë 1962. 520 pages, 216 text figures elucidating descriptive terms, 2 sketch maps.

K. PAPANISTO, XH. QOSJA, M. DEMIRI: *Flora e Tiranës (Ikono-grafia)*. Tiranë 1965. 515 pages with habit figures of all 1300 plant species of Albania.

I. MITRUSHI: *Dendroflora e Shqipërisë (Tree Flora of Albania)*. Tiranë 1966. 519 pages, 617 habit figures of plants, 23 pages with drawings elucidating descriptive terms.

XH. QOSJA: *Barërat e këqia të Shqipërisë*. Tiranë 1966. (Adventive plants of Albania). Not seen.

Papers

Buletin i Shkencave Bujqësore (Bulletin of Agricultural Sciences):

1963 no. 4 p. 21-50: M. PAPAJANI (The Botanical composition of the oats cultivated in the P. R. of Albania). Albanian, with summary in English, French and Russian.

1965 no. 4 p. 99-123: LL. TRESKA DHE I. NAKO: [The Chestnut tree (*Castanea sativa* Mill.) in Albania]. Albanian, with summary in English, French and Russian.

Buletin i Universitetet Shtetëror të Tiranës, Seria Shkencat Natyrore (Bulletin of the State's University of Tirana, Series of Natural Sciences):

1962 no. 1 p. 83-95: XH. QOSJA [The species of the genus *kokëmadhë* (*Phalaris*) in the cultivated lands of Albania]. Albanian, with summary in English.

1962 no. 3. p. 63-87: M. DEMIRI (Geobotanical Considerations on the Coniferous forests of Mediterranean Type at Divjaka). Albanian, with summary in French.

1962 no. 3. p. 157-172: XH. QOSJA (The weed vegetation in the agricultural zones of Peshkopia and Burrel). Albanian, with summary in English.

1962 no. 4. p. 40-53: I. MITRUSHI (Identification key to the species of the Class Coniferopsida according to their fruits). Albanian, with summary in French.

1963 no. 2. p. 62-87: XH. QOSJA (The vegetation of adventive plants in the district of Elbasan). Albanian, with summary in French.

1963 no. 3. p. 40-61: I. MITRUSHI (Analytical key of the families of trees, shrubs and subshrubs indigenous and cultivated in Europe). Albanian, with summary in French.

1964 no. 1. p. 89-97: M. DEMIRI [Considerations on ecology and geographical distribution of the species of trifilë (*Trifolium*) in Albania]. Albanian, with summary in French.

1964 no. 2. p. 116-118: M. DEMIRI [Considerations on the bio-ecology and geographical distribution of the drizë (*Paliurus aculeatus* Lam.) and of some means of combatting it]. Albanian, with summary in French.

1964 no. 3. p. 55-61: I. MITRUSHI [Features of distribution and ecology of mëshhtëknë (*Betula pendula* Roth) in Albania]. Albanian, with summary in French.

1965 no. 3. p. 59: I. MITRUSHI [A prototypic key of the genus trëndafil (*Rosa*)]. Albanian, with summary in French.

1966 no. 4. p. 3-24: M. DEMIRI (Considerations on the distribution and ecology of the noxious weeds of the natural grasslands of the Dumre and the Polis, and on the possibility of combatting them). Albanian, with summary in French.

1968 no. 1. p. 9-21: I. MITRUSHI [Ecology of the chestnut tree (*Castanea sativa* Mill.) in the district of Shkodra]. Albanian, with summary in French.

1969 no. 3. p. 93-113: U. ASLLANI [Features of the dafinë (*Laurus nobilis* L.) and its fat oil]. Albanian, with summary in French.

1969 no. 4. p. 145-191: I. MITRUSHI (Identification key of the most important trees and shrubs of Albania in the winter season). Albanian, with summary in French.

I. MITRUSHI & L. TOPUSI (Biometrical and biochemical considerations regarding the forms and possible cultivars of the Chestnut tree in our country). Albanian, with summary in French.

The Floras, all written in the Albanian language, are produced principally for the interest of Albanian scholars, students, agriculturalists, technicians etc. Both begin with a dichotomous key to families, the Dendroflora moreover by a direct key for determination of genera, and proceed to generic and specific keys. The species are characterized especially by a description within the key, by their Albanian name, their habitat, flowering and fruiting time, and by illustrations. These are in part original drawings, but mainly taken from well-known, reliable books. In several cases localities are cited. 1300 species are enumerated and all are figured in the «Ikonografia» for the region of Tirana. According to the sketch map this region extends westwards halfway to Durrës, northwards halfway to Krujë, southwards to Elbasan and eastwards to Shëngjergj and Mount Shën Nue. It comprises therefore different vegetation belts, from lowland to high mountain chains. The Dendroflora, referring to the whole country, also contains many cultivated taxa.

It is unknown to the reviewer, whether the authors had the opportunity of comparing their collections with the type specimens of foreign botanical centres, or whether they relied on literature and on their own experience. At any rate, since there was in former times, as far as is known to the reviewer, no possibility for higher botanical education in Albania, it must be admired that these authors have initiated such progress in botany in their country in the short time since 1962.

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FLORISTIC REPORT ON AUSTRIA (1961-1971)

BY

W. GUTERMANN & H. NIKLFELD

Botanical Institute of the University, Vienna

SINCE the publication of JANCHEN's well known *Catalogus Florae Austriae* and its supplementing «Ergänzungshefte» (1963, 1964, 1966a) no further bibliography of floristic work concerned with the whole country was issued. After JANCHEN's death, in 1970, no institution was prepared to gather further data of published or unpublished work in the fields of taxonomy, floristics, and phytogeography in Austria.

In need of an extensive bibliographical survey we tried to collect the data of the last decade as completely as possible, including also publications on plant geography in a wider sense (not fully covered by JANCHEN's bibliographies) and other more marginal disciplines. Thus we hoped to provide both appropriate information for any research in these fields, and a basis for further bibliographical indices which it is planned will be issued at shorter intervals.

The presentation of so comprehensive a list, not fully congruent with the aims of the Flora Europaea Editorial Committee, will however be beyond the scope and concept of these present «Floristic & Taxonomic Reports». We decided therefore to publish the elaborated bibliography (EHRENDORFER, FÜRNKRANZ, GUTERMANN & NIKLFELD, 1974) in Austria but to give here in short the data directly connected to Flora Europaea as well as some general information.

While phytosociological and palynological studies on recent and postglacial vegetation have been promoted by an increasing number of institutions during this decade, taxonomy is still centered at the few university or museum institutes traditionally devoted to this subject. Pure floristics have not found their appropriate place in the scientific programs of university institutions during the past 50 years, and have remained principally the domain of private engagement, in many cases unfortunately cut off from the advan-

cements of to-day's taxonomy. New activities however arose with some amateur groups linked to regional institutions, and increasing floristic work is inspired by the program of the distribution mapping scheme of Austria, connected to the international project of «*Kartierung der Flora Mitteleuropas*» (see NIKLFELD, 1971). There is however no botanical organization of Austria to connect all floristic interests, nor a central organ to collect the relevant results.

An extensive list of current Austrian journals containing taxonomic, floristic, or geobotanical information is included in the full bibliography mentioned above. Of those periodicals started after 1961 two are mentioned here, as they contain, beyond local floristics, information of wider taxonomic interest:

Mitteilungen der Botanischen Arbeitsgemeinschaft am Oberösterreichischen Landesmuseum Linz. Linz. 1969. 1.

Mitteilungsblatt. Floristische Arbeitsgemeinschaft, Naturwissenschaftlicher Verein für Steiermark. Graz. 1967. 5. (Numbers 1-4 were issued under the title «*Hinweise an die Mitarbeiter*»; they were not distributed to the public and did not contain taxonomic information.)

A modern Austrian flora is still lacking. Each detailed floristic work in this country has to be based on a large number of either older or local contributions. JANCHEN's *Catalogus Florae Austriae*, together with its supplements (JANCHEN, 1963, 1964, 1966a, and, the completing index, 1967) may serve as the main guidance and summary. Austria as a whole is included in HEGI's «*Illustrierte Flora von Mittel-Europa*», new editions of which are still in progress (cf. the «Report» on Germany in this volume; detailed references to the last issues are included in our full bibliography mentioned). Taxonomical and nomenclatural changes as well as additions to the Austrian flora since JANCHEN's *Catalogus* are covered by the «*Liste der Gefäßpflanzen Mitteleuropas*» (EHRENDORFER & al., 1967)¹.

As to the scope of regional floras within Austria (relating to the Bundesländer), publication of a «*Flora von Wien, Niederösterreich und Nordburgenland*» has commenced (JANCHEN, 1966b), the concept of which is similar to that of the «*Catalogus*» but giving more details in respect to the area covered. The editorship of a further three fascicules of the late JANCHEN's inheritance is left to G. WENDELBERGER. Work on other regional floras is in progress or

¹ A revised and enlarged edition of this check list was issued in 1973.

is under discussion; important results of these investigations are the comprehensive supplementary records by LEUTE (1967, 1969) to the flora of Kärnten, and by POLATSCHEK (first instalment: 1969) to the flora of Tirol and Vorarlberg. The latter countries were previously covered by the late Hermann von HANDEL-MAZZETTI's contributions to the flora of historical Tyrol (1961, 1962). The late REITER published (1964) an addition to his rare and little known but noteworthy «*Kleine Flora des Landes Salzburg*» (†LEEDER & REITER, 1959, issued just before our report's decade). New records to the flora of Oberösterreich, collected by a group of active florists, are published in annual reports in the *Jahrbuch des Oberösterreichischen Musealvereins* (e. g. SCHMID & HAMANN, 1963). We must further point to the important contributions by MELZER (e. g. MELZER, 1961, 1962, 1963a, 1965, 1966a, 1967a) reflecting critical and extensive field work in Steiermark and neighbouring countries, as well as to TRAXLER's papers on the Burgenland flora (e. g. TRAXLER, 1967-1971).

As stated already, a considerable amount of bibliographical data is included in the supplements to the «Catalogus» (JANCHEN, 1963, 1964, 1966a). Additional bibliographical summaries of phytosociology and floristics may be found in *Bibliographia Phytosociologica* (WAGNER, 1961a, b), and in the «Hegi» bibliography (HAMANN & WAGENITZ, 1970; Austrian chapters revised by H. NIKLFELD). TEPPNER (1971) gave a survey of the floristic activities at Graz, including a list of published papers.

A full account of Austrian activities in European systematic botany and cytotaxonomy is provided in our more comprehensive report (EHRENDORFER, FÜRNKRANZ, GUTERMANN & NIKLFELD, 1974). Investigations of a wider scope, which are continued, comprise e. g. *Anthemideae*, *Anthoxanthum*, *Arabis*, *Erysimum*, *Euphrasia*, *Knautia*, *Onosma*, *Rubieae*, *Veroniceae*, *Waldsteinia*. Works on ecology, phytosociology, palynology, and phytogeography are, in detail, also found there. As to distribution mapping we have already mentioned NIKLFELD's report (1971) on this subject.

Corrections and additions to *Flora Europaea* vols. 1 and 2

With the exception of some nomenclatural remarks concerning vol. 1 (JANCHEN, 1965), no comprehensive corrections to *Flora Europaea* have yet been published in Austria.

Only those errors or omissions which affect the indication «Au» (standing for Austria and Liechtenstein) in the abbreviated distribution to each species in Flora Europaea are listed below. No attempt has been made to suggest taxonomical or nomenclatural changes here with very few exceptions (*Aconitum*, *Amaranthus*, *Draba*, *Erysimum*, in accordance with SEITZ, 1969, SAUER, 1967, BUTTLER, 1967, MELZER & POLATSCHEK, 1971; *Rubus* on advice of H. E. WEBER, Melle).

The sequence of species in each of the lists given below is that of Flora Europaea.

1. Species known to be native in Austria, whose occurrence was either not indicated in Flora Europaea, or mentioned as doubtful

<i>Dryopteris assimilis</i> (cfr. Appendix B)	<i>Rubus</i> * <i>scissus</i>
<i>Polypodium interjectum</i> (cfr. App. B)	<i>R. sprengelii</i>
<i>Salix myrtilloides</i> (cfr. App. B)	<i>R. obtusangulus</i> (cfr. App. B)
<i>Spergula pentandra</i> (cfr. App. B)	<i>R. pallidiflorus</i> E. H. L. Krause
<i>Spergularia echinosperma</i>	(= <i>R. serpens</i> auct. plur.) (cfr.
(cfr. App. B)	list 4)
<i>Aconitum (firmum, incl. A. formosum =) napellus</i> subsp. <i>hians</i> (Reichenb.) Gáyer	<i>Alchemilla scintillans</i>
<i>Erysimum virgatum</i>	<i>A. crinita</i>
<i>Erysimum (wahlenbergii =) hungaricum</i> (cfr. App. B)	<i>A. curtiloba</i> (cfr. App. B)
<i>E. repandum</i>	<i>A. undulata</i>
<i>Nasturtium microphyllum</i>	<i>A. heteropoda</i> (cfr. App. B)
<i>Draba norvegica</i> (= <i>D. kotschyi</i> auct. austr.) (cfr. list 4 and App. B)	<i>A. glomerulans</i>
<i>Aethionema saxatile</i>	<i>A. effusa</i> (cfr. App. B)
<i>Sedum reflexum</i>	<i>A. (ursina =) effusa</i> (cfr. App. B)
	<i>A. flexicaulis</i>
	<i>Chamaecytisus austriacus</i>
	<i>Myriophyllum alternifolium</i>
	(cfr. App. B)

2. Species known to be extinct in Austria though once being native, whose former occurrence was not mentioned in Flora Europaea

Cystopteris sudetica
Ceratocephalus falcatus

* Our remarks on *Rubus* are in most cases based on personal communications of the late A. NEUMANN, known as an ardent field botanist and most distinguished student especially of the critical genera *Rubus* and *Salix*.

3. Species known to be naturalized in Austria, whose occurrence was either not indicated in Flora Europaea, or mentioned as doubtful

<i>Amaranthus (boucheonii =) powellii</i>	<i>Alchemilla mollis</i> (cfr. App. C)
S. Watson	<i>Amelanchier spicata</i>
<i>Silene dichotoma</i>	<i>Vicia lutea</i>
<i>Chorispora tenella</i> (cfr. App. C)	<i>Ptelea trifoliata</i> (cfr. App. C)
<i>Rubus armeniacus</i> (= <i>R. discolor</i>	<i>Althaea hirsuta</i>
auct. p. p.) (cfr. list 4)	<i>Epilobium adenocaulon</i> (cfr. App. C)

4. Species not known to occur in Austria, neither native nor as established aliens (though sometimes as casuals), but indicated as native or possibly native in Flora Europaea

<i>Isoetes setacea</i>	<i>R. ulmifolius</i>
<i>Paronychia kapela</i>	<i>R. winteri</i>
<i>Erysimum crepidifolium</i>	<i>R. discolor</i> s. str.
<i>E. carniolicum</i>	<i>R. helveticus</i>
<i>Alyssum petraeum</i>	<i>R. schmidelyanus</i>
<i>Draba kotschyi</i> (cfr. list 1)	<i>R. hirsutus</i>
<i>Ribes spicatum</i>	<i>R. obscurus</i>
<i>Rubus* affinis</i>	<i>R. lejeunei</i>
<i>R. vulgaris</i>	<i>R. histrix</i>
<i>R. hypomalacus</i>	<i>R. schleicheri</i> s. str.
<i>R. chlorothyrsos</i>	<i>R. serpens</i> s. str. (cf. list 1: <i>R. pal-</i>
<i>R. rhombifolius</i>	lidiflorus!)
<i>R. schlechtendalii</i>	<i>R. oreades</i>
<i>R. silvaticus</i> s. str.	<i>Medicago polymorpha</i>
<i>R. egregius</i> s. str.	<i>Coronilla elegans</i>

5. Species recorded as doubtful for Austria in Flora Europaea, which do not occur in this country

Equisetum scirpoides (the indication of this species is based on one old record proved to be wrong)

Anthriscus fumarioides

6. Species recorded for Austria in Flora Europaea, which must be supposed as extinct now

Isoetes lacustris

Aldrovanda vesiculosa

Saxifraga hirculus

* See our footnote on the preceding page.

7. Species whose status (native or naturalized) in Austria is uncertain though recorded as native resp. missing in Flora Europaea

Laburnum anagyroides

Acer obtusatum (cfr. App. C)

8. Species recorded as naturalized in Austria by Flora Europaea, which are known however only sporadically escaped from cultivation, or as casuals, but are not established in this country

Abies pinsapo

Picea orientalis

Picea engelmannii

Picea pungens

Pinus ponderosa

Populus deltoides

Sedum hybridum

Bergenia crassifolia

Physocarpus opulifolius

Spiraea alba

S. douglasii

Rosa foetida

R. acicularis

R. blanda

R. virginiana

Agrimonia repens

Potentilla intermedia

Cydonia oblonga

Cotoneaster horizontalis

Crataegus sanguinea

Prunus persica

P. dulcis

P. armeniaca

Gleditsia triacanthos

Lupinus angustifolius

L. albus

L. varius

L. perennis

Glycyrrhiza glabra

Vicia articulata

V. ervilia

Lens culinaris

Lathyrus odoratus

L. cicera

L. sativus

Pisum sativum

Melilotus indica

Trigonella foenum-graecum

Medicago scutellata

Trifolium resupinatum

T. incarnatum

T. alexandrinum

Oxalis tetraphylla

Tropaeolum majus

Euphorbia lathyris

Impatiens balsaminea

Malva verticillata

Alcea rosea

Hypericum androsaemum

Viola cornuta

Sicyos angulatus

Opuntia vulgaris

Coriandrum sativum

Smyrniun perfoliatum

Pimpinella anisum

Sium sisarum

Foeniculum vulgare

Levisticum officinale

Torilis nodosa

T. leptophylla

9. Species recorded for Austria in Flora Europaea, whose occurrence is however doubtful

<i>Diphysium tristachyum</i>	<i>R.</i> ('fuscater', recte:) <i>fusco-ater</i>
<i>Rubus</i> * <i>pyramidalis</i>	<i>R. adornatus</i>
<i>R. chloocladus</i>	<i>R. rosaceus</i>
<i>R. macrostachys</i>	<i>R. koehleri</i>
<i>R. condensatus</i>	<i>R. pygmaeus</i>
<i>R. teretiusculus</i>	<i>R. scaber</i> s. str.
<i>R. fuscus</i> s. str.	<i>R. rivularis</i>
<i>R. foliosus</i> s. str.	<i>Rosa stylosa</i>
<i>R. flexuosus</i>	<i>Potentilla wiemanniana</i>
<i>R. (saltuus =) flexuosus</i>	<i>Alchemilla cinerea</i>
<i>R. thyrsiflorus</i> s. str.	<i>A. sinuata</i>
<i>R. pallidus</i> s. str.	<i>A. demissa</i>
<i>R. cruentatus</i>	<i>A. semisecta</i>
<i>R. menkei</i> s. str.	<i>Lotus alpinus</i> s. str.
<i>R. melanoxydon</i>	

10. Species not recorded for Austria in Flora Europaea, but possibly occurring in this country

- Quercus polycarpa* (recorded by JANCHEN, 1964; taxonomic identity is to be checked)
Jovibarba allionii (recorded by LEUTE, 1966; taxonomic identity is to be checked)
Alchemilla gracillima (recorded by ROTHMAIER, 1962, but not verified since)

APPENDIX A

New taxa validly described from plants of Austria

(No changes in rank are included in this list, nor new combinations and new names which substitute earlier published valid names. They as well as invalid names are cited in our comprehensive version of this report mentioned in the introduction.)

- Alchemilla anisiaca* f. *glabrescens* Rothm., *Feddes Repert.* 66: 226 (1962).
A. kernerii Rothm., *loc. cit.* 226 (1962).
A. sectilis Rothm., *loc. cit.* 229 (1962).
Aquilegia oenipontana A. Kerner ex H. Riedl, *Österr. Bot. Z.* 114: 98 (1967)
pro hybr.
Asplenium adulteriniforme Lovis, Melzer & Reichst., *Bauhinia* 2: 233 (1965)
pro hybr.

* Our remarks on *Rubus* are in most cases based on personal communications of the late A. NEUMANN, known as an ardent field botanist and most distinguished student especially of the critical genera *Rubus* and *Salix*.

- A. mendelianum* D. E. Meyer, *Ber. Deutsch. Bot. Ges.* 81: 97 (1968) *pro hybr.*
A. stiriacum D. E. Meyer, *loc. cit.* 75: 29 (1962) *pro hybr.*
A. trichomanes subsp. *inexpectans* Lovis, *Brit. Fern Gaz.* 9: 155 (1964).
Bromus arvensis subsp. *segetalis* H. Scholz, *Willdenowia* 6: 145 (1970).
Delphinium elatum subsp. *austriacum* Pawl., *Fragm. Florist. Geobot.* 9: 434 (1963).
D. elatum var. *austriacum* Pawl., *loc. cit.* 434 (1963) (*nomen superfl.* *pro var. glabridum* Pawl., 1934).
Diopogon arenarius subsp. *pseudohirtus* Leute, *Verh. Zool.-Bot. Ges. Wien* 105/106: 186 (1966).
Dryopteris lavalreei Janchen, *Catal. Fl. Austriae* 1 (Ergänzungsheft): 15, 121 (1963) *pro hybr.*
Euphorbia jablonskiana Polatsch., *Ann. Naturh. Mus. Wien.* 75: 199 (1971) *pro hybr.*
Gymnadenia conopsea subsp. *montana* Bisse, *Feddes Repert.* 67: 187 (1963).
Helictotrichon krischae Melzer, *Österr. Bot. Z.* 114: 312 (1968) *pro hybr.*
H. petzense Melzer, *loc. cit.* 308 (1968).
Knautia carinthiaca Ehrend., *Österr. Bot. Z.* 109: 335 (1962).
K. norica Ehrend., *loc. cit.* 336 (1962).
Polystichum meyeri Sleep & Reichst., *Bauhinia* 3: 303 (1967) *pro hybr.*
Ranunculus gayeri Soó, *Acta Bot. Acad. Sci. Hung.* 11: 402 (1965): '*gáyeri*'.
Rubus graecensis Maurer, *Österr. Bot. Z.* 115: 224 (1968).
R. weizensis Maurer, *loc. cit.* 226 (1968).
Stipa styriaca Martinovsky, *Österr. Bot. Z.* 118: 179 (1970).
S. styriaca var. *melzeri* Martinovsky, *loc. cit.* 179 (1970): '*melzerii*'.
Taraxacum austriacum v. Soest, *Proc. K. Nederl. Akad. Wet.*, ser. C, 69: 435 (1966).
T. austriacum f. *achyrocarpum* v. Soest, *loc. cit.* 436 (1966).
T. brunneum v. Soest, *loc. cit.* 439 (1966).
T. canophyllum v. Soest, *loc. cit.* 440 (1966).
T. cochleatophyllum v. Soest, *loc. cit.* 455 (1966).
T. korbii v. Soest, *loc. cit.* 469 (1966).
T. limosum v. Soest, *Acta Bot. Neerl.* 14: 40 (1965).
T. linearisquameum v. Soest, *Proc. K. Nederl. Akad. Wet.*, ser. C, 69: 471 (1966).
T. mazzettii v. Soest, *loc. cit.* 451 (1966).
T. melzeranum v. Soest, *loc. cit.* 452 (1966): '*melzerianum*'.
T. minutissimum v. Soest, *Acta Bot. Neerl.* 20: 144 (1971).
T. nigratum v. Soest, *Proc. K. Nederl. Akad. Wet.*, ser. C, 69: 460 (1966).
T. olivaceum v. Soest, *Acta Bot. Neerl.* 14: 43 (1965).
T. ooststroomii v. Soest, *Proc. K. Nederl. Akad. Wet.*, ser. C, 69: 461 (1966).
T. oplilobum v. Soest, *loc. cit.* 475 (1966).
T. pallidisquameum v. Soest, *loc. cit.* 463 (1966).
T. paucidentatiforme v. Soest, *loc. cit.* 477 (1966).
T. pseudo-balticum v. Soest, *Acta Bot. Neerl.* 14: 45 (1965).
T. senile v. Soest, *Proc. K. Nederl. Akad. Wet.*, ser. C, 69: 458 (1966).
T. stephanocephalum v. Soest, *loc. cit.* 486 (1966).
T. vindobonense v. Soest, *Acta Bot. Neerl.* 14: 50 (1965).
Thymus alpigenuus var. *patentipilus* Pawl., *Phyton (Austria)* 13: 71 (1968).

- Th. maureri* Machule in Janchen, *Catal. Fl. Austriae* 1 (Ergänzungsheft 2): 61 (1964) *pro hybr.*
Th. oenipontanus var. *hirticaulis* Pawl., *Phyton (Austria)* 13: 67 (1968).
Th. parilis Machule in Janchen, *Catal. Fl. Austriae* 1 (Ergänzungsheft): 78 (1963) *pro hybr.*
Th. sparsipilus nm. *peisonis* Machule in Janchen, *loc. cit.* 77 (1963) *pro hybr.*
Th. thermarum Machule in Janchen, *loc. cit.* 77 (1963) *pro hybr.*
Veronica chamaedrys subsp. *vindobonensis* M. Fischer, *Österr. Bot. Z.* 118: 207 (1970).
V. sublobata M. Fischer, *loc. cit.* 114: 227 (1967).

APPENDIX B

First records of native species for Austria

- Alchemilla curtiloba* Buser (POLATSCHKEK, 1969).
A. heteropoda Buser (POLATSCHKEK, 1969).
A. lineata Buser (POLATSCHKEK, 1969).
A. (ursina) Fröhner (=) *effusa* Buser (FRÖHNER, 1965).
Allium atropurpureum Waldst. & Kit. (MELZER, 1963b).
Anthoxanthum alpinum A. & D. Löve (POLATSCHKEK, 1966).
Arabis allionii DC. (MELZER, 1966a).
Brassica elongata Ehrh. s. str. (H. METLESICS in JANCHEN, 1963).
Campanula moravica (Spitzner) Kovanda (KOVANDA, 1968).
Cardamine parviflora L. (A. NEUMANN in JANCHEN, 1963).
Carex vaginata Tausch (MELZER, 1967a).
Dactylorhiza cruenta (O. F. Mueller) Soó (SENGHAS, 1968; HAUTZINGER, 1970).
Diphysium zeileri (Rouy) Damboldt (RAUSCHERT, 1967).
Draba norvegica Gunn. (BUTTLER, 1967).
Dryopteris assimilis S. Walker (DYCE, 1966).
Epilobium lanceolatum Seb. & Mauri (MELZER, 1961).
Epipactis leptochila (Godf.) Godf. (YOUNG, 1962).
E. muelleri Godf. (HOLUB, 1970).
Erigeron macrophyllus Herbich (PAWLOWSKI, 1970).
Erysimum hungaricum Zapal. [= *E. wahlenbergii* (Aschers. & Engler) Borbás] (MELZER & POLATSCHKEK, 1971).
Filago lutescens Jordan (WAGENITZ, 1965).
Gagea spathacea (Hayne) Salisb. (TRAXLER, 1969b).
Gladiolus illyricus Koch (H. MELZER in JANCHEN, 1964).
Glyceria nemoralis (Uechtr.) Uechtr. & Körn. (HOLUB & al., 1970).
Hierochloë repens (Host) Bess. (= *H. odorata* subsp. *pannonica* Chrték & Jirásek) (H. MELZER in JANCHEN, 1966).
Leucanthemum gaudinii DT. [= *L. vulgare* subsp. *alpicola* (Gremli) A & D. Löve] (POLATSCHKEK, 1966).
L. halleri (Suter) Ducommun (POLATSCHKEK, 1966).
L. lithopolitanicum (E. Mayer) Polatsch. (MELZER, 1965).
Lotus alpinus (Ser.) Schleicher ex Ramond (ZERTOVÁ, 1964) (cfr. however above sub list no. 9!).

- Myosotis decumbens* Host (GRAU, 1964).
Myriophyllum alterniflorum DC. (A. LONSING in SCHMID & HAMANN, 1963).
Pedicularis julica E. Mayer (MAYER, 1961).
P. sceptrum-carolinum L. (MELZER, 1963a: not extinct).
Polypodium interjectum Shivas (MELZER, 1963a).
Ranunculus acriformis Soó (TRAXLER, 1971).
R. baudotii Godron (COOK & PATZAK, 1962).
R. carpaticola Soó (Soó, 1964).
R. pseudobinatus Soó (TRAXLER, 1971).
R. rionii Lager (COOK & PATZAK, 1962).
Rubus obtusangulus Gremli (A. NEUMANN in POLATSCHKE, 1969).
R. villicaulis Koehler (A. NEUMANN in MAURER, 1964).
Salix myrtilloides L. (A. NEUMANN in JANCHEN, 1963).
Schoenoplectus litoralis Schrader (SAUERZOPF, 1968).
Spergula pentandra L. (HOLZNER, 1971).
Spergularia echinosperma Celak. (H. METLESICS in JANCHEN, 1964).
Stipa sabulosa (Pacz.) Sijuss. (MARTINOVSKY, 1966).
S. stenophylla Czern. (H. MELZER in JANCHEN, 1963).
Taraxacum angustisquameum Dahlst. ex Lindb. fil. (SOEST, 1969).
T. balticiforme Dahlst. (SOEST, 1965).
T. bavaricum v. Soest (SOEST, 1965).
T. brachyglossum (Dahlst.) Dahlst. (SOEST, 1966c).
T. brevifloroides v. Soest (SOEST, 1969).
T. caudatuliforme v. Soest (SOEST, 1966a).
T. cordatifolium v. Soest (SOEST, 1969).
T. croceicarpum v. Soest (SOEST, 1969).
T. disseminatum Hagl. (SOEST, 1966c).
T. gracillimum v. Soest (SOEST, 1969).
T. graiense v. Soest (SOEST, 1961).
T. kraetlii v. Soest (SOEST, 1969).
T. laetiforme Dahlst. (SOEST, 1966c).
T. lanjouwii v. Soest (SOEST, 1969).
T. lawalreei v. Soest (SOEST, 1966a).
T. lividum Peterm. (SOEST, 1965).
T. luteolum Hagl. (SOEST, 1969).
T. magnodilatatum v. Soest (SOEST, 1969).
T. magnopyramidophorum v. Soest (SOEST, 1969).
T. mattmarkense v. Soest (SOEST, 1969).
T. pannonicum Sonck & v. Soest (SONCK & SOEST, 1969).
T. parsennense v. Soest (SOEST, 1969).
T. parvilobum Dahlst. (SOEST, 1969).
T. pedemontanum v. Soest (SOEST, 1969).
T. pedrottii v. Soest (SOEST, 1966b).
T. peregrinum Hagl. & v. Soest (SOEST, 1969).
T. perfisum v. Soest (SOEST, 1969).
T. plumbeum Dahlst. (SOEST, 1966c).
T. praeticum v. Soest (SOEST, 1969).
T. procerum Hagl. (SOEST, 1969).

- T. proximum* (Dahlst.) Dahlst. (SOEST, 1966c).
T. pseudolacistophyllum v. Soest (SOEST, 1966c).
T. purpureomarginatum v. Soest (SOEST, 1966c).
T. rhaeticum v. Soest (SOEST, 1969).
T. rubicundum (Dahlst.) Dahlst. (SOEST, 1966c).
T. rufonerve v. Soest (SOEST, 1969).
T. scanicum Dahlst. (SOEST, 1966c).
T. silesiacum Dahlst. ex Hagl. (SOEST, 1966c).
T. subdissimile Dahlst. (SOEST, 1966c, 1969).
T. subjurassicum v. Soest (SOEST, 1969).
T. subpatens Hagl. (SOEST, 1969).
T. tanyolobum Dahlst. (SOEST, 1969).
T. valesiacum v. Soest (SOEST, 1969).
Vitaliana primuliflora Bertol. (WARMUTH, 1965).
Wolffia arrhiza (L.) Wimmer (I. HUTTAR in JANCHEN, 1964).

APPENDIX C

First records of alien species, supposed to be established in Austria

- Acer obtusatum* Waldst. & Kit. ex Willd. (LEUTE, 1969; possibly native?).
Agropyron desertorum (Fisch.) Roem. & Schult. (TITZ, 1966).
Alchemilla mollis (Buser) Rothm. (POLATSCHKEK, 1969).
Cardamine glanduligera O. Schwarz (= *Dentaria glandulosa* Waldst. & Kit.) (MELZER, 1962).
Chorispora tenella (Pallas) DC. (H. METLESICS in JANCHEN, 1966a).
Crocus heuffelianus Herbert (TRAXLER, 1970).
Epilobium adenocaulon Hausskn. (A. NEUMANN in JANCHEN, 1966a).
Glyceria striata (Lam.) Hitchc. (MELZER, 1966b).
Kalmia angustifolia L. (F. MORTON in JANCHEN, 1964).
Melica altissima L. (G. STIEBÖCK, H. METLESICS & F. EHRENDORFER in JANCHEN, 1963; possibly native?).
Myriophyllum heterophyllum Michx. (A. NEUMANN in MELZER, 1965).
Oxalis dillenii Jacq. (= *O. stricta* auct.) (MELZER, 1967b).
Ptelea trifoliata L. (W. FORSTNER in JANCHEN, 1964).

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TAXONOMIC STUDIES ON VASCULAR PLANTS IN BULGARIA 1961-1971

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1. INTRODUCTION

THE last ten years have been a period of intensive development in taxonomic research in Bulgaria, due to both internal and external factors (JORDANOV, KOZUHAROV, KUZMANOV & ASENOV, 1970). The economic and social progress in the country have had a favourable effect on natural science research in general. Major taxonomic and floristic studies in neighbouring countries and the rest of Europe also favour this development (KUZMANOV, 1971). The completion of the remarkable «Flora USSR», the successful continuation of «Flora RS Romaine» (vol. 12 — 1970), «Flora of Turkey», «Flora SR Srbije», the elaboration of a project for «Analiticka flora Jugoslaviae», and the recent «Flora of Greece» project (GOULANDRIS, 1971) all show the intensification of taxonomic and floristic studies in this part of the world. These processes provide an ever-increasing and improving base for the continental project «Flora Europaea».

Retrospectively one may see four chief periods in the development of floristic and taxonomic research on the Bulgarian flora:

- 1) Before «Flora Bulgarica» of VELENOVSKY (1891, 1898), characterized almost exclusively by studies of foreign botanists (see STEFANOV, 1930; STOJANOV & KITANOV, 1967).
- 2) Up to «Flora na Balgaria» by STOJANOV & STEFANOV (1924-1925), characterized by very intensive floristic studies both by Bulgarian and foreign botanists.
- 3) Up to the first volume of «Flora RP Bulgaricae» (ed. JORDANOV, 1963), characterized by the first monographic and taxonomic revisions of genera or sections, including *Colchicum*, *Centaurea*, *Dianthus*, *Cerastium*, *Anthemis*.
- 4) This last decade, which marks the beginning and successful realization of the first four volumes of the major project of taxonomic botany in the country: «Flora RP Bulgaricae» (JORDANOV, KOZUHAROV, KUZMANOV & ASENOV, 1970). During this period the fourth edition of «Flora na Balgaria» was also published (STOJANOV, STEFANOV & KITANOV, 1966-1967), and the first local flora, of Vitosa mountain (KITANOV & PENEV, 1963), appeared.

That floristic and taxonomic research has received a new impetus is well illustrated in Appendices A, B and C. Only two examples of this will be mentioned here. In the early thirties STEFANOV (1930) regarded floristic studies (which resulted in «Flora na Balgaria» in 1924-1925) as nearly complete: «Mit Sicherheit kann man sagen, das von jetzt an das Auffinden von einer für die Flora Bulgariens neuen Art nur einem glücklichen Zufall zu danken sein wird, und das Entdecken einer Art von der Kategorie der sogen «Guten Arten» ein unverhofftes Ereignis bleiben wird». (STEFANOV, 1930: 61). The present Appendices A and B show a very different situation. The well-known feature of multiplication of scientific information is also characteristic for the period (see also Part 2). A bibliography (KITANOV, 1960) covering the decade 1949-1958 deals with a total of 180 numbers. The present cites more than 360.

Not only has there been an increase in the number of taxonomic studies, but also new and different methods of delimiting

taxa have been used. The use of karyological data and cytotaxonomic research is discussed in Part 6. Here may be mentioned the use of:

- a) Embryological data (GEORGIEV, 1961; NIKOLOV, 1961; CHRISTOV & TERZIJSKI, 1964; CHRISTOV, KRUSEVA & NIKOLOV, 1963; CHRISTOV & KRUSEVA, 1967, 1968; CHRISTOV & MOSKOVA, 1967; TERZIJSKI, 1969, 1971a, 1971b; GEORGIEV, 1969; MOSKOVA, 1969; KOLEV & TERZIJSKI, 1964; KARAGIJOZOVA, 1963, 1965, 1971; KARAGIJOZOVA & DASKALOVA, 1971; KARAGIJOZOVA & CAKALOVA, 1970; for the period up to 1966 see also KOZUHAROV and KUZMANOV, 1968a, 1969a).
- b) Anatomical data (KOVACEV, 1964b; VODENICAROV & KABASANOVA, 1965; JORDANOV & PEEV, 1966, 1970; DELIPAVLOV, 1968b; DELIPAVLOV & KOSTOV, 1968; KOSTOV & DELIPAVLOV, 1968; PETROV, 1964; KALINKOV et al., 1965; KOLEV, 1965b; KOLEV & BEMBASAT, 1964; KOLEV & JAKIMOVA, 1967; CHRISTOV et al., 1969; BEMBASAT et al., 1969; NINOVA, 1969; KARAGIJOZOVA & CAKALOVA, 1971).
- c) Chemical data (KUZMANOV et al., 1970).
- d) Pollen morphology (BOZILOVA, 1963, 1966; BOZILOVA & PETROVA, 1964, 1967a, 1967b; BOZILOVA & JANKOVA, 1968; VODENICAROV & NINOVA, 1964; PETROVA, 1969; KOVACEV, 1968a, 1969, 1970b; ANCEV, 1971).
- e) Biometrics (KUZMANOV, 1961, 1963; KUZMANOV, KOZUHAROV & IVANOVA, 1966; KOZUHAROV, 1965; BOZILOVA, 1963 et foll.; JORDANOV & PEEV, 1966, 1970; PETROVA, 1969; STASZKIEWICZ, 1968).

Taxonomic studies and species concepts have been influenced by the ideas and methods of biosystematics and cytotaxonomy (JORDANOV, KOZUHAROV, KUZMANOV & ASENOV, 1970; JORDANOV & KUZMANOV in JORDANOV, 1966; KOZUHAROV & KUZMANOV, 1968e), and the rôle of genetic, cytological, embryological, chemical and experimental data in delimiting and describing taxa are better appreciated. Nomenclatural problems have steadily received more attention, especially in connection with the «Flora RP Bulgaricae». This project also stresses the importance of international collaboration, and exchanges of herbarium material and literature have been on a scale not known previously in the country. Finally, the

utilization of the type-concept and typification of taxa is also a characteristic feature of taxonomic research in this period (KUZMANOV, 1971).

The increased number of botanists devoted to floristics and to taxonomy not only contributed to the intensity of research, but made possible the recent discussion of a new project for the next decade: a detailed local flora of the Rhodope mountains. This is undertaken by a group of botanists in Plovdiv.

The results of increased phytochemical investigation of Bulgarian plants have been summarized by MOLLOV in a report at the International Symposium «Phytochemistry of the Balkan Flora» held in Varna, 14-18 October 1971 (MOLLOV, 1971).

The stimulation afforded to the development of Bulgarian taxonomy by ecological, historical, phytosociological and chorological studies is briefly reviewed in Parts 7, 8 and 9.

2. NEW JOURNALS PUBLISHING TAXONOMIC OR FLORISTIC INFORMATION WHICH HAVE COME INTO EXISTENCE SINCE 1961

- a) *Rastenievádni nauki* (Plant Growing, later Plant Sciences), ed.: Academy of Agricultural sciences; publ. — Bulg. Acad. Sci. (monthly, No. 1 — 1964).
- b) *Gorskostopanska nauka* (Sylviculture, later Forest science), ed.: Academy of Agricultural sciences; publ. — Bulg. Acad. Sci. (bimonthly, No. 1 — 1964).
- c) *Naucni Trudove Viss Pedagogicéski Institute, Plovdive* (Works of the Higher Pedagogic Institute, later Travaux scientifiques, Ecole Normale Superior), ed.: Higher Pedagogic Institute (twice a year, later thrice a year) (No. 1 — 1963).
- d) *Natura*, ed.: Higher Pedagogic Institute, Plovdiv, publ. — «Hristo Danov» (No. 1 — 1967, yearly; mainly algology).
- e) *Comptes rendus de l'Academie des Sciences Agricoles en Bulgarie*, ed.: Academy of Agricultural sciences, publ. — Bulg. Acad. Sci. (quarterly, No. 1 — 1968).
- f) *Genetika i selekcija* (Genetics and plant breeding) ed.: Academy Agricultural sciences, publ. — Bulg. Acad. Sci. (bimonthly, No. 1 — 1968) (genetics, cytology, cytogenetics, cytotaxonomy).

- g) *Izvestija na Prirodinaucnija Muzei, Plovdiv* (Bulletin of the Natural Sciences Museum, Plovdiv), ed.: Natural Sciences Museum, Plovdiv, publ. — «Hristo Danov» (No. 1 — 1970).

Note. Summaries on every biological paper published in Bulgaria are in the edition of Bulgarian Academy of Sciences: «Abstracts of bulgarian scientific literature — Biology and Biochemistry» (quarterly, regulary 1961-1971).

3. NEW NATIONAL, LOCAL FLORAS, KEYS AND SYNOPSES

- a) Flora na Narodna Republica Bálgarija (Flora Republicae Popularis Bulgaricae) ed.: Botanical Institute, publ. — Bulg. Acad. Sci., General editor — Acad. D. Jordanov (JORDANOV, 1963, 1964, 1966, 1970). More information in KUZMANOV & KOZUHAROV (1968) and JORDANOV, KOZUHAROV, KUZMANOV & ASENOV (1970).
- b) Flora na Bálgarija, ed. 4, by STOJANOV, STEFANOV and KITANOV (1966-1967) (I-1966, II-1967), publ. «Nauka i Izkustvo».
- c) Flora na Vitosa by KITANOV and PENEV (1963) (Flora of Vitosa mountain near Sofia, 1849 species keyed and briefly described), publ. «Nauka i Izkustvo».
- d) Visokoplaninskite rastenija v Bálgarija by STOJANOV and KITANOV (1966) (300 species briefly described, col. ill.), publ. «Nauka i Izkustvo».
- e) Plevelite v Bálgarija by KOLEV (1963) (Synopsis of the weeds in Bulgaria, descr. and ill. for 334 sp.), publ. — Bulg. Acad. Sci.
- f) Kljuc za opredeljane na plevelite by KOZUHAROV and KUZMANOV (1967) (Key for determination of 484 species), publ. «Zemizdat».

4. BIBLIOGRAPHICAL SUMMARIES

- a) PETROV and PALAMAREV (1965) — Paleobotanical studies in Bulgaria: 1929-1964.
- b) KOZUHAROV and KUZMANOV (1968a, 1969a) — Biosystematic and cytotaxonomic studies on bulgarian flora: 1925-1966.

5. REVISIONS AND TAXONOMIC STUDIES

These have mainly been done in connection with the elaboration of «Flora RP Bulgaricae».

Pteridophyta	KOZUHAROV (1968b)
Angiospermae	
<i>Allium</i>	PANOV & JORDANOV (1966)
<i>Amaranthus</i>	KOVACEV (1963, 1964b, 1965c, 1966, 1968b)
<i>Arenaria</i>	KOZUHAROV & KUZMANOV (1970b)
<i>Astragalus</i>	PENZES (1968a)
<i>Cuscuta</i>	MARKOV (1963)
<i>Dactylis</i>	DIMITROV (1962); GANCEV (1968)
<i>Euphorbia</i>	KUZMANOV (1961b, 1963)
<i>Festuca</i>	GANCEV (1968)
<i>Fraxinus</i>	STEFANOV (1969)
<i>Galanthus</i>	ARTJUSHENKO (1966); DELIPAVLOV (1965d, 1968b, 1971); DELIPAVLOV & ANGELIEV (1970)
<i>Galium</i>	ANCEV (1971)
<i>Gladiolus</i>	KOVACEV (1965d)
<i>Hesperis</i>	DVORAK (1965, 1966a, 1966b)
<i>Hieracium</i>	GEORGIEV (1961)
<i>Jurinea</i>	KOZUHAROV (1968a)
<i>Lathyrus</i>	MITEV (1968)
<i>Lilium</i>	DELIPAVLOV & POPOVA (1965)
<i>Linum</i>	PETROVA (1969)
<i>Medicago</i>	KOZUHAROV (1962, 1965)
<i>Merendera</i>	CESMEDZIEV (1970)
<i>Minuartia</i>	KOZUHAROV & KUZMANOV (1970b)
<i>Oporanthus</i>	KOVACEV (1971)
<i>Primula</i>	JORDANOV & PEEV (1966, 1970)
<i>Quercus</i>	GEORGESCU & CIOBANU (1966)
<i>Rosa</i>	DIMITROV (1966, 1968a, 1968b, 1970)
<i>Rubus</i>	MARKOVA (1961b, 1962a, 1962b)
<i>Solanum</i>	GEORGIEVA & TSIKOVA (1967)
<i>Sternbergia</i>	KOVACEV (1964a, 1970a)
<i>Tragopogon</i>	KUZMANOV et al. (1970)
<i>Verbascum</i>	MITEV & STEFANOVA (1971)

6. CYTOTAXONOMIC STUDIES

The last decade is a third period in the development of biosystematic studies in Bulgaria (KOZUHAROV & KUZMANOV, 1969a). It is characterised by rapid growth of cytotaxonomic investigations, both in the number of species studied, and in the number of research workers and publications. Another feature is the close link between taxonomic and cytological studies (KOZUHAROV & KUZMANOV, 1969a), which had previously been lacking. This made possible the discussion on another long-term collective project of Bulgarian botanists — «Chromosome atlas of Flowering plants in Bulgaria» (KUZMANOV & KOZUHAROV, 1968; KOZUHAROV & KUZMANOV, 1973). This is expected to be completed in 20 years and a draft programme for studies has been proposed (KOZUHAROV & KUZMANOV, 1973).

Biosystematic studies on the Bulgarian flora up to 1966 are reviewed by KOZUHAROV and KUZMANOV (1968a, 1969a, see also VASILEVA, 1967). New chromosome numbers have been reported by: KOZUHAROV and KUZMANOV (1968b, c, d, 1969b, 1970a; KUZMANOV and KOZUHAROV, 1969, 1970), KOZUHAROV, POPOVA and KUZMANOV (1968), KUZMANOV, POPOVA and KOZUHAROV (1969), MARKOVA (1968a, b, 1971a, b), MARKOVA and IVANOVA (1970, 1971a, b), POPOVA (1968, 1969), CESMEDZIEV (1970a, b, 1971), CHRISTOV and TERZIJSKI (1968), TSIKOVA (1966), MOSKOVA (1969), ANCEV (1971), HEYN (1970), HANELT (1963), HANELT and METTIN (1966), SVESHNIKOVA (1967, 1971), FREY (1969, 1970), BAUER (1968, 1971), BOURDET (1967), TARNAVCHI and LUNGEANU (1967), CZAPIK (1969), VAARAMA and LEIKAS (1970), BORSOS (1971), GRAU (1961).

A total of 350 species have been studied cytotaxonomically, which is about 10% of the flora. The author is well aware that the present list is possibly incomplete, especially as regards research published outside Bulgaria. Critical remarks concerning omissions will be greatly appreciated.

7. PHYTOSOCIOLOGY, ECOLOGY AND VEGETATION MAPPING

The reviewed period is characterized also by intensive phytosociological studies on the vegetation of Bulgaria. A number of papers have detailed data on the vegetation in different parts of the country: Northeastern Bulgaria (DELIPAVLOV et al., 1961),

Tárnovo district (GANCEV & KOCEV, 1964b) and Mihailovgrad district (CHRISTOV et al., 1964) in Northern Bulgaria, Stara planina mountain (KOCEV, 1967, 1969; GANCEV & KOCEV, 1964a; BONDEV, 1966; VELCEV, 1971; VELCEV, JORDANOV and GANCEV, 1965; VELCEV & VASILEV, 1971a; NEDEVA, 1964; SMARDA, 1966d), some regions near Sredna Gora mountain (VALEV, 1961; GANCEV, 1963; DELIPAVLOV & KOSTOV, 1967; DELIPAVLOV, 1962), Rila mountain (DRAZEVA, 1963; S. GANCEV, 1963; SIMEONOVSKI, 1965, 1971; KOSTOV, 1966; RUSSAKOVA, 1969), Vitosa mountain (GANCEV, 1961; PENEV, 1965), W. C. Bulgaria (VELCEV, 1962), Slavjanka mountain (PENEV N., 1963), Rhodopi mountain (KOTOV, 1969), near Plovdiv (DELIPAVLOV, 1962), in southern Bulgaria and Strandza mountain (BROVICZ, 1961) and the Black Sea coast (VICHEREK, 1971; FILIPOVA, 1971) in eastern Bulgaria. The halophytic vegetation throughout the country has been studied by GANCEV, KOCEV and JORDANOV (1971).

The regional phytosociological studies made possible some general conclusions on the formation and the development of the vegetation (GANCEV et al. eds. 1964; GANCEV, 1962, 1963, 1971; STEFANOV & KOSTOV, 1964; KOLEV, 1964b. See also HORWAT, 1962; FUKAREK, 1964b, 1968a, 1970; SOO, 1963). They also made possible the organization of a project for preparing a 1:200 000 geobotanical map of the country (VELCEV, GANCEV, BONDEV & KOCEV, 1969). The work on the project progresses and is expected to be completed in the next decade. Geobotanic maps have thus far been produced for several districts (KOCEV, 1969; RUSSAKOVA, 1969; VELCEV, 1971) and a 1:1 000 000 map of the country is expected shortly (BONDEV, unpublished).

Ecological information for many species appears in most of the phytosociological and floristic papers (see Appendix B). The ecology of seed development of several high mountain species was studied by BONDEV and KOCEV (1961). GANCEV and RUSSAKOVA (1966) studied the phytoclimate in beech, pine and spruce forests in the mountains of Western Stara planina and JOTZOVA (1967, 1971) the night and day regularities in transpiration of *Quercus dalechampii* and *Q. cerris* wood. PENEV and VOJKOV (1965) studied the development of pioneer vegetation in a highly polluted area near Pernik. PALAVEEVA (1967) studied the ecology of vegetative reproduction in *Aristolochia clematitidis*; JORDANOV and PENEV (1966, 1970) the ecology of several species of *Primula*; KOCEV (1963), of *Poa sylvicola*;

CORBADZIJSKA (1964), of *Cynodon dactylon*; MARKOV (1963), of *Cuscuta* spp.; CHRISTOV (1961), of *Lolium perenne*; VELCEV, JORDANOV and GANCEV (1965), of *Acer monspessulanum*; ILIEVA (1965) and ILIEVA & MATEEVA (1971), of *Salvia sclarea*; JAKIMOVA (1966), of *Onobrychis* spp.; PALAVEEVA (1966), of *Cirsium arvense*; GANCEV and KOCEV (1969), of *Nardus stricta*; VELCEV, RASEV and VASILEV (1971), of *Ramonda serbica* and *Haberlea rhodopensis*; VELCEV and GANCEV (1961), of some calciphile species; SIMEONOVSKI and ANDREEV (1971), of some plant associations.

8. FLORISTICS AND PLANT GEOGRAPHY

Floristic studies were numerous all over the country during the period, especially in some parts of southwestern, south and north-central Bulgaria. Many species have been recorded for the Bulgarian flora, and an even greater number of infraspecific taxa (see Appendix B). A great number of new localities were also recorded. More general phytogeographic problems are discussed in STOJANOV (1965, 1966), STEFANOV and KITANOV (1963), KUZMANOV (1964, 1969), JORDANOV and JANEV (1962). Data are also given by SMARDA (1965a, b, c; 1966a, b, c, d; 1967a, b, c) and KRLAVEC (1963).

9. ORIGIN AND HISTORY OF THE FLORA

During recent years large-scale research has begun on pollen-analytical studies of Quaternary deposits (PETROV, FILIPOVA & DRAZEVA, 1968). The problem is discussed also by STEFANOV and KITANOV (1963), STOJANOV (1965, 1966) and KUZMANOV (1969).

10. CONCLUSION

This analysis of taxonomic and allied botanical studies in Bulgaria during the period 1961-1971 shows that there has been an intensive development of research, a large number of problems studied, a greater number of species and genera examined, and new methods applied. This provides a basis and a stimulus for the successful continuation and completion in the future of the major

projects of Bulgarian botanists: «Flora RP Bulgaricae», «Geobotanic map of Bulgaria», «Chromosome atlas of flowering plants in Bulgaria».

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11. APPENDICES

Appendix A — New supraspecific, species, infraspecific taxa and new combinations

A.1 — New taxa

A.1.a — Supraspecific taxa

Genus *Camena* Kovacev (1971).

Amaranthus subsect. *Moquimi*, subsect. *Pyxidium* Kovacev, series *Brestovitsae*, *Danubii*, *Dumortieri*, *Gheorghievi*, *Indehiscens*, *Kirschlegeri*, *Ustinae*, *Willdenowii* Kovacev (1965c).

Euphorbia subsect. *Esulae*, *Murtekioideae*, *Tulocarpae* Kuzmanov (1963).

Primula subsect. *Deorum* D. Jordanov & Peev (1970).

A.1.b — Species

Allium stojanovii Kovacev (1968c).

Alopecurus thracicus Penev & Kozuharov (1968).

Amaranthus bulgaricus Kovacev (1971d).

Andrachne pojarkovae Kovacev (1965b, see also STOJANOV, STEFANOV, KITANOV, 1967).

Arenaria rhodopaea Dellipavlov (1964b).

Astragalus aitosensis Ivanischvili (1969).

Astragalus central-alpinus Braun-Blanquet (1968).

Cardamine tuberosa Penzes & Vida in Penzes (1965).

Centaurea camciensis Kocev & Gancev (1968).

Colchicum diampolis Dellipavlov & Cesmedziev in Jordanov (1964).

Colchicum rhodopaeum Kovacev (1965c).

Delphinium balcanicum Pawlowski (1963a).

Dianthus burgasensis Tutin in Heywood (1963).

Erigeron vichrenensis Pawlowski (1969).

Hieracium asenovgradense Jas. & Pawl. in Pawlowski (1963b).

Hieracium javasevii Georgiev (1961).

Hieracium pawlowskiellum Merxmüller (1970).

Jurinea kitanovii Iljin (1963b).

Jurinea mamillarioides Iljin (1963a).

Jurinea stojanovii Iljin (1963a).

Koeleria rhodopaea Ujhelyi (1968).

Koeleria schurii Ujhelyi (1968).

Luzula bulgarica Chrtek & Krisa (1962, 1964a, b).

Luzula deflexa Kozuharov in Jordanov (1964).

Medicago bondevii Kozuharov (1965).

Pyrus bulgarica Kuthateladze & Sachokia (1967).

Quercus mestensis Bondev & Gancev in Jordanov (1966).

- Quercus* × *polycarpoides* Georgescu & Ciobanu (1966).
Ranunculus stojanovii Delipavlov (1971).
Rosa balcanica Dimitrov (1966).
Rosa bulgarica Dimitrov (1966).
Rosa orphei Dimitrov (1966).
Rosa parilica Dimitrov (1966).
Rosa pontica Dimitrov (1966).
Rosa rhodopaea Dimitrov (1966).
Secale rhodopaeum Delipavlov (1962).
Sedum tschernokolevii Stefanov (1965).
Sempervivum velenovskyi Cesmedziev (1969b).
Silene caliacrae Jordanov & Panov in Jordanov (1966).
Silene × *hybrida* Jordanov & Panov in Jordanov (1966).
Silene velcevii Jordanov & Panov in Jordanov (1966).
Silene velenovskyana Jordanov & Panov in Jordanov (1966).
Taraxacum caudatiformae van Soest (1966).
Verbascum juruk Stefanov (1966).
Verbascum minutifolium Stefanov (1965, see also BRUMMITT, 1966).
Vicia incisaeformis Stefanov (1966).

A.1.c — New infraspecific taxa

- Acer heldreichii* ssp. *bulgarica* Lacusic (1964). *Agropyrum intermedium* f. *ciliatum* Kitanov in Jordanov (1963), *A. intermedium* f. *davidovii* Kitan., f. *minor* Kitan. in Jordanov (1963). *Allium pallens* var. *compactum* Cesm., f. *viviparum* Cesmedziev (1970b). *Andrachne telephioides* var. *ustinense* Kovacev (1961). *Anemone appenina* f. *alba* Kuzm. in Jordanov (1970), *A. ranunculoides* f. *tenuiloba* Kuzm. in Jordanov (1970), *A. sylvestris* f. *lanata* Kuzm. in Jordanov (1970). *Arabis bellidifolia* var. *ciliolata* Stefanov (1963). *Arenaria filicaulis* var. *intermedia* Koz. & Kuzm. in Jordanov (1966). *Asperula tenella* f. *achtarovii* Jord. & Kuzm., var. *hirta* Jord. & Kuzm. (1963). *Aubrieta columnae* ssp. *pirinica* Asenov in Jordanov (1970).
Berberis vulgaris var. *achtarovii* Mark. in Jordanov (1970). *Bolboschoenus maritimus* var. *polystachys* Koz. & Kuzm. in Jordanov, (1964). *Brachypodium pinnatum* f. *davidovii* Kitan., var. *macedonicum* Kitan. in Jordanov (1963), *B. sylvaticum* var. *balcanicum* Kitan. in Jordanov (1963).
Centaurea banatica var. *stojanovii* Soo (1967). *Chenopodium glaucum* var. *farinosum* Mark. in Jordanov (1966). *Corydalis bulbosa* var. *bicaulis* Jord. & Koz., *C. marschalliana* var. *oppositifolia* Jord. & Koz., f. *bicaulis* Jord. & Koz., f. *eliptisecta* Jord. & Koz., *C. slivenensis* var. *ramosa* Jord. & Koz., f. *macrantha* Jord. & Koz., var. *subintegra* f. *hagerii* Jord. & Koz., *C. solida* f. *lutea* Jord. & Koz. in Jordanov (1970). *Cyperus fuscus* var. *jordanovii* Mark. in Jordanov (1964).
Daphne cneorum var. *glabrata* D. A. Webb in Heywood (1967). *Daucus carota* ssp. *zahariadii* Heywood (1968). *Diplotaxis tenuifolia* var. *maritima* Kuzm. in Jordanov (1970). *Doronicum hungaricum* ssp. *praehungaricum* Penzes (1968b).

- Euphorbia aleppica* f. *elongatobracteata* Kuzmanov (1963), *E. barrelieri* var. *fryvaldskyi* Kuz., f. *stojanovii* Kuzmanov (1963), *E. chanaesyce* var. *ustinense* Kovacev (1961), *E. niciana* f. *thracica* Kuzmanov (1963).
- Gagea pusilla* f. *bulgarica* Jord. & Pan. in Panov & Jordanov (1966). *Gladiolus segetum* f. *stranskii* Kovacev in Jordanov (1964).
- Hieracium brachiatum* ssp. *davidovii* Georgiev (1961), *H. djmilense* var. *balcaniforme* Pawlowski (1963b), *H. erythrocarpum* ssp. *chlorophyllum* Georg., ssp. *glabrescens* Georgiev (1961), *H. heldreihii* ssp. *bandericolum* Pawlowski (1963b), *H. hoppeanum* ssp. *stenolepium* Georg., var. *minoriceps* Georg., *H. leithneri* var. *sericatum* Georgiev (1961), *H. olympicum* ssp. *permuticeps* Jas. & Pawl. in Pawlowski (1963b), *H. peristericum* ssp. *monocephalum* Georgiev (1961), *H. pilosissimum* ssp. *subpannosum* Pawlowski (1963b), *H. pseudopilosella* × *pratense* Georg., *H. ruprechtii* ssp. *trojanicum* Georg., *H. sparsum* ssp. *kitanoffianum* Georg., ssp. *malamvicense* var. *altissimum* Georg., f. *parvulum* Georg., *H. stuppeum* ssp. *davidoffianum* Georg., ssp. *spathifolium* Georgiev (1961). *Hypericum aucheri* var. *macrantha* Jord. & Koz., var. *simplex* Jord. & Koz., *H. barbatum* var. *gracilis* Jord. & Koz., *H. cerastioides* f. *mycophylla* Jord. & Koz. f. *prostrata* Jord. & Koz., var. *simplex* Jord. & Koz., *H. elegans* var. *pedunculatus* Jord. & Koz., *H. olympicum* f. *prostrata* Jord. & Koz., f. *uniflorum* Jord. & Koz., var. *tenuifolia* Jord. & Koz., *H. perforatum* var. *longicapsula* Jord. & Koz., *H. richerii* var. *parvifolium* Jord. & Koz., ssp. *urumovii* Jord. & Koz., *H. rocheli* var. *minor* Jord. & Koz., *H. rumelicum* var. *ciliatum* Jord. & Koz., var. *georgievii* Jord. & Koz., f. *reptans* Jord. & Koz., var. *tenuifolium* Jord. & Koz., var. *vihodcevskyi* Jord. & Koz. in Jordanov (1970).
- Iberis sempervirens* f. *rosea* Valev in Jordanov (1970). *Iris variegata* var. *davidovii* Radenkova in Jordanov (1964).
- Jurinea albicaulis* f. *grandifolia* Koz., f. *latisecta* Koz., *J. consanguinea* var. *balcanica* Koz., f. *graminifolia* Koz., ssp. *neicevii* Kozuharov (1968a).
- Lilium martagon* var. *bulgaricum* Priszter & Borhidi in Priszter, (1967). *Linum flavum* var. *penevii* Stefanov (1963). *Linaria rediviva* var. *davidovii* Asenov in Jordanov (1970). *Luzula campestris* var. *erectiuscula* Koz. in Jordanov (1964), *L. campestris* var. *macrospica* Koz. in Jordanov (1964), *L. forsteri* var. *macrantha* Koz., var. *media* Koz. in Jordanov (1964), *L. multiflora* ssp. *thracica* Koz., *L. nemorosa* f. *aggregata* Kozuharov (1963), *L. nemorosa* f. *grandiflora* Koz. in Jordanov (1964), *L. pilosa* var. *brevicapsula* Kozuharov (1963), *L. spadicea* f. *compacta* Koz. in Jordanov (1964), *L. spadicea* f. *pumilla* Koz. in Jordanov (1964).
- Medicago arabica* f. *elegans* Koz., f. *pastoralis* Koz., *M. carstiensis* ssp. *belasicae* Kozuharov (1965), *M. coronata* f. *glandulosa* Kocev (1961), *M. disciformis* f. *parvicarpa* Kozuharov (1965), *M. disciformis* var. *strumensis* Velcev & Bondev (1961), *M. falcata* var. *erectiuscula* Koz., f. *davidovii* Koz., *M. minima* var. *intermedia* Koz., *M. orbicularis* f. *glanduligera* Koz. *M. rigidula* f. *viscosa* Koz., var. *compacta* Koz., f. *viscosa* Koz., f. *elegans* Koz., f. *pastoralis* Koz., f. *subnudulosa* Koz., var. *turbiniformis* Koz., f. *discoidea* Koz., *M. romanica* var. *semifalcata* Kozuharov (1965). *Minuartia glomerata* f. *pauciflora* Koz. & Kuzm. in Jordanov (1966), *M. hirsuta* var.

- compacta* Koz. & Kuzm., var. *xerotina* Koz. & Kuzm., *M. rhodopea* var. *australis* Koz. & Kuzm., f. *intermedia* Koz. & Kuzm., *M. saxifraga* var. *urumovii* Koz. & Kuzm., *M. setacea* var. *misica* Koz. & Kuzm., var. *pirinica* Koz. & Kuzm. in Jordanov (1966), *M. stojanovii* ssp. *pirinica* Kozuharov & Kuzmanov (1970).
- Ophioglossum vulgatum* var. *ovatum* Delipavlov (1971). *Ornithogalum comosum* var. *pseudoarcuatum* Radenkova in Jordanov (1964).
- Paeonia peregrina* var. *fuelei* Penzes (1968b), var. *latiloba* Janev & Jordanov in Jordanov (1970), f. *rosea* Janev & Jordanov in Jordanov (1970). *Paronychia cephalotes* var. *sooi* Borhidi (1966), ssp. *bulgarica* Chaudhri (1968), var. *minutiflora* Chaudhri (1968). *Phleum phleoides* var. *intermedium* Penev in Jordanov (1963). *Polygala major* var. *minor* Stefanov (1966). *Primula frondosa* var. *jordanovii* Peev in Jordanov & Peev (1970). *Prunella vulgaris* var. *parviflora* Stefanov (1966). *Pulsatilla montana* ssp. *bulgarica* Rosenthal ex Rummelspacher (1965).
- Quercus dalechampii* f. *breviloba* Gancev & Bondev, *Q. erucifolia* f. *cremena* Gancev & Bondev, *Q. mestensis* f. *pinnatifida* Gancev et Bondev, *Q. pedunculiflora* f. *longiloba* Gancev & Bondev, var. *pubipedunculata* Gancev & Bondev, *Q. robur* f. *brachypedunculata* Gancev & Bondev, f. *camciensis* Gancev & Bondev, *Q. virgiliana* f. *pirinica* Gancev & Bondev in Jordanov (1966).
- Ranunculus montanus* f. *mussalense* Penev, *R. nemorosus* var. *georgievii* Penev in Jordanov (1970). *Raphanus raphanistrum* var. *setosa* Delipavlov (1964a). *Reseda inodora* var. *septemsepalis* Mark. in Jordanov (1970). *Rubus tomentosus* var. *stojanovii* Markova (1961).
- Salix fragilis* var. *divergens* Stef. & A. Ganc. ex Velcev, *S. triandra* var. *amplifolia* Stef. & A. Ganc. ex Velcev in Jordanov (1966). *Schoenoplectus lacustris* f. *erectus* Koz. & Kuzm., *S. tabernemontanii* var. *davidovii* Koz. & Kuzm., f. *junciformis* Koz. & Kuzm. in Jordanov (1964). *Secale montanum* var. *balcanicum* Gancev in Jordanov (1963). *Sedum stefco* var. *albiflora* Cesmedzlev (1967). *Sempervivum heuffelii* var. *bulgarica* Cesmedzlev (1969b). *Silene conica* ssp. *conomaritima* Jord. & Panov in Jordanov (1966), *S. euzina* var. *bulgarica* Jord. & Panov, *S. × hybrida* Jord. & Panov, *S. italica* var. *achtarovii* Jord. & Panov, *S. roemeri* var. *polycephala* Jord. & Panov, *S. subconica* f. *urumovii* Jord. & Panov in Jordanov (1966). *Sternbergia colchiciflora* f. *contorta* Kovacev, f. *dimittrovii* Kovacev f. *gheorgievii* Kovacev (1962), f. *terata* Kovacev (1961).
- Thalictrum aquilegifolium* ssp. *storgosiacum* Panov in Jordanov (1970). *Tulipa rhodopea* var. *achtarovii* Delipavlov (1961), *T. urumovii* f. *glauca* Kitan. in Jordanov (1964).
- Verbascum blattaria* var. *megalantha* Stefanov (1966). *Vicia cordata* var. *microsperma* Stefanov (1966). *Vinca herbacea* f. *albiflora* Janev & Panov (1964).

A.2 — New combinations

- Acer campestre* f. *hebecarpum* (DC.) Stoj. Stef. & Kitan. (1967). *Aconitum firmum* var. *callibotryon* (Rchb.) Penev & Simeonovski in Jordanov (1970), *A. lamarckii* var. *wagneri* (Deg.) Penev & Simeonovski, *A. variegatum*

- var. *diffusum* (Rchb.) Penev & Simeonovski, var. *gracile* (Rchb.) Penev & Simeonovski in Jordanov (1970), f. *balcanicum* (Vel.) Stoj. Stef. & Kitan., f. *vitosanum* (Gayer) Stoj. Stef. & Kitan. (1966). *Aegilops ovata* ssp. *biunciale* (Vis.) Stoj. Stef. & Kitan. (1966). *Agropyrum brandzae* var. *durum* (Stef.) Kitan. in Jordanov (1963), *A. elongatum* var. *ponticum* (Podp.) Kitan., *A. intermedium* var. *varnense* (Vel.) Kitan., var. *vestitum* (Vel.) Kitan., *A. repens* var. *caesium* (Presl.) Kitan. in Jordanov (1963). *Alchemilla vulgaris* var. *asternantha* (Rothm.) Stoj. Stef. & Kitan., var. *acutiloba* (Opiz) Stoj. Stef. & Kitan., var. *catachnoa* (Rothm.) Stoj. Stef. & Kitan., var. *gracilima* (Rothm.) Stoj. Stef. & Kitan., var. *heterophylla* (Rothm.) Stoj. Stef. & Kitan. (1966). *Alisma plantago-aquatica* ssp. *graminifolium* (Ehrh.) Stoj. Stef. & Kitan. (1966). *Allium margaritaceum* f. *guttatum* (Stev.) Stoj. Stef. & Kitan., f. *rubellum* (Boiss.) Stoj. Stef. & Kitan. (1966), *A. paniculatum* f. *rupestre* (Stev.) Stoj. Stef. & Kitan. (1966), *A. sphaerocephalum* var. *descendens* (L.) Valev & Asenov in Jordanov (1963). *Alyssoides bulgarica* (Sagorski) Asenov in Jordanov (1970). *Alyssum cuneifolium* ssp. *pirinicum* (Stoj. & Acht.) Stoj. in Jordanov (1970), *A. minus* ssp. *strigosum* (Banks & Soland.) Stoj. Stef. & Kitan. (1966). *Anagallis arvensis* f. *latifolia* (L.) Stoj. Stef. & Kitan. (1967). *Anchusa procera* var. *dauidovii* (Stoj.) Stoj. Stef. & Kitan. (1967). *Anemone rhodopaea* (Stoj. & Stef.) Stoj. Stef. & Kitan. var. *montana* (Hoppe) Stoj. Stef. & Kitan. (1966). *Anthyllis vulneraria* ssp. *bulgarica* (Sagorski) Cullen (1968). *Arabis jaquinii* var. *ciliolata* (Stef.) Stoj. Stef. & Kitan. (1966), *A. sagitata* ssp. *hornungiana* (Schur) Asenov in Jordanov (1970). *Arenaria rotundifolia* f. *pauciflora* (Boiss.) Koz. & Kuzm. in Jordanov (1966). *Arrhenatherum elatius* var. *urumovii* (Acht. & Kitan.) Kitan. in Jordanov (1963). *Artemisia maritima* var. *monogyne* (Wk.) Stoj. Stef. & Kitan. (1967). *Asperula cynanchica* var. *bulgarica* (Vel.) Soo (1965). *Aster amellus* f. *ottomanus* (Vel.) Stoj. Stef. & Kitan. (1967). *Astragalus onobrychis* f. *gilliatii* (Turrill) Stoj. Stef. & Kitan., f. *skorpillii* (Vel.) Stoj. Stef. & Kitan. (1967). *Atropis convoluta* var. *faestucaeformis* (Host) Georgiev in Jordanov (1963). *Asyneuma anthericoides* f. *villosa* (Stoj. & Acht.) Stoj. Stef. & Kitan., var. *grandiflorum* (Vel.) Stoj. Stef. & Kitan. (1967), *A. kellererianum* (Stef.) Stoj. Stef. & Kitan. (1967), *A. limonifolium* f. *pubescens* (Stoj. & Acht.) Stoj. Stef. & Kitan. (1967).
- Bilderdykia convolvulus* var. *pusilla* (Opiz) Asenov in Jordanov (1966). *Bistorta major* var. *minus* (Meissn.) Asenov, f. *griseum* (Beck) Asenov, f. *puberula* (Beck) Asenov, *B. vivipara* var. *alpina* (Wahlenb.) Asenov in Jordanov (1966). *Bromus squarrosus* var. *danubialis* (Penzes) Stoj. Stef. & Kitan., f. *wolgensis* (Fisch.) Stoj. Stef. & Kitan. (1966), *B. tectorum* f. *ponticus* (C. Koch) Stoj. Stef. & Kitan., f. *longipilus* (Küm. & Sendtn.) Stoj. Stef. & Kitan. (1966); *Buglossoides glandulosum* (Vel.) Fernandes in Heywood (1971c).
- Calamintha alpina* var. *hungarica* (Simk.) Stoj. Stef. & Kitan. (1967). *Camelina sativa* ssp. *rumelica* (Vel.) Stoj. Stef. & Kitan. (1966). *Campanula persicifolia* f. *hispida* (Lej.) Stoj. Stef. & Kitan., *C. rapunculus* f. *lambertiana* (Boiss.) Stoj. Stef. & Kitan., *C. trachelium* var. *athoa* (Boiss. & Heldr.)

- Stoj. Stef. & Kitan. (1967). *Carex cuprina* ssp. *polyphylla* (Kar. & Kir.) Valev in Jordanov (1964), *C. glauca* var. *eryostachys* (Hoppe) Stoj. Stef. & Kit., *C. pairaei* f. *depauperata* (Hampe) Stoj. Stef. & Kitan., *C. vulpina* var. *compacta* (Lam.) Stoj. Stef. & Kitan. (1966). *Carlina vulgaris* f. *macrocephala* (Vel.) Stoj. Stef. & Kitan., f. *spinosa* (Vel.) Stoj. Stef. & Kitan. (1967). *Centaurea rutifolia* ssp. *lyrophylla* (Grsb.) Stoj. Stef. & Kitan., *C. stoebe* ssp. *vatevii* (Deg. Urum. & Wagn.) Stoj. Stef. & Kitan. (1967). *Centaureum umbellatum* var. *turcicum* (Vel.) Stoj. Stef. & Kitan. (1967). *Cerastium arvense* f. *latifolium* (Georgiev) Stoj. Stef. & Kitan., f. *stenophyllum* (Georgiev) Stoj. Stef. & Kitan., f. *kellereri* (Georgiev) Stoj. Stef. & Kitan., *C. brachyphyllum* f. *luridum* (Guss.) Stoj. Stef. & Kitan. (1966). *Cirsium desertorum* var. *viride* (Vel.) Stoj. Stef. & Kitan., *C. lanceolatum* var. *hypoleucum* (DC.) Stoj. Stef. & Kitan. (1967), *C. ligulare* var. *albidum* (Vel.) Stoj. Stef. & Kitan., var. *armatum* (Vel.) Stoj. Stef. & Kitan. (1967). *Clypeola johnthlaspi* var. *microcarpa* (Moris) Stoj. Stef. & Kitan. (1966). *Consolida regalis* var. *divaricatum* (Ldb.) Simeonovski & Penev in Jordanov (1970). *Coronilla varia* var. *pauciflora* (Grsb.) Stoj. Stef. & Kitan. (1967). *Corothismus rectipilosus* (Adam.) Skalicka (1967). *Corydalis slivenensis* var. *integrata* (Stoj.) Jord. & Koz., *C. solida* var. *caucasica* (DC.) Jord. & Koz., f. *bicalcarata* (Vel.) Jord. & Koz., f. *depauperata* (Schur) Jord. & Koz. in Jordanov (1970). *Crepis setosa* f. *calvifrons* (Borb.) Stoj. Stef. & Kitan. (1967), *C. setosa* f. *dobrogica* (Backok) Nyarady in Savulescu (1965). *Crocus veluchensis* f. *balcanensis* (Janka) Stoj. Stef. & Kitan. (1966). *Cytisanthus trifoliatius* (Jka) Mayer (1970a). *Cytisus albus* spp. *frivaldszkyanus* (Deg.) Soo (1964), *C. hirsutus* f. *grisebachii* (Briq.) Stoj. Stef. & Kitan., f. *hirsutissimus* (Koch) Stoj. Stef. & Kitan., f. *perhirsutus* (Simk.) Stoj. Stef. & Kitan., f. *subleiocarpus* (Simk.) Stoj. Stef. & Kitan., *C. procumbens* f. *rectipilosus* (Adam.) Stoj. Stef. & Kitan. (1967), *C. supinus* var. *absinthioides* (Janka) Stoj. Stef. & Kitan. (1967).
- Daphne oleoides* var. *kosanini* (Stoj.) Stoj. Stef. & Kitan. (1967). *Delphinium halteratum* var. *balcanicum* (Pawlowski) Simeonovski & Penev in Jordanov (1970). *Dianthus armeria* var. *armeriastrum* (Wolfn.) Stoj. Stef. & Kitan., *D. cruentus* ssp. *panicii* (Vel.) Stoj. Stef. & Kitan. (1966), *D. giganteus* ssp. *subgiganteus* (Borb.) Stoj. in Jordanov (1966), *D. gracilis* ssp. *achtarovii* (Stoj. & Kitan.) Tutin in Heywood (1963). *Digraphis arundinacea* var. *picta* (L.) Hinkova in Jordanov (1963). *Diosphaera rumeliana* var. *chalcidicum* (Buser) Stoj. Stef. & Kitan. (1967). *Diplachne serotina* var. *bulgarica* (Bornm.) Stoj. Stef. & Kitan. (1966). *Draba athoa* var. *alibotusensis* (Deg. & Dren.) Valev, *D. tomentosa* var. *pirinica* (Stoj. & Acht.) Valev in Jordanov (1970).
- Echinops sphaerocephalus* var. *albidus* (Boiss.) Stoj. Stef. & Kitan. (1967). *Eranthis bulgaricus* (Stef.) Stefanov (1963). *Erigeron atticus* f. *drenovskyi* (Deg.) Stoj. Stef. & Kitan. (1967). *Erysimum comatum* var. *drenovskyi* (Deg.) Stoj. Stef. & Kitan. (1966). *E. helveticum* var. *drenovskyi* (Deg.) Asenov in Jordanov (1970). *Euphorbia barrelleri* ssp. *carnica* (Flori) Kuzm., ssp. *hercegovina* (Beck) Kuzmanov (1963), *E. barrelleri* f. *planicornis* (Stoj.) Stoj. Stef. & Kitan. (1967), *E. glareosa* ssp. *cardilateri*

- (Prod.) Kuzm., ssp. *dobrogensis* (Prod.) Kuzm., ssp. *pannonica* (Host) Kuzm. (1961b, 1963), *E. seguieriana* var. *niciciana* (Borb.) Stoj. Stef. & Kitan. (1967), *E. velenovskyi* ssp. *aristata* (Schmahl.) Prokh. & Kuzm. in Kuzmanov (1961b), f. *trichocarpa* (Bornm.) Stoj. Stef. & Kitan. (1967).
- Festuca elatior* f. *mediterranea* (Hack.) Stoj. Stef. & Kitan. (1966), var. *fenas* (Lag.) Stoj. Stef. & Kitan. (1966), *F. ovina* var. *stojanovii* (Acht.) Stoj. Stef. & Kitan., f. *pubiculmis* (Hack.) Stoj. Stef. & Kitan., *F. varia* var. *balcanica* (Acht.) Stoj. Stef. & Kitan. (1966). *Fritillaria drenovskyi* f. *polyantha* (Rech.) Janev in Jordanov (1964). *Fumaria officinalis* var. *micrantha* (Lag.) Stoj. Stef. & Kitan. (1966).
- Galanthus elwesii* f. *maximus* (Vel.) Stoj. Stef. & Kitan. (1966), *G. graecus* f. *maximus* (Vel.) Zahariadi in Savulescu (1966). *Galeopsis speciosa* var. *sulphurea* (Jord.) Stoj. Stef. & Kitan. (1967). *Galium mollugo* ssp. *erectum* f. *asperum* (Podp.) Stoj. Stef. & Kitan., *G. palustre* ssp. *constrictum* (Chaub.) Stoj. Stef. & Kitan. *G. parisiense* ssp. *tenuissimum* (M. B.) Stoj. Stef. & Kitan. (1967). *Gentiana bulgarica* f. *jonantha* (Borb.) Stoj. Stef. & Kitan. (1967). *Gentiana bulgarica* (Vel.) Holub (1967a), *G. lutescens* (Vel.) Holub (1967a). *Goniolimon tataricum* var. *besserianum* (R. S.) Stoj. Stef. & Kitan., var. *collinum* (Grsb.) Stoj. Stef. & Kitan. (1967). *Glyceria aquatica* ssp. *arundinacea* (MB.) Georgiev in Jordanov (1963).
- Haynaldia villosa* f. *rhodopea* (Vel.) Kitan. in Jordanov (1963). *Heracleum sphondylium* ssp. *ternatum* (Vel.) Brummitt in Heywood (1968). *Herniaria glabra* var. *scabrescens* (Roem.) Koz. & Kuzm. in Jordanov (1966). *Hesperis dinarica* f. *degeniana* (Borb.) Stoj. Stef. & Kitan., *H. matronalis* var. *theophrasti* (Borb.) Stoj. Stef. & Kitan. (1966). *Hieracium bifidum* f. *psamogenes* (Zahn.) Stoj. Stef. & Kitan., *H. cymosum* f. *meizocephalum* (Zahn & Hayek) Stoj. Stef. & Kitan., *H. echioides* f. *echiophyllum* (N. P.) Stoj. Stef. & Kitan., *H. hoppeanum* var. *cilicicum* (N. P.) Stoj. Stef. & Kitan., var. *macranthum* (Ten.) Stoj. Stef. & Kitan. (1967). *Hordeum hystrix* var. *fonilladei* (Rouy) Gancev in Jordanov (1963). *Hypericum elegans* var. *pedunculata*, *H. maculatum* var. *immaculatum* (Murb.) Jord. & Koz., *H. rochellii* ssp. *pseudotenellum* (Vandas) Jord. & Koz. in Jordanov (1970).
- Jovibarba heuffelii* var. *patens* (Grsb.) Valev in Jordanov (1970). *Juglans regia* var. *balcanica* (Stoj. Stef. & Stoichkoff) Kitan. in Jordanov (1966). *Juniperus communis* ssp. *brevifolia* (Sano) Penzes (1970). *Jurinea albicaulis* ssp. *killea* (Azn.) Koz., var. *kitanovii* (Iljin) Koz., *J. consanguinea* ssp. *arachnoides* (Bge.) Koz., ssp. *bulgarica* (Vel.) Koz., var. *integrifolia* (Schur.) Kozuharov (1968a).
- Kickxia elatine* var. *sicheri* (Rchb.) Stoj. Stef. & Kitan. (1967). *Knautia arvensis* var. *travnicensis* (Beck) Stoj. Stef. & Kitan., *K. macedonica* var. *lyrata* (Vis. & Panc.) Stoj. Stef. & Kitan. (1967). *Kochia tosevii* (Urum.) Penzes (1968a). *Koeleria cristata* var. *elatior* (Vel.) Soó (1971), *K. gracilis* var. *eryostachya* (Panc.) Stoj. Stef. & Kitan., var. *glaucovirrens* (Domin) Stoj. Stef. & Kitan., var. *pyramidata* (Domin) Stoj. Stef. & Kitan. (1966), var. *skorpilii* (Podp.) Ujhelyi (1966).
- Lamium garganicum* var. *pictum* (Boiss. & Heldr.) Stoj. Stef. & Kitan. (1967). *Lathyrus alpestris* var. *fridrichsthalii* (Grsb.) Stoj. Stef. & Kitan.,

- L. laxiflorus* f. *glabratus* (Grsb.) Stoj. Stef. & Kitan. (1967). *Leontodon asper* f. *intermedius* (Vel.) Stoj. Stef. & Kitan., f. *pirinicus* (Stoj. & Acht.) Stoj. Stef. & Kitan. (1967). *Leopoldia tenuifolia* var. *bulgaricum* (Vel.) Valev in Jordanov (1964). *Lilium jankae* var. *rhodopaeum* (Delipavlov) Janev in Jordanov (1964). *Linaria genistifolia* f. *linifolia* (Boiss.) Stoj. Stef. & Kitan. (1967). *Linum flavum* var. *hungaricum* (Podp.) Stoj. Stef. & Kitan., *L. tauricum* f. *linearifolium* (Lind.) Stoj. Stef. & Kitan. (1967). *Luzula campestris* ssp. *alpestris* (R. Breyer) Koz., var. *debilis* (Vel.) Koz. in Jordanov (1964), *L. multiflora* ssp. *tenella* (Mielich) Kozuharov (1963). *Lychnis viscaria* ssp. *atropurpurea* (Grsb.) Chater in Heywood (1969).
- Medicago coronata* var. *glandulosa* (Kocev) Kozuharov (1965), *M. disciformis* f. *strumensis* (Velcev & Bondev) Kozuharov (1965), *M. falcata* f. *filiformis* (Nyarady) Koz., var. *glandulosa* (Davidov) Koz., f. *podperae* (Sirjaev) Koz., ssp. *glandulosa* (Davidov) Koz., f. *pastoralis* (Wisjulina) Kozuharov (1965), *M. lupulina* f. *glandulosa* (Neum.) Stoj. Stef. & Kitan., *M. minima* f. *brevispina* (Benth.) Stoj. Stef. & Kitan., f. *pulchella* (Löve) Stoj. Stef. & Kitan., f. *viscida* (Koch) Stoj. Stef. & Kitan. (1967), *M. minima* f. *mollissima* (Koch) Koz., f. *pulchella* (Löwe) Kozuharov (1965), *M. rigidula* f. *glandulosa* (Podp.) Stoj. Stef. & Kitan. (1967). *Melica ciliata* f. *nebrodensis* (Parl.) Stoj. Stef. & Kitan. (1966). *Mentha aquatica* f. *caput-medusae* (Trautm. & Urumov) Stoj. Stef. & Kitan., *M. pulegium* f. *pubescens* (Sleb.) Stoj. Stef. & Kitan. (1967). *Micromeria dalmatica* f. *bulgarica* (Vel.) Stoj. Stef. & Kitan. (1967), *M. dalmatica* ssp. *bulgarica* (Vel.) Guinea in Heywood (1971c). *Minuartia caespitosa* var. *glandulosa* (Rouy & Fouc.) Koz. & Kuzm., var. *orthophylla* (Beck) Koz. & Kuzm., var. *ramosissima* (Fenzl.) Koz. & Kuzm. in Jordanov (1966), *M. glomerata* ssp. *velutina* (Boiss. & Orph.) Stoj. Stef. & Kitan. (1966), *M. recurva* ssp. *orbelica* (Vel.) Koz. & Kuzm., *M. rhodopaea* (Deg.) Koz. & Kuzm., *M. stojanovii* (Kitan.) Koz. & Kuzm., in Jordanov (1966). *Molinia litoralis* var. *arundinacea* (Asch. & Graebn.) Koz. in Jordanov (1963). *Muscari comosum* ssp. *pyramidatum* (Vel.) Breistroffer (1966), *M. racemosum* f. *velenovskyi* (Acht.) Stoj. Stef. & Kitan. (1966), *M. tenuifolium* var. *bulgaricum* (Vel.) Stoj. Stef. & Kitanov (1966). *Myosotis incrassata* var. *pontica* (Davidov) Grau (1968), *M. nemorosa* ssp. *orbelica* (Vel.) Schuster (1967).
- Neslia paniculata* var. *apiculata* (Fisch. Meyer & Avé Lall) Stoj. Stef. & Kitan. (1966).
- Onobrychis gracilis* f. *bulgarica* (Jord.) Stoj. Stef. & Kitan. (1967). *Onosma aucherianum* var. *stojanoffii* (Turrill) Stoj. Stef. & Kitan., *O. visianii* var. *rhodopaeum* (Vel.) Stoj. Stef. & Kitan. (1967). *Ornithogalum nutans* ssp. *prasadrum* (Grsb.) Radenkova in Jordanov (1964).
- Panicum crus-galli* var. *oryzicola* (Vasing.) Stoj. Stef. & Kitan. (1966). *Papaver degenii* (Urum. & Jav.) Kuzm. in Jordanov (1970). *Parageum bulgaricum* (Panc.) Klal (1966). *Pastinaca hirsuta* f. *puberula* (Acht.) Stoj. Stef. & Kitan. (1967). *Pedicularis leucodon* ssp. *oculta* (Jka) Mayer (1970b). *Persicaria salicifolia* (Brouss. ex Willd.) Asenov, *P. orientalis* (L.) Asenov in Jordanov (1966). *Picris hieracioides* var. *sonchoides* (Vest.) Stoj. Stef.

& Kitan. (1967). *Polygala supina* ssp. *rhodopaea* (Vel.) McNeill in Heywood (1968). *Polystichum lonchitis* f. *hastatum* (Christ) Acht. in Jordanov (1963). *Potentilla argentea* f. *pseudocalabra* (Th. Wolf) Stoj. Stef. & Kitan. (1966), *P. impolita* ssp. *tenorrima* (Vel.) Borhidi (1965), *P. taurica* var. *emilii-popi* (Nyarady) Stoj. Stef. & Kitan. (1966). *Primula acaulis* f. *rosea* (Boiss.) Stoj. Stef. & Kitan., *P. elatior* var. *intrichata* (Gren. & Godr.) Stoj. Stef. & Kitan., *P. officinalis* f. *canescens* (Opiz) Stoj. Stef. & Kitan., var. *columnae* (Ten.) Stoj. Stef. & Kitan. (1967). *Pseudolysimachia urumovii* (Vel.) Holub (1967b). *Pulsatilla montana* ssp. *slavjankae* (Zimm.) Rumelspacher (1964), *P. slavjankae* (Zimm.) Jord. & Koz. in Jordanov (1970). *Pyracantha coccinea* f. *stojanovii* (Penzes) Stoj. Stef. & Kitan. (1966).

Quercus virgiliana f. *lacera* (Vuk.) Gancev & Bondev in Jordanov (1966).

Ranunculus acris f. *latisectus* (Beck) Penev, f. *napelifolius* (Crantz) Penev, *R. aquatilis* var. *pellatus* (Schrank) Penev in Jordanov, (1970), *R. aquatilis* var. *riloense* (Vel.) Stoj. Stef. & Kitan. (1966), *R. auricomus* var. *biformis* (W. Koch) Penev, var. *binatus* (Kit.) Penev, var. *fissus* (A. Nyarady) Penev, var. *subtaticus* (Jasievicz) Penev, *R. fallax* var. *digitatifolius* (Jasievicz) Penev, var. *incisifolius* (Rchb.) Penev, var. *longidentatus* (Nyarady) Penev, *R. ficaria* var. *bulbifer* (Lawal.) Penev, *R. millefoliatus* var. *garganicus* (Ten.) Penev, *R. pseudofluitans* var. *carinathus* (Schur) Penev, *R. sardous* f. *hirsutus* (Curt.) Penev, f. *laevis* (Celak.) Penev, *R. trichophyllus* var. *divaricatus* (Schrank) Penev, var. *druetii* (Schulz) Penev in Jordanov (1970). *Rhinanthus rumelicus* var. *sagorskii* (Sempl.) Stoj. Stef. & Kitan. (1967). *Rorippa palustris* var. *prolifera* (Heuff.) Stoj. Stef. & Kitan. (1966). *Rubus hedycarpus* var. *macrostemon* (Focke) Stoj. Stef. & Kitan. (1966), *R. hirtus* f. *appendiculatus* (Hruby) Markova, f. *rilaensis* (Hruby) Markova (1966a), *R. hirtus* var. *bayeri* (Focke) Stoj. Stef. & Kitan., var. *bellardii* (Weiche) Stoj. Stef. & Kitan., var. *guentheri* (W. N.) Stoj. Stef. & Kitan., var. *rivularis* (P. J. Müll.) Stoj. Stef. & Kitan., var. *schleicheri* (Weiche) Stoj. Stef. & Kitan., var. *serpens* (Weiche) Stoj. Stef. & Kitan. (1966), *R. sanguineus* f. *cyclophyllus* (Hruby) Markova (1962a), *R. scaber* var. *macrostachys* (P. J. Müll.) Stoj. Stef. & Kitan., var. *tereticaulis* (P. J. Müll.) Stoj. Stef. & Kitan. (1966). *Ruppia palustris* var. *rostellata* (Koch) Stoj. Stef. & Kitan. (1966).

Salvia nutans f. *sublanuginosa* (Nyarady) Stoj. Stef. & Kitan. (1967). *Saponaria glutinosa* var. *calvescens* (Borb.) Valev in Jordanov (1966), *S. sicula* ssp. *stranjensis* (Jord.) Chater in Heywood (1964). *Saxifraga ascendens* ssp. *discolor* (Vel.) Kuzm. in Jordanov (1970), *S. cymosa* f. *parviflora* (Stoj. Ach. & Georgiev) Stoj. Stef. & Kitan. (1966), *S. exarata* ssp. *pirinica* (S. Pawl.) Kuzm. in Jordanov (1970), *S. juniperifolia* f. *macedonica* (Deg.) Stoj. Stef. & Kitan. (1966), *S. marginata* var. *balkanica* (Hayek) Kuzm. in Jordanov (1970), *S. moschata* var. *pirinica* (S. Pawl.) Stoj. Stef. & Kitan. (1966), *S. paniculata* var. *brevifolia* (Engl.) Kuzm., var. *orientalis* (Engl.) Kuzm., var. *recta* (Lap.) Kuzm., *S. pedemontana* var. *parviflora* (Stoj. Ach. & Georgiev) Kuzm. in Jordanov (1970), *S. rotundifolia* ssp. *chrysosplenifolia* (Boiss.) D. A. Webb, var. *rhodopaea*

- (Vel.) D. A. Webb in Jordanov (1970), *S. sancta* ssp. *pseudosanta* (Janka) Kuzm., var. *macedonica* (Deg.) Kuzm. in Jordanov (1970). *Scabiosa columbaria* ssp. *velenovskiyana* (Borb.) Stoj. Stef. & Kitan. (1967). *Scandix australis* var. *balcanica* (Vien.) Stoj. Stef. & Kitan., *S. pecten-veneris* var. *macrorrhynchia* (C. A. M.) Stoj. Stef. & Kitan. (1967). *Scilla autumnalis* f. *alba* (Vel.) Kitan. in Jordanov (1964). *Scleranthus dichotomus* var. *ponticus* (Vel.) Koz. & Kuzm. in Jordanov (1966). *Scorzonera laciniata* f. *calcitrapifolium* (Vahl.) Stoj. Stef. & Kitan. (1967). *Scutellaria albida* f. *pichleri* (Vel.) Stoj. Stef. & Kitan., *S. alpina* f. *hirtula* (Stef.) Stoj. Stef. & Kitan. (1967). *Sedum acre* f. *acutifolium* (Stef.) Stoj. Stef. & Kitan., f. *microphyllum* (Stef.) Stoj. Stef. & Kitan. (1966), *S. sartorianum* ssp. *ponticum* (Vel.) D. A. Webb in Heywood (1963). *Sempervivum marmoreum* var. *balcanicum* (Stoj.) Stoj. Stef. & Kitan. (1966). *Senecio paludosus* f. *bochemicus* (Tausch.) Stoj. Stef. & Kitan. (1967). *Seseli bulgaricum* P. W. Ball. in Heywood (1968). *Schoenoplectus tabernemontanii* f. *capitata* (Hausskn.) Koz. & Kuzm. in Jordanov (1964). *Schoenus nigricans* var. *intermedius* (Brügg.) Koz. & Kuzm. in Jordanov (1964). *Silene bupleuroides* var. *regis-ferdinandii* (Deg. & Urum.) Stoj. Stef. & Kitan., var. *urumovii* (Jav.) Stoj. Stef. & Kitan., f. *ramosa* (Nov.) Stoj. Stef. & Kitan., var. *scabra* (Nov.) Stoj. Stef. & Kitan. (1966), *S. cserei* f. *elatior* (Gusul.) Jord. & Panov, *S. densiflora* var. *volgensis* (Wolf) Jord. & Panov. *S. gigantea* var. *rhodopaea* (Janka) Jord. & Panov, *S. lerchenfeldiana* f. *intermedia* (Kitan., Penev & Vyhodceviski) Stoj. Stef. & Kitan., f. *pirinica* (Stoj.) Stoj. Stef. & Kitan. (1966), *S. pusilla* var. *monachorum* (Vis. & Panc.) Jord. & Panov, var. *pubibundum* (Hoffmansegg) Jord. & Panov, *S. roemeri* ssp. *sendtneri* (Boiss.) Jord. & Panov in Jordanov (1966). *Solidago virga-aurea* ssp. *alpestris* f. *vestita* (Hal.) Stoj. Stef. & Kitan. (1967). *Sorbus aria* var. *kövasgii* (Penzes) Stoj. Stef. & Kitan., var. *umbellata* (Desf.) Stoj. Stef. & Kitan. (1966). *Stachys alpina* var. *reinertii* (Heldr.) Stoj. Stef. & Kitan., *S. germanica* f. *drosocalyx* (Ronn.) Stoj. Stef. & Kitan. (1967). *Tanacetum millefolium* var. *achillefolium* (MB.) Stoj. Stef. & Kitan. (1967). *Thalictrum lucidum* var. *rhodopaeum* (Rech.) Stoj. Stef. (1966). *T. simplex* ssp. *rhodopaeum* (Rech.) Panov in Jordanov (1970). *Thesium simplex* ssp. *moesiicum* (Vel.) Koz. & Kuzm. in Jordanov (1966). *Thlaspi kovatsii* var. *affine* (Schott) Valev, var. *jankae* (Kern.) Valev in Jordanov (1970), *T. praecox* var. *avalanum* (Panc.) Stoj. Stef. & Kitan. (1966). *Thymus atticus* var. *pseudoatticus* (Ronn.) Stoj. Stef. & Kitan. (1967), *T. glabrescens* ssp. *urumovii* (Vel.) J alas in Heywood (1971b), *T. marschallianus* var. *bulgaricus* (Dom. & Podp.) Stoj. Stef. & Kitan., f. *elipticus* (Opiz) Stoj. Stef. & Kitan., *T. perenicus* (Vel.) Stoj. Stef. & Kitan. (1967), *T. praecox* ssp. *polytrichus* (Borb.) J alas (1970), ssp. *skorpilii* (Vel.) J alas in Heywood (1971b), *T. pulegioides* f. *istriacus* (H. Br.) Stoj. Stef. & Kitan. (1967). *Thypha angustifolia* var. *angustata* (Bory & Chaub.) Jordanov in Jordanov (1963), *T. latifolia* var. *schuttleworthii* (Koch & Sonder) Stoj. Stef. & Kitan. (1966). *Torilis anthriscus* var. *ucrainica* (Spreng.) Stoj. Stef. & Kitan. (1967). *Tragopogon crocifolium* ssp. *balcanicum* (Vel.) Kuzm. Koz. & Simeonov in Kitanov et al., (1970), *T. lati-*

folius ssp. *stribrnyi* (Hayek) Kuzm. Koz. & Simeonov in Kuzmanov et al., (1970), *T. orientalis* var. *rumelicum* (Vel.) Kuzm., Koz. & Simeonov in Kuzmanov et al., (1970). *Trifolium aureum* ssp. *velenovskiyi* f. *achtarovii* (Urumov) Stoj. Stef. & Kitan., *T. hybridum* f. *anatolicum* (Boiss.) Stoj. Stef. & Kitan., *T. spadiceum* f. *rhodopaeum* (Podp.) Stoj. Stef. & Kitan. (1967). *Tulipa rhodopaea* f. *achtarovii* (Delipavlov) Kitan. in Jordanov (1964). *Turritis glabra* f. *trifurcato-pilosa* (O. Kuntze) Stoj. Stef. & Kitan. (1966).

Umbilicus erectus var. *lassithiensis* (Gandog.) Stoj. Stef. & Kitan. (1966), *U. rupestris* var. *horisontalis* (DC.) Valev in Jordanov (1970).

Valeriana officinalis f. *latifolia* (Vahl.) Stoj. Stef. & Kitan. (1967). *Valerianella discoidea* var. *kotschyi* (Boiss.) Stoj. Stef. & Kitan. (1967). *Verbascum abietinum* f. *vitosanum* (Dimitrov) Stoj. Stef. & Kitan. (1967), *V. nigrum* ssp. *abietinum* (Borb.) Ferguson in Heywood (1971a), *V. ovalifolium* f. *incisifoliatum* (Nyarady) Stoj. Stef. & Kitan. (1967), *V. rorripifolium* (Hal.) Ferguson in Heywood (1971a), *V. rupestre* (Davidov) Ferguson in Heywood (1971a). *Veronica anagalis-aquatica* var. *anagaloides* (Guss.) Stoj. Stef. & Kitan., *V. beccabunga* f. *callida* (Podp.) Stoj. Stef. & Kitan., var. *scardica* (Grsb.) Stoj. Stef. & Kitan. (1967), *V. saturejoides* ssp. *kellereri* (Deg. & Urumov) Fischer (1970), *V. spicata* f. *austrobulgarica* (Deg. & Drenovski) Stoj. Stef. & Kitan., var. *barrelieri* (Schult) Stoj. Stef. & Kitan. (1967). *Vicia angustifolia* var. *microsperma* (Stef.) Stoj. Stef. & Kitan. (1967). *Viola dacica* var. *macedonica* (Boiss. & Heldr.) Stoj. Stef. & Kitan. (1967), *V. elatior* var. *debilis* (Vel.) Soo (1967), *V. grisebachiana* var. *perinensis* (Becker) Stoj. Stef. & Kitan. (1967). *Viscum album* ssp. *laxum* (Boiss.) Stoj. Stef. & Kitan. (1966).

Key to the abbreviations of bulgarian author's name cited in Appendix A:

Jord. — D. JORDANOV	Kuzm. — B. KUZMANOV
Kitan. — B. KITANOV	Stef. — B. STEFANOV
Koz. — S. KOZUHAROV	Stoj. — N. STOJANOV

Appendix B — New records of native taxa

B.1 — New species

Adonis wolgensis Stev. (Panov & Asenov in JORDANOV, 1970).

Allium albidum Fisch. (DELIPAVLOV, 1968a).

Allium decipiens Fisch. (CESMEDZIEV, 1971).

Allium fuscum W. K. (CESMEDZIEV, 1970b).

Allium leucanthemum C. Koch (GANCEV & DENCEV, 1963).

Allium pallens L. (CESMEDZIEV, 1970b).

Allium tauricum (Bess.) Don. (CESMEDZIEV, 1970b).

Allium cephalotes Boiss. (DENCEV, 1970).

Amygdalus webbii Spach (DELIPAVLOV, 1966).

Andrachne * *telephioides* L. (VELCEV & BONDEV, 1961).

Anthoxanthum aristatum Boiss. (VELCEV & BONDEV, 1964).

- Arabis collina* Ten. (ASENOV in JORDANOV, 1970).
Asperula involucrata Bergr. (STEFANOV, 1963b).
Asplenium cuneifolium Viv. (KOZUHAROV, 1968b).
Asplenium javorkeanum Vida (VIDA, 1963).
Asparagus trichophyllus Bge. (VIHODCEVSKI, 1963).
Astragalus sesameus L. (VELCEV et al., 1962).
Bombycilaena * *bombicinus* (Lag.) Smol. (GANCEV, 1963).
Bromus maximus Desf. (STEFANOV, 1963b).
Caltha palustris group: *C. alpestris* Sch. N. K., *C. minor* Mill., *C. rostrata* Borb. (Kozuharov & Markova in JORDANOV, 1970).
Carex strigosa Huds. (GANCEV & DENCEV, 1965).
Centaurea atropurpurea W. K. (JORDANOV, 1966b).
Centaurea formanekii Hal. (GANCEV & DENCEV, 1965).
Chaerophyllum aromaticum L. (DIMITROV et al., 1967).
Colutea cilicica (DENCEV, 1963b, see BROWICZ, 1967).
Convolvulus compactus Boiss. (VELCEV, 1970).
Corynephorus * *articulatus* P. B. (VELCEV & BONDEV, 1961).
Crocus tommasinianus Herb. (VELCEV in JORDANOV, 1964).
Crupina crupinastrum (Moris) Vis. (VELCEV & BONDEV, 1961).
Dryopteris assimilis S. Walk. (SIMON & VIDA, 1966).
Ephedra campylopoda C. A. M. (VELCEV & BONDEV, 1961).
Erodium elatium Form. (JORDANOV & PANOV, 1965).
Eryngium creticum Cam. (JORDANOV et al., 1965).
Erythraea meyeri (Bge.) Drue (DIMITROV et al., 1967).
Festuca affinis Boiss. & Heldr. (GANCEV & VELCEV, 1963).
Festuca xanthina Roem. & Schult. (VELCEV, 1961).
Filago spathulata Presl (GANCEV, 1963).
Fumana arabica L. (VELCEV et al., 1966).
Hedysarum grandiflorum Pall. (STEFANOV, 1963b).
Helianthemum aegyptiacum (L.) Mill. (VELCEV & BONDEV, 1961).
Helminthia humifusa Trev. (DELIPAVLOV, 1968a).
Hieracium bauchinii Bess. (GEORGIEV, 1961).
Hieracium densiflorum Fisch. (GEORGIEV, 1961).
Hieracium levicaule Jord. (GEORGIEV, 1961).
Hieracium oxydon Fr. (GEORGIEV, 1961).
Hieracium pavichii Heuf. (GEORGIEV, 1961).
Hieracium ruprechtii Boiss. (GEORGIEV, 1961).
Hypericum boissieri (Jordanov & Kozuharov in JORDANOV, 1970).
Iris aphylla L. (CESMEDZIEV, 1967).
Jurinea ledebourii Bge. (KOZUHAROV, 1968a).
Koeleria fenzliana Schur (UJHELYI, 1968).
Koeleria penzesii Ujhelyi (UJHELYI, 1968).
Koeleria pilatii Ujhelyi (UJHELYI, 1968).
Koeleria schurii Ujhelyi (UJHELYI, 1968).
Lathyrus montanus Benth. (DELIPAVLOV, 1964a).

* The genera are also new for the bulgarian flora.

- Lilium albanicum* Grsb. (DELIPAVLOV & POPOVA, 1965).
Limonium mayeri (Boiss.) Kuntze (GANCEV, 1963).
Medicago globosa Presl (VELCEV & BONDEV, 1961).
Medicago litoralis Rde. (BONDEV & KOZUHAROV, 1963).
Medicago praecox DC. (VELCEV & BONDEV, 1961).
Medicago rromanica Prod. (BONDEV & KOZUHAROV, 1963).
Minuartia attica (Boiss. et Sprun.) Vierh. (Kozuharov & Kuzmanov in JORDANOV, 1966).
Minuartia mediterranea (Ldb.) Maly (Kozuharov & Kuzmanov in JORDANOV, 1966).
Minuartia stojanovii (Kitan.) Koz. & Kuzm. (Kozuharov & Kuzmanov in JORDANOV, 1966).
Ononis reclinata L. (VELCEV & BONDEV, 1961).
Paronichia taurica Borh. & Sikura (BORHIDI, 1966).
Phleum roschevitzii N. Pav. (GANCEV & DRAZEVA, 1965).
Pimpinella lithophila Schischk. (GANCEV & DENCEV, 1971).
Pinguicula balcanica Casper (CASPER, 1962).
Pinguicula leptoceras Rchb. (CASPER, 1962).
Polygonum arenastrum Boreau (Asenov in JORDANOV, 1966).
Polygonum rurivagum Boreau (Asenov in JORDANOV, 1966).
Pycreus badius (Desf.) Hayek (JORDANOV et al., 1965).
Quercus macranthera F. & M. (DONCEV & BUZOV, 1969).
Ranunculus falax (Wimm. & Grsb.) Kern. (Penev in JORDANOV, 1970).
Ranunculus hayekii Dörf. (Penev in JORDANOV, 1970).
Ranunculus spaerospermum Boiss. et Bl. (Penev in JORDANOV, 1970).
Romulea linaresii Parl. (HINKOVA & FAKIROVA, 1970).
Rosa myriacantha DC. (DIMITROV et al., 1967).
Rosa oxyodon Boiss. (DIMITROV et al., 1967).
Rubus bellardii Weihe (MARKOVA, 1962b).
Rubus scaber Weihe & Nees (MARKOVA, 1962b).
Salix aurita L. (Velcev in JORDANOV, 1966).
Salix hastata L. (Velcev in JORDANOV, 1966).
Salvia adenostachya Juz. (RUSAKOVA & POPOV, 1971).
Scorzonera parviflora Jacq. (DELIPAVLOV, 1961).
Secale anatolicum Boiss. (DELIPAVLOV, 1961).
Sempervivum tectorum L. (CESMEDZIEV, 1969a).
Sesleria alba Sibth. & Sm. (BONDEV & POPOV, 1971).
Silene glareosa Jord. (VELCEV, 1961).
Silene graeca Boiss. (VELCEV & BONDEV, 1961).
Stachys thracica Dav. (STEFANOV, 1963a).
Tilia petiolaris DC. (DONCEV, 1964a).
Trifolium squarrosus L. (GANCEV & DENCEV, 1965).
Trifolium spumosum L. (STEFANOV, 1963a).
Tulipa schrenkii Reg. (DELIPAVLOV, 1968a).
Valeriana simplicifolia (Rchb.) Kabath (JORDANOV & KUZMANOV, 1963).
Veronica sublobata Fischer (FISCHER, 1967).
Vulpia ambigua (Le Gall) A. G. More (KOZUHAROV & KUZMANOV, 1970a).

B.2—New infraspecific taxa for bulgarian flora, new localities, rediscoveries, rejections, etc.

- Abies macedonica* (FUKAREK, 1964b). *Acer intermedium* (FUKAREK, 1965), *A. monspessulanum* (VELCEV, 1961; JORDANOV, 1966b; CESMEDZIEV, 1967; DIMITROV et al., 1967); *A. pseudoplatanus* (DONCEV, 1964b). *Achillaea ageratifolia* (VIHODCEVSKI, 1962; STANEV, 1970), *A. chrysocoma* (VALEV et al., 1961), *A. grandifolia* (JORDANOV, 1966b), *A. kotschyi* (BÄSSLER, 1963), *Aconitum cammarum* (JANEV, 1966), *A. ranunculaefolium* (VALEV, 1963; JANEV & PANOVA, 1964; JANEV, 1966), *A. variegatum* (GÖTZ, 1967). *Adonis annua* (VELCEV et al., 1968). *Aegilops ovata* (JORDANOV & JANEV, 1968), *A. triuncunalis* (JORDANOV & JANEV, 1968; CESMEDZIEV, 1969a). *Aegopodium podagraria* (CESMEDZIEV, 1965; VIHODCEVSKI, 1965). *Aethusa cynapium* (CESMEDZIEV, 1967). *Agropyrum brandzae* (BONDEV et al., 1967; GANCEV & DENCEV, 1967, 1971; DELIPAVLOV, 1971), *A. caninum* (VELCEV & DJANKOV, 1965; VELCEV & VASILEV, 1971b), *A. elongatum* (VELCEV & BONDEV, 1961; JORDANOV et al., 1965), *A. intermedium* (JORDANOV & JANEV, 1968; BONDEV & RADENKOVA, 1969; CESMEDZIEV, 1969a; GANCEV & DENCEV, 1971), *A. litorale* (BONDEV & RADENKOVA, 1969), *A. pectiniformae* (GANCEV & KOCEV, 1968). *Agrostis alba* (GANCEV, 1963), *A. byzanthina* (VALEV et al., 1961). *Ajuga genevensis* (JANEV, 1962), *A. salicifolia* (GANCEV & KOCEV, 1961). *Alchemilla arvensis* (JANEV & PANOVA, 1964), *A. bulgarica* (JORDANOV & PANOVA, 1965), *A. gracilima* (DIMITROV et al., 1967). *Alkanna primuliflora* (VELCEV et al., 1968), *A. sibirnyi* (GANCEV & DENCEV, 1963), *A. tinctoria* (GANCEV & KOCEV, 1963b). *Allium atropurpureum* (JORDANOV & PANOVA, 1965; JORDANOV, 1966), *A. flavescens* (JORDANOV & JANEV, 1962), *A. leucanthum* (JORDANOV & JANEV, 1962), *A. margaritaceum* (JANEV & PANOVA, 1964), *A. melanantherum* (DELIPAVLOV, 1971), *A. moschatum* (DELIPAVLOV, 1971), *A. paniculatum* (JORDANOV, 1968), *A. rotundum* (CESMEDZIEV, 1971), *A. saxatile* (GANCEV & DENCEV, 1971), *A. scordoprasum* (CESMEDZIEV, 1970b), *A. stamineum* (DELIPAVLOV, 1968a), *A. stojanovii* (CESMEDZIEV, 1969a), *A. ursinum* (CESMEDZIEV, 1965), *A. nineale* (CESMEDZIEV, 1969a, 1970b; DENCEV, 1970; GANCEV & DENCEV, 1971). *Alopecurus himalaicus* (DIMITROV et al., 1967), *A. ventricosus* (DELIPAVLOV, 1963; GANCEV & DRAZEVA, 1965). *Alyssum montanum* (VELCEV, 1961), *A. murale* (VIHODCEVSKI, 1969), *A. umbellatum* (GANCEV, 1963). *Althaea heldreichi* (VIHODCEVSKI, 1969). *Amaranthus crispus* (DELIPAVLOV, 1964a, 1971). *A. deflexus* (VIHODCEVSKI, 1963). *Ammania verticillata* (BONDEV & POPOV, 1971). *Anchusa ochroleuca* (JORDANOV & JANEV, 1962), *A. procera* (VALEV et al., 1961). *Amygdalus nana* (JANEV & PANOVA, 1964). *Andrachne telephioides* (KOVACEV, 1961; VIHODCEVSKI, 1962; VELCEV & DJANKOV, 1965). *Anemone nemorosa* (GANCEV & DENCEV, 1967), *A. rhodopaea* (BONDEV, 1961a), *A. sylvestris* (VALEV, 1968). *Antennaria dioica* (KUZMANOV, 1961a). *Anthemis montana* (VELCEV et al., 1962), *A. tenuiloba* (STANEV, 1969), *A. virescens* (STEFANOV, 1966; GANCEV & DENCEV, 1971). *Anthericum liliago* (JORDANOV & JANEV, 1968). *Anthyllis aurea* (DIMITROV et al., 1967), *A. spruneri* (VELCEV & BONDEV, 1965), *A. vulneraria* (SIMEONOVSKI, 1965).

- Arabis constricta* (VALEV et al., 1961), *Arctostaphylos uva-ursi* (KUZMANOV, 1961a). *Aristolochia pallida* (JANEV, 1966; VIHODCEVSKI, 1969). *Arrhenatherum elatius* (VIHODCEVSKI, 1965), *A. palaestinum* (KOCEV & DENCEV, 1961; VELCEV & BONDEV, 1964; DIMITROV et al., 1967; JORDANOV & JANEV, 1968). *Artemisia lobelii* (JANEV, 1966), *A. maritima* (JORDANOV et al., 1965), *A. petrosa* (SIMEONOVSKI, 1965), *A. pontica* (STANEV, 1965; JORDANOV, 1966b). *Asparagus acutifolius* (JORDANOV & JANEV, 1968). *A. trichophyllus* (JORDANOV & JANEV, 1968). *Asperula taurina* (VIHODCEVSKI, 1963; JANEV, 1966; VELCEV et al., 1968), *A. tenella* (JORDANOV & KUZMANOV, 1963). *Asphodeline liburnica* (GANCEV & DENCEV, 1971; STANEV, 1971). *Asplenium fissum* (KOZUHAROV, 1968b), *A. germanicum* (JORDANOV & PANOV, 1965), *A. inopteris* (KOZUHAROV, 1968b). *Aster villosus* (JANEV, 1962). *Asterolinon linum-stellatum* (BONDEV et al., 1967). *Astragalus albicaulis* (JORDANOV & JANEV, 1962), *A. alopecurus* (JORDANOV & JANEV, 1962), *A. angustifolius* (BONDEV & KUZMANOV, 1963; JORDANOV et al., 1965; VELCEV et al., 1968), *A. arnacantha* (GEORGIEV, 1967), *A. centralalpinus* (Br. Blanquet in HEYWOOD, 1968), *A. dasyanthus* (JORDANOV & JANEV, 1962), *A. wilmottianus* (GANCEV, 1963), *A. monspessulanum* (VELCEV & BONDEV, 1965), *A. vulfenii* (VELCEV, 1961), *A. onobrychis* (JANEV, 1966), *A. physocalyx* (VELCEV & BONDEV, 1961; STEFANOV, 1963; STANEV, 1970b), *A. ponticus* (GANCEV & KOCEV, 1961; KOCEV, 1962; VELCEV & BONDEV, 1965), *A. pubiflorus* (GANCEV & KOCEV, 1961; JORDANOV & JANEV, 1962; GANCEV & KOCEV, 1963b; VELCEV & BONDEV, 1965), *A. pugioniferus* (VELCEV et al., 1962), *A. sesameus* (VELCEV et al., 1962), *A. spruneri* (VELCEV & BONDEV, 1965), *A. testiculatus* (BONDEV & KUZMANOV, 1963), *A. vesicarius* (VIHODCEVSKI, 1962; GANCEV & KOCEV, 1963), *A. virgatus* (GANCEV & KOCEV, 1961; JORDANOV & JANEV, 1962). *Astrantia major* (STANEV, 1971). *Astrodaucus litoralis* (JORDANOV & JANEV, 1962). *Asyneuma antherrioides*, *A. canescens*, *A. limonifolium* (DAMBOLT, 1970). *Atragene alpina* (DELI-PAVLOV, 1961). *Atropis convoluta* (GANCEV & KOCEV, 1961, 1963b; VELCEV et al., 1962), *A. distans* (GANCEV & KOCEV; KOCEV, 1962; VELCEV et al., 1962). *Athyrium alpestre* (JANEV & PANOV, 1964). *Avena barbata* (DELI-PAVLOV, 1961; VELCEV & BONDEV, 1961; VELCEV & VASILEV, 1971b), *A. clauda* (VELCEV & BONDEV, 1961), *A. compressa* (JORDANOV & JANEV, 1968), *A. ludoviciana* (VELCEV & VASILEV, 1971b).
- Betula alba* (DENCEV, 1968). *Berteroa mutabilis* (VIHODCEVSKI, 1963). *Blechnum spicant* (KOZUHAROV, 1968b). *Botrichium lunaria* (JANEV & PANOV, 1964; JORDANOV & PANOV, 1965). *Brachypodium dystachyon* (GANCEV & KOCEV, 1961; VELCEV & BONDEV, 1961; VIHODCEVSKI, 1962; GANCEV & KOCEV, 1963b, 1964b; VELCEV & VASILEV, 1971b). *Briza maxima* (JORDANOV & JANEV, 1968; CESMEDZIEV, 1969a), *B. spicata* (KOCEV & DENCEV, 1961; VELCEV & BONDEV, 1965; JORDANOV & JANEV, 1968). *Bromus commutatus* (DIMITROV et al., 1967), *B. madritensis* (STEFANOV, 1963a), *B. scoparius* (GANCEV, 1963), *B. secalinus* (GANCEV & DENCEV, 1965), *B. tectorum* (JORDANOV & JANEV, 1968). *Buphtalmum speciosum* (JANEV, 1966). *Bupleurum affine* (JORDANOV, 1968), *B. asperuloides* (JORDANOV & PANOV, 1965), *B. commutatus* (STANEV, 1969), *B. marschalianum* (JORDANOV

- et al., 1965; BONDEV & POPOV, 1971), *B. tenuissimum* (BONDEV, 1961b, 1963; GANCEV & BONDEV, 1965; JORDANOV et al., 1965, 1968).
- Cachrys alpina* (STANEV, 1965). *Calamagrostis pseudophragmites* (KOZUHAROV & KUZMANOV, 1962). *Calystemma palaestinum* (BONDEV, 1961a; VELCEV & BONDEV, 1965). *Campanula alpina* (DIMITROV et al., 1967), *C. epigea* (BONDEV, 1961b), *C. grossekii* (CESMEDZIEV, 1969a; VELCEV & BONDEV, 1965), *C. lanata* (GANCEV & VELCEV, 1963), *C. rapunculus* (GANCEV, 1963; CESMEDZIEV, 1965; VIHODCEVSKI, 1969), *C. scutellata* (VELCEV & VASILEV, 1971b). *Camphorosma monspeliaca* (GANCEV & KOCEV, 1961). *Cardamine acris* (STANEV, 1966). *Carex brevicollis* (GANCEV & KOCEV, 1963b), *C. cuprina* (JORDANOV & JANEV, 1968), *C. depauperata* (VELCEV, 1961, VELCEV et al., 1966, VELCEV & VASILEV, 1971b; PETROV, 1965; VIHODCEVSKI, 1969; DENCEV, 1970), *C. divisa* (GANCEV, 1963; GANCEV & DENCEV, 1965; JORDANOV & JANEV, 1968), *C. divulsa* (JORDANOV & JANEV, 1968), *C. ericetorum* (DIMITROV et al., 1967), *C. extensa* (JORDANOV et al., 1965), *C. halleriana* (JORDANOV & JANEV, 1968), *C. hordeistichos* (DELIPAVLOV, 1961), *C. paniculata* (JORDANOV & JANEV, 1968), *C. pendula* (KOZUHAROV & KUZMANOV, 1962; JORDANOV, 1966), *C. pyrenaica* (GANCEV & DRAZEVA, 1965), *C. riparia* (VIHODCEVSKI, 1962; JORDANOV & JANEV, 1968), *C. tricolor* (GANCEV & KOCEV, 1963b). *Carlina corymbosa* (VIHODCEVSKI, 1963). *Carpinus betulus* (DONCEV, 1964b). *Carthamus dentatus* (HANELT, 1963). *Celsia orientalis* (JANEV & PANOVA, 1964), *C. roripifolia* (BONDEV, 1963). *Celtis australis* (DONCEV, 1964b), *C. caucasica* (JORDANOV & JANEV, 1968). *Centaurea atropurpurea* (DIMITROV et al., 1967), *C. deusta* (GANCEV & DENCEV, 1967), *C. depressa* (JANEV, 1962), *C. formanekii* (GANCEV & DENCEV, 1965), *C. inermis* (DIMITROV et al., 1967), *C. kerneriana* (DIMITROV et al., 1967), *C. salonitana* (JANEV & PANOVA, 1964), *C. tenuiflora* (GANCEV & DENCEV, 1965), *C. thirkei* (DIMITROV et al., 1967), *C. triumfettii* (GANCEV & DENCEV, 1963). *Centunculus minimus* (BONDEV, 1961a). *Centhranthus kellereri* (VELCEV, 1961). *Cephalaria uralensis* (VELCEV, 1961; VIHODCEVSKI, 1962; JORDANOV, 1966b; DIMITROV et al., 1967). *Cerastium glutinosum* (CESMEDZIEV, 1965), *C. riaei* (VIHODCEVSKI, 1965). *Cerasus avium* (HRUNKIEWICZ, 1968), *C. mahaleb* (TERPO, 1968). *Chamaenerium palustre* (CESMEDZIEV, 1967; BONDEV, 1961a). *Chaerophyllum byzantinum* (JANEV & PANOVA, 1964). *Cheilanthes maranthae* (KOZUHAROV, 1968b), *C. persica* (KOZUHAROV, 1968b), *C. szowitzii* (BONDEV, 1961a; VIHODCEVSKI, 1962). *Chenopodium multifidum* (DELIPAVLOV, 1971). *Chrysanthemum corymbosum* (JORDANOV & PANOVA, 1965). *Cionura erecta* (BROWICZ, 1967a). *Circaea luteciana* (CESMEDZIEV, 1965). *Clematis integrifolia* (DENCEV, 1970), *C. erecta* (CESMEDZIEV, 1965; JORDANOV & JANEV, 1968; GANCEV & DENCEV, 1971). *Clypeola jonthlaspi* (STANEV, 1965; DENCEV, 1970). *Cnicus benedictus* (STANEV, 1971). *Onidium apioides* (BONDEV & KUZMANOV, 1963). *Colchicum biebersteinii* (VIHODCEVSKI, 1962), *C. diamopolis* (DIMITROV et al., 1967), *C. rhodopaeum* (CESMEDZIEV, 1967), *C. turcicum* (CESMEDZIEV, 1967; DIMITROV et al., 1967), *Colladonia triquerta* (GANCEV & DENCEV, 1971). *Colutea arborescens* (BROWICZ, 1963; DONCEV, 1963b; VELCEV & DJANKOV, 1965), *C. cilicica* (DONCEV, 1963b, 1964b). *Convolvulus persicus* (VIHODCEVSKI, 1963). *Coronilla cretica* (BONDEV,

- 1961a; VELCEV et al., 1962; VELCEV & BONDEV, 1965), *C. elegans* (VELCEV & BONDEV, 1965; JORDANOV, 1966b), *C. emerus* (BONDEV, 1961a). *Coro-thamnus agnipilus* (SKALICKA, 1967). *Corrigiola litoralis* (DELIPAVLOV, 1964a; VIHODCEVSKI, 1969). *Coryspermum hyssopifolium* (JORDANOV & JANEV, 1962). *Cotoneaster tomentosus* (JANEV, 1962). *Crataegus azarella* (VELCEV & BONDEV, 1961b), *C. orientalis* (CESMEDZIEV, 1969a), *C. pentagyna* (VELCEV, 1963). *Crepis foetida* (STANEV, 1971). *Crocus chrysanthus* (JORDANOV & JANEV, 1968), *C. oliveri* (DELIPAVLOV, 1961; VIHODCEVSKI, 1962; JANEV & PANOV, 1964; VELCEV, 1968). *Crupina crupinastrum* (VELCEV et al., 1962; BONDEV et al., 1967). *Crypsis aculeata* (GANCEV & KOCEV, 1961; VELCEV et al., 1962; GANCEV, 1963; GANCEV & KOCEV, 1963b), *C. schonoides* (DELIPAVLOV, 1964a). *Crytium maritimum* (MIROVA & STANEV, 1965). *Cyclamen neapolitanum* (DELIPAVLOV, 1961; VIHODCEVSKI, 1963), *C. vernum* (JORDANOV & JANEV, 1962). *Cynanchum fuscatum* (JANEV & PANOV, 1964; JANEV, 1966; VELCEV et al., 1968), *C. nivale* (KOCEV, 1961; VELCEV & DJANKOV, 1965; STANEV, 1971), *C. speciosum* (VELCEV & BONDEV, 1964), *C. vincetoxicum* (VELCEV, 1961). *Cyperus difformis* (VIHODCEVSKI, 1963), *C. montii* (JANEV, 1962), *Cytisanthus sessilifolius* (MAYER, 1970a), *C. trifolius* (FUKARECK, 1964a, see also MAYER, 1970). *Cytisus hirsutus* (BONDEV, 1961b), *C. polytrichus* (JORDANOV & JANEV, 1962).
- Dactylis glomerata* (GANCEV & DENCEV, 1971). *Daphne cneorum* (JANEV, 1962). *Daucus broterii* (BONDEV, 1961b), *D. platycarpus* (BONDEV, 1961b), *D. platycarpus* (BONDEV & KUZMANOV, 1963). *Delphinium fisum* (VALEV et al., 1961; VELCEV, 1961), *D. halteratum* (JANEV, 1962), *D. macedonicum* (VIHODCEVSKI, 1963), *D. peregrinum* (VELCEV & VASILEV, 1971b). *Deschampsia caespitosa* (DENCEV, 1970), *D. flexuosa* (DENCEV, 1970). *Dianthus campestris* (JORDANOV & JANEV, 1962), *D. microlepis* (DELIPAVLOV, 1971), *D. petraeus* (VALEV, 1968; STANEV, 1970; DELIPAVLOV, 1971). *Dictamnus albus* (GANCEV & DENCEV, 1971). *Digitalis laevigata* (JORDANOV, 1966b), *D. lanata* (STOJANOV, STEFANOV, SLAVCEV, 1967). *Diotis candidissima* (VIHODCEVSKI, 1963; BONDEV & POPOV, 1971). *Diplotaxis muralis* (STANEV, 1970). *Doronicum hungaricum* (KOZUHAROV & KUZMANOV, 1962). *Dorycnium herbaceum* (BONDEV, 1961b). *Draba carinthiaca* (SIMEONOVSKI, 1965), *D. lasiocarpa* (DELIPAVLOV, 1961; SIMEONOVSKI, 1965), *D. siliquosa* (JORDANOV & JANEV, 1962). *Dryopteris carthusiana* (KOZUHAROV, 1968b), *D. dilatata* (KOZUHAROV, 1968b).
- Echinaria capitata* (BONDEV, 1961a; BONDEV & KUZMANOV, 1963; VIHODCEVSKI, 1962). *Echinochloa eruciforme* (GANCEV & DENCEV, 1965; DIMITROV et al., 1967). *Echium rubrum* (STANEV, 1970a). *Elatine alsinastrum* (DIMITROV et al., 1967). *Eleusine indica* (DELIPAVLOV, 1964a), *E. tristachya* (CESMEDZIEV, 1969a). *Equisetum hiemale* (JORDANOV & KUZMANOV, 1963; JANEV & PANOV, 1964), *E. ramosissimum* (VIHODCEVSKI, 1969). *Erianthus hostii* (DELIPAVLOV, 1961). *Eriolobus trilobatus* (BROWICZ, 1969). *Eryngium creticum* (CESMEDZIEV, 1965; DIMITROV et al., 1967), *E. palmatum* (VELCEV, 1961). *Erythronium dens-canis* (DELIPAVLOV, 1971). *Euphorbia agraria* (KUZMANOV, 1961b), *E. aleppica*, *E. apios* (KUZMANOV, 1961b; KOZUHAROV & KUZMANOV, 1962), *E. barrelieri* (VIHODCEVSKI, 1965), *E. chamaesyce*



- KOVACEV, 1961), *E. dulcis* (KUZMANOV, 1961b), *E. falcata* (VIHODCEVSKI, 1963), *E. glareosa* (KUZMANOV, 1961b), *E. maculata* (KUZMANOV, 1961b; KOZUHAROV & KUZMANOV, 1962), *E. myrsinites* (JANEV, 1966), *E. niciciana* (KUZMANOV, 1961b), *E. nutans* (DELIPAVLOV, 1971), *E. oblongata* (KUZMANOV, 1961b), *E. polychroma* (JANEV & PANOVA, 1964), *E. seguieriana* (KUZMANOV, 1961b), *E. velenovskiyi* (KUZMANOV, 1961b).
- Fagus sylvatica* (DONCEV, 1964b). *Ferulago galbanifera* (JORDANOV et al., 1965). *Festuca dalmatica* (BONDEV, 1961b; VELCEV, 1961; GANCEV & DENCEV, 1971), *F. cylvatica* (GANCEV & DELCEV, 1963), *F. montana* (DENCEV, 1970), *F. pseudovina* (JORDANOV & JANEV, 1962), *F. spadicea* (JANEV, 1966), *F. sulcata* (GANCEV & VELCEV, 1963), *F. vaginata* (GANCEV & KOCEV, 1968), *F. valida* (GANCEV & KOCEV, 1963b). *Fibigia clypeata* (VELCEV & VASILEV, 1971b). *Filago galica* (DELIPAVLOV, 1964a; BONDEV et al., 1967). *Fymbristyllis dichotoma* (VIHODCEVSKI, 1963, 1969). *Foeniculum officinale* (CESMEDZIEV, 1965). *Fragaria oxycarpa* (GANCEV, 1963). *Fritillaria graeca* (VALEV et al., 1961; VELCEV et al., 1968), *F. tenella* (VELCEV & BONDEV, 1965). *Fumana procumbens* (JANEV, 1966; DENCEV, 1970).
- Gagea bochemica* (JORDANOV & PANOVA, 1965; HINKOVA, 1971), *G. fistulosa* (JORDANOV & PANOVA, 1965), *G. pusilla* (JORDANOV & PANOVA, 1965), *G. reticulata* (JORDANOV & JANEV, 1962; HINKOVA, 1971), *G. alba* (ARTJUSHENKO, 1966; DELIPAVLOV, 1971), *G. graeca* (ARTJUSHENKO, 1966; DELIPAVLOV, 1971), *G. nivalis* (DELIPAVLOV, 1971), *G. plicatus* (JORDANOV & JANEV, 1962). *Galium anisophyllum* (KUCOVA, 1962), *G. verticillatum* (VELCEV & BONDEV, 1965), *G. verum* (DIMITROV et al., 1967). *Gaudinia fragilis* (VELCEV et al., 1966). *Genista depressa* (JORDANOV & JANEV, 1962; STANEV, 1965), *G. rumelica* (VELCEV & VASILEV, 1971b), *G. spatulata* (STANEV, 1966), *G. trifoliata* (GANCEV & KOCEV, 1961; DELIPAVLOV, 1971). *Gentiana bulgarica* (JANEV, 1966), *G. ciliata* (VALEV et al., 1961; VELCEV & VASILEV, 1969), *G. pneumonanthe* (DENCEV, 1970), *G. punctata* (BONDEV, 1961b), *G. utriculosa* (JORDANOV & KUZMANOV, 1963; JANEV, 1966). *Geranium bochemicum* (STANEV, 1966), *G. divaricatum* (KOCEV, 1961; MIROVA & STANEV, 1965), *G. tuberosum* (VELCEV et al., 1962; CESMEDZIEV, 1969a). *Gladiolus illyricus* (KOCEV & DENCEV, 1961), *G. paluster* (JORDANOV & KUZMANOV, 1963), *G. segetum* (JORDANOV & JANEV, 1968). *Glechoma hederacea* (JANEV & PANOVA, 1964). *Glinus lotoides* (VIHODCEVSKI, 1963). *Gnaphalium luteo-album* (VIHODCEVSKI, 1969). *Goniolimon besserianum* (JORDANOV & JANEV, 1962), *G. tataricum* (JORDANOV & JANEV, 1962). *Goodiera repens* (DELIPAVLOV, 1964a). *Gymnocarpium robertianum* (KOZUHAROV, 1968b). *Gypsophyla scorzonifolia* (JORDANOV & JANEV, 1962), *G. tekirae* (STANEV, 1970a).
- Haynaldia villosa* (KOZUHAROV & KUZMANOV, 1962). *Hedypnois polymorpha* (VELCEV & BONDEV, 1961; VIHODCEVSKI, 1962). *Hedysarum tauricum* (GANCEV & KOCEV, 1961, 1963b). *Helyanthemum aegyptiacum* (KOCEV, 1961), *H. alpestre* (DIMITROV et al., 1967), *H. guttatum* (BONDEV, 1961a; GANCEV & VELCEV, 1963; VELCEV & BONDEV, 1965). *Heracleum sibiricum* (CESMEDZIEV, 1969a), *H. ternatum* (CESMEDZIEV, 1967). *Herniaria nigri-montium* (BONDEV, 1963). *Hesperis glutinosa* (VIHODCEVSKI, 1962; MIROVA

- & STANEV, 1965), *H. theophrasii* (DVORAK, 1965, 1966a, b). *Hieracium alpicola* (GEORGIEV, 1961; PAWLOWSKI, 1963b), *H. brachiatum*, *H. hoppeanum* (GEORGIEV, 1961), *H. juranomorphum* (PAWLOWSKI, 1963b), *H. niphiliasium* (DIMITROV et al., 1967), *H. pannosum* (PAWLOWSKI, 1963b), *H. pilosella* (GEORGIEV, 1961), *H. pilosissimum* (VELCEV, 1961), *H. praecox* (DIMITROV et al., 1967), *H. prenanthoides*, *H. pseudopilosella* (PAWLOWSKI, 1963b), *H. stefanoffii* (PAWLOWSKI, 1963), *H. stupeanum* (DIMITROV et al., 1967). *Himantoglossum carpinum* (JORDANOV & JANEV, 1962), *H. hircinum* (VALEV, 1963). *Hippocrepis ciliata* (VELCEV & BONDEV, 1961; BONDEV & KUZMANOV, 1963; VELCEV & BONDEV, 1965), *H. comosa* (BONDEV, 1961a; VELCEV & BONDEV, 1961; VELCEV et al., 1968). *Holoschoenus vulgaris* (JORDANOV & JANEV, 1968). *Homogyne alpina* (BONDEV, 1961b). *Hordeum crinitum* (GANCEV & DENCEV, 1967). *Huetia cynapoides* (Ball in HEYWOOD, 1968). *Huperzia selago* (KOZUHAROV, 1968b). *Hutschinsia petraea* (JANEV & PANOVA, 1964). *Hyoscyamus albus* (JORDANOV, 1966b). *Hypericum alpestre* (JORDANOV & JANEV, 1962), *H. annulatum* (CESMEDZIEV, 1969a; DENCEV, 1970), *H. boissieri* (JORDANOV, 1970), *H. montbretii* (STANEV, 1966), *H. rumelicum* (BONDEV, 1961b), *H. thasium* (GANCEV & DENCEV, 1967), *H. umbellatum* (VELCEV & VASILEV, 1969). *Hypochaeris glabra* (GANCEV & DENCEV, 1963), *H. pseudopilosella* (PAWLOWSKI, 1963b). *Ilex aquifolium* (BONDEV et al., 1967). *Impatiens noli-tangere* (JANEV & PANOVA, 1964). *Inula candida* (JORDANOV & PANOVA, 1965), *I. helenium* (DELIPAVLOV, 1964a). *Iris melita* (JORDANOV & JANEV, 1968), *I. pumila* (STEFANOV, 1963b), *I. sibirica* (VALEV, 1963).
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- Kenthranthus kellereri* (VELCEV & VASILEV, 1970). *Kickxia elatine* (CESMEDZIEV, 1969a). *Knautia integrifolia* (DENCEV, 1970). *Kochia arenaria* (JORDANOV, 1966b). *Koeleria degenii* (VELCEV & BONDEV, 1965), *K. nitidula* (UJHELYI, 1968), *K. phleoides* (JORDANOV & JANEV, 1968), *K. pyramidata* (BONDEV, 1961b).
- Lactuca muralis* (CESMEDZIEV, 1969a). *Lagoecia cuminoides* (KOCEV, 1961). *Lamium garganicum* (CESMEDZIEV, 1967). *Laserpitium siler* (VELCEV, 1961). *Lathraea rhodopaea* (CESMEDZIEV, 1965). *Lathyrus alpestris* (DELIPAVLOV, 1971), *L. aureus* (KOCEV & DENCEV, 1961; DELIPAVLOV, 1968a), *L. grandiflorus* (VELCEV et al., 1966; DIMITROV et al., 1967), *L. hierosolymitanus* (VIHODCEVSKI, 1965), *L. setifolius* (VELCEV et al., 1961), *L. vernus* (STANEV, 1970a). *Laurocerasus officinalis* (BROWICZ, 1970a). *Leersia oryzoides* (DELIPAVLOV, 1961). *Lemna gibba* (MIROVA & STANEV, 1965). *Leontice leontopetalum* (CESMEDZIEV, 1967). *Leontodon fasciculatus* (VIHODCEVSKI, 1965). *Lepturus cylindricus* (JORDANOV, 1968). *Leucopodium aestivum* (STOJANOV, SAVCEV, 1964). *Libanotis montana* (STANEV, 1971). *Lilium*

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- Malabaila graveolens* (JORDANOV & JANEV, 1962). *Malcolmia serbica* (DIMITROV et al., 1967). *Malva erecta* (DIMITROV et al., 1967), *M. pusilla* (GANCEV, 1963). *Matthiola tristic* (GANCEV & KOCEV, 1963b). *Medicago aculeata* (BONDEV & KUZMANOV, 1963), *M. bondevii* (BONDEV et al., 1967), *M. carsiensis* (KOZUHAROV, 1962), *M. disciformis* (KOZUHAROV, 1962), *M. falcata* (BONDEV & KOZUHAROV, 1963), *M. hispida* (BONDEV, 1961a; KOCEV, 1962), *M. lupulina* (KOZUHAROV, 1962; KOZUHAROV & KUZMANOV, 1962; BONDEV & KOZUHAROV, 1963; VELCEV & BONDEV, 1965; STANEV, 1971) *M. minima* (BONDEV, 1961b; KOCEV, 1961; VALEV et al., 1961; BONDEV & KOZUHAROV, 1963; VELCEV & BONDEV, 1965), *M. orbicularis* (BONDEV, 1961b; VELCEV et al., 1961, VELCEV & BONDEV, 1961; KOZUHAROV, 1962; DELIPAVLOV, 1968a), *M. praecox* (KOZUHAROV, 1962; BONDEV et al., 1967), *M. rhodopea* (VELCEV & BONDEV, 1965), *M. rigidula* (BONDEV, 1961b; VELCEV et al., 1968). *Melica ciliata* (GANCEV & DENCEV, 1963). *Melilotus neapolitanus* (VELCEV et al., 1968). *Mespilus germanica* (BROWICZ, 1968), *M. pentagyna* (JORDANOV, 1966b). *Meum athamaticum* (DIMITROV et al., 1967). *Micromeria frivaldszkyana* (JORDANOV et al., 1965). *Micropus supinus* (STEFANOV, 1966). *Milium effusum* (JORDANOV, 1966b). *M. vernale* (JORDANOV & JANEV, 1968). *Minuartia montana* (BONDEV, 1961a; VELCEV & BONDEV, 1961), *M. setacea* (DENCEV, 1970), *M. verna* (SIMEONOVSKI, 1965). *Moehringia grisebachii* (STANEV, 1970a). *Moenchia graeca* (VIHODCEVSKI, 1965), *M. quaternella* (GANCEV & VELCEV, 1963; VIHODCEVSKI, 1965; BONDEV et al., 1967). *Molineria minuta* (DELIPAVLOV, 1961; 1971; VIHODCEVSKI, 1963; 1965). *Molinia coerulea* (DENCEV, 1970).
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Odontospermum aquaticum (BONDEV & RADENKOVA, 1969). *Oenanthe banatica* (JORDANOV & KUZMANOV, 1963). *Onobrychis aequidentata* (KOCEV, 1962), *O. alba* (VELCEV & BONDEV, 1965; VELCEV et al., 1968; GANCEV & DENCEV, 1971), *O. calcarea* (BONDEV, 1961b; VELCEV, 1961; VIHODCEVSKI, 1963), *O. caput-galli* (BONDEV, 1961a; GANCEV & DENCEV, 1963; BONDEV et al., 1967). *Ononis hircina* (GANCEV & DRAZEVA, 1965), *O. reclinata* (VELCEV et al., 1962; BONDEV & KUZMANOV, 1963; VELCEV et al., 1966), *O. leucosperma* (GANCEV & DRAZEVA, 1965). *Onosma setosum* (JORDANOV & JANEV, 1962), *O. tauricum* (DIMITROV et al., 1967). *Ophrys cornuta* (JORDANOV & JANEV, 1968), *O. bertolonii* (SOÓ, 1970), *O. sphegoides* SOÓ, 1970). *Ophyoglossum vulgatum* (KOZUHAROV, 1968b). *Opapanax hispidum* (STANEV, 1971). *Orchis simia* (DELIPAVLOV, 1971). *Oreoherzogia fallax* (VENT, 1962). *Origanum heracleoticum* (DIMITROV et al., 1967). *Ornithogalum comosum* (CESMEDZIEV, 1967), *O. montanum* (JORDANOV & JANEV, 1968), *O. tenuifolium* (JANEV & PANOV, 1964). *Ornithopus compressus* (BONDEV, 1963). *Orobanche mutellii* (LAZAROV & ANDREEV, 1967). *Oryzopsis holciforme* (JORDANOV & JANEV, 1968). *Ostrya carpinifolia* (GANCEV & DENCEV, 1967). *Oxalis corniculata* (JANEV & PANOV, 1964; VIHODCEVSKI, 1965; BONDEV, 1961b). *Oxytropis campestris* (SIMEONOVSKI, 1965).

Paeonia corallina (JANEV, 1966), *P. mascula* (Cullen & Heywood, in HEYWOOD, 1964; VELCEV et al., 1968), *P. peregrina* (VELCEV et al., 1968; STANEV, 1970a). *Paliurus aculeatus* (DENCEV, 1964b). *Panicum eruciforme* (DELIPAVLOV, 1961; VELCEV & BONDEV, 1961; CESMEDZIEV, 1965), *P. lineare* (BONDEV, 1963). *Papaver pinnatifidum* (DELIPAVLOV, 1961; CESMEDZIEV, 1969a). *Parunticella latifolia* (DELIPAVLOV, 1971). *Paronychia cephalotes* (DELIPAVLOV, 1961; BORHIDI, 1966), *P. kapella* (BORHIDI, 1966). *Paspalum digitaria* (VIHODCEVSKI, 1969). *Pastinaca hirsuta* (CESMEDZIEV, 1969a), *P. sativa* (DIMITROV et al., 1967), *P. teretiuscula* (CESMEDZIEV, 1965, 1967). *Pedicularis leucodon* (JANEV & PANOV, 1964; STANEV, 1966). *Peganum harmala* (STOJANOV, STEFANOV, SAVCEV, 1968). *Peplis alternifolia* (DIMITROV et al., 1967). *Periploca graeca* (BROWICZ, 1966). *Petasites kablickianus* (VALEV, 1968). *Petrorhagia saxifraga* (JORDANOV & JANEV, 1968), *P. velutina* (JORDANOV & JANEV, 1968). *Peucedanum aegopodioides* (JORDANOV & KUZMANOV, 1963; CESMEDZIEV, 1965; VIHODCEVSKI, 1969), *P. arenarium* (VIHODCEVSKI, 1969; GANCEV & DENCEV, 1971), *P. carvifolia* (DELIPAVLOV, 1971), *P. latifolium* (JORDANOV & JANEV, 1962), *P. ruthenicum* (DENCEV, 1970). *Phleum bertolonii* (GANCEV & BONDEV, 1965), *P. graecum* (BONDEV, 1963; BONDEV & RADENKOVA, 1969), *P. paniculatum* (BONDEV, 1961b), *P. phleoides* (JORDANOV & JANEV, 1968). *Pholiurus pannonicus* (JORDANOV et al., 1968). *Phyllirea media* (BONDEV et al., 1967). *Picea excelsa* (GEOV, 1962). *Picris echioides* (GANCEV, 1963; VIHODCEVSKI, 1965; GANCEV & KOCEV, 1968; JORDANOV, 1968; CESMEDZIEV, 1969a), *P. pauciflora* (DIMITROV et al., 1967). *Pinguicula sempervivum* (PENZES, 1968b). *Pinus montana* (DIMITROV et al., 1967), *P. nigra* (VELCEV & VASILEV,

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- (STEFANOV, 1963a), *T. speciosum* (KOCEV, 1961; KOZUHAROV & KUZMANOV, 1962; BONDEV & KUZMANOV, 1963; VELCEV & BONDEV, 1965), *T. spumosum* (DELIPAVLOV, 1968a; VIHODCEVSKI, 1969), *T. squarrosus* (GANCEV & DENCEV, 1965), *T. strictum* (DELIPAVLOV, 1971; GANCEV & DENCEV, 1971), *T. subterraneum* (GANCEV & KOCEV, 1961), *T. suffocatum* (KOCEV, 1961; BONDEV et al., 1967), *T. tenuifolium* (BONDEV, 1963). *Trigonella gladiata* (BONDEV, 1961b; VELCEV & BONDEV, 1961; JANEV & PANOVA, 1964; VELCEV et al., 1968; SANEV, 1871), *T. spicata* (VELCEV, 1962). *Trinita kitaibelii* (JORDANOV & JANEV, 1962), *T. ucrainica* (DENCEV, 1970). *Trisetum flavescens* (BONDEV, 1961b). *Triticum aegilopoides* (DELIPAVLOV, 1961), 1961), *T. ovatum* (BONDEV, 1961b). *Tulipa celsiana* (DELIPAVLOV, 1961), *T. rhodopea* (DELIPAVLOV, 1961), *T. urumofii* (VIHODCEVSKI, 1969). *Tunica velutina* (KOCEV & DENCEV, 1961). *Tyrimnus leucographus* (CESMEDZIEV, 1965; 1965; GANCEV & DENCEV, 1965; VELCEV & BONDEV, 1965).
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- Zacyntha verrucosa* (DELIPAVLOV, 1964a; VELCEV & BONDEV, 1965). *Zigophyllum fabago* (JORDANOV, 1968). *Ziziphora capitata* (BONDEV, 1961b; GANCEV & KOCEV, 1961, 1963b).

Appendix C — Aliens

The problem of alien species in the flora of Bulgaria is discussed historically in detail by STEFANOV and KITANOV (1963). New information is in KOLEV (1963, 1964a), KOLEV and CHRISROV (1963), KOZUHAROV and KUZMANOV (1962, 1967), VELCEV and BONDEV (1961), JORDANOV and KUZMANOV (1963), JORDANOV, GANCEV and KOCEV (1965), VIHODCEVSKI (1963, 1965, 1968), DELIPAVLOV (1961, 1964a, 1968a, 1971), DIMITROV and DELIPAVLOV (1962), KOVACEV (1963, 1965c, 1967, 1968b), CESMEDZIEV (1965, 1969a), GRAMATIKOV (1968, 1969),

BONDEV (1963, 1964), STEFANOV (1963a), CHRISTOV and PALAVEEVA (1961), PALAVEEVA (1967a). A recent review of the problem is by KUZMANOV and KOZUHAROV (1971).

The following genera (*) and species are new for the Bulgarian flora:

- Azolla** *fuliculoides* L. (PETROV, 1970).
Bryonia dioica Jacq. (JORDANOV, 1966b).
*Calendula** *arvensis* L. (VIHODCEVSKI, 1969).
*Diotis** *candidissima* Desf. (DELIPAVLOV, 1961).
Eleusine tristachya Gaertn. (CESMEDZIEV, 1969a).
Euphorbia maculata L. KUZMANOV, 1961b).
Euphorbia nutans Lag. (VIHODCEVSKI, 1963).
Malva crispa L. (DELIPAVLOV, 1961).
*Paspalum** *digitaria* Poir. (VELCEV & BONDEV, 1961).
*Roubieva** *multifida* Moq. (VELCEV & BONDEV, 1961).
Solanum heterodoxum Dunal. (DELIPAVLOV, 1968a).
*Sporobolus** *indicus* (L.) R. Br. (DIMITROV & DELIPAVLOV, 1962).
Trifolium ligusticum Ballo. (STEFANOV, 1963a).
Urtica pillulifera (KOZUHAROV & KUZMANOV, 1962).

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* To be concise the papers in Cyrillic are cited by their English, French or German summary titles (when available). Most of the originals are transliterated by BRUMMITT (1966, 1968, 1969, 1970, 1972).

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FLORISTIC AND TAXONOMIC ACTIVITY IN DENMARK BETWEEN 1960 AND 1971

BY

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LIKE the period 1945-1960, floristic and taxonomic activity in Denmark during the years 1960-1971 has mainly been devoted to three fields: 1) Preparation and publication of topographical-botanical investigations in the form of distribution maps for all species in the country, 2) Biosystematic investigation (cultivation experiments and cytological research) on species belonging to the Danish and Arctic floras, and 3) Continuation on the flora of Greenland.

The great majority of native Danish plants has now been mapped, and only a few families are lacking preparation (e. g. Potamogetonaceae in its widest sense; the Gramineae manuscript exists and awaits publication).

The floristic investigation of the Faeroe Islands mentioned in the report for 1945-1960 [BÖCHER, *Webbia* 18: 165-172 (1963)] has now been concluded, and the results published in two papers by KJELD HANSEN (no. 49, 50).

The majority of floristic papers and smaller reports again have been published in the journals «*Botanisk Tidsskrift*» (B. T.) and «*Flora og Fauna*» (F. F.).

Since 1960 the most important and interesting annual floristic finds within Denmark have been compiled and published almost every year, or for two years at a time (see no. 20, 21, 25a, 28, 32, 34, 43, 45).

1. Danmarks topografisk-botaniske undersøgelser (Danish topographical-botanical investigations):

Since 1960 45 families have been investigated, and 409 maps have been drawn. The families are:

- Aceraceae, S. Ødum 1968 (120)
- Amaranthaceae, A. Hansen & A. Pedersen 1968 (40)
- Aquifoliaceae, S. Ødum 1968 (120)
- Araliaceae, S. Ødum 1968 (120)
- Aristolochiaceae, A. Pedersen 1966 (90)
- Berberidaceae, S. Ødum 1968 (120)
- Betulaceae, S. Ødum 1968 (120)
- Boraginaceae, S. M. Rasmussen 1965 (105)
- Callitrichaceae, A. Pedersen 1966 (91)
- Cannabaceae, A. Pedersen 1966 (90)
- Celastraceae, S. Ødum 1968 (120)
- Chenopodiaceae, A. Hansen & A. Pedersen 1968 (40)
- Cistaceae, A. Pedersen 1966 (90)
- Compositae, A. Pedersen 1961 (79)
- Convolvulaceae, A. Hansen 1963 (26)
- Cornaceae, S. Ødum 1968 (120)
- Corylaceae, S. Ødum 1968 (120)
- Cupressaceae, S. Ødum 1968 (120)
- Cuscutaceae, A. Hansen 1963 (26)
- Elaeagnaceae, S. Ødum 1968 (120)
- Fagaceae, S. Ødum 1968 (120)
- Grossulariaceae, S. Ødum 1968 (120)
- Hippocastanaceae, S. Ødum 1968 (120)
- Hydrophyllaceae, A. Hansen 1963 (26)
- Labiatae, A. Pedersen 1969 (99)
- Loranthaceae, S. Ødum 1968 (120)
- Myricaceae, S. Ødum 1968 (120)
- Oenotheraceae, N. Jensen 1971 (58)
- Cleaceae, S. Ødum 1968 (120)
- Orobanchaceae, A. Pedersen 1963 (82)
- Pinaceae, S. Ødum 1968 (120)
- Polemoniaceae, A. Hansen 1963 (26)
- Resedaceae, A. Pedersen 1966 (90)
- Rhamnaceae, S. Ødum 1968 (120)
- Rosaceae I, A. Pedersen 1965 (88), Rosaceae (Pomoideae, Prunoideae), S. Ødum 1968 (120)
- Salicaceae, S. Ødum 1968 (120)
- Santalaceae, A. Pedersen 1966 (90)
- Scrophulariaceae, A. Pedersen 1963 (82)
- Solanaceae, A. Hansen 1963 (26)
- Taxaceae, S. Ødum 1968 (120)
- Thymelaeaceae, S. Ødum 1968 (120)

- Tiliaceae, S. Ødum 1968 (120)
Ulmaceae, S. Ødum 1968 (120)
Urticaceae, A. Pedersen 1966 (90)
Verbenaceae, A. Pedersen 1969 (99)

2. New taxa in Denmark's flora:

a) *Spontaneous-subspontaneous:*

- Callitriche platycarpa (89)
Chrysanthemum leucanthemum f. tubiflorum (101)
Epipactis helleborine var. neerlandica (26a)
Ranunculus ficaria ssp. fertilis (71)

b) *Introduced:*

- Alchemilla mollis (83)
Dipsacus strigosus (22)
Echinochloa colona (54)
Epilobium inornatum (56)
Pulmonaria mollis (19)
Sedum anglicum (109a, 103)
Spartina anglica (100)
Zizania aquatica (66)
Lists of new aliens (22, 27, 30, 32)

c) *Description of new taxa:*

- Callitriche cophocarpa f. pedicellata (91)
Odontites verna ssp. pumila (81)
Taraxacum-species (9, 122)

3. Revisions, important new records, nomenclature:

- Agrostis coarctata (41)
Alchemilla glabra (83)
— glomerulans (84)
— obtusa (83)
— subglobosa (83)
Allium vineale var. purpureum (42)
Alopecurus arundinaceus (97)
Anthyllis vulneraria ssp. vulneraria var. langei (87)
Arrhenatherum elatior ssp. bulbosum (33)
Asplenium ruta-muraria (110)
Atriplex latifolia-aggr. (95)
— sabulosa (17)
Carex chordorrhiza (121)
Claytonia perfoliata (33)

- Chenopodium suecicum* (44)
Cotula coronopifolia (39)
Dactylorhiza fuchsii (39)
— *traunsteineri* (69)
Digitaria-species (17)
Eleocharis multicaulis (36)
Equisetum variegatum (59)
Eragrostis poides (17)
Galinsoga ciliata (19)
— *parviflora* (19)
Geranium robertianum ssp. *maritimum* (17)
Illecebrum verticillatum (1)
Isoetes echinospora (48)
Juncus acutifolius (33)
— *anceps* (39)
Lathyrus maritimus (24, 92)
— *silvestris* (17)
— *sphaericus* (65)
Liliaceae (109)
Lotus uliginosus ssp. *vestitus* (87)
Montia fontana-aggr. (96)
Orobanche major (51)
Poa bulbosa (35)
Polypodium vulgare (98)
Potentilla collina (85)
— *subarenaria* (85)
— *subargentea* (85)
Pyrola rotundifolia ssp. *arenaria* (19)
Rosa rugosa (17)
Rubus laciniatus (39)
— — ssp. (111)
Salix rosmarinifolia (76)
Sedum anglicum (103)
— *sexangulare* (86)
Setania viridis (17)
Silene noctiflora (70)
Spergula morisonii (102)
Thymus serpyllum (93)
Tragopogon porrifolius (52)
Vicia villosa ssp. *dasycarpa* (33)
— — — *villosa* (33)
Lists of aliens (27, 29, 37, 60, 61)
Compilations of new floristic records (18, 19, 20, 21, 25a, 28, 32, 33, 34,
43, 45)

4. Floristic treatments of important parts of Denmark and Danish plant communities:

- Anholt (23), Bornholm (33a), Dybsø (14), Fanø (104), Fjandø (115), Hirsholmene (119), Laesø (44), Saltholm (31), Vensholm (113), Vorsø (63)
 The vegetation of some Danish barrows (South Zealand) (12)
 Field weeds in Denmark in the beginning of the 1960s (75)
 The raised bog Draved Kongsmose (47)
 Vegetation of a Danish off-shore barren islands (11)
 Plants with northern distribution in Jutland (78)
 The xerothermic flora element of the Danish southern Inner Waters (20)
 East Danish village-ponds and their vegetation (55)
 The vegetation of some marshes in South Zealand (13)
 The vegetation of heath-dunes, Isle of Rømø (106)
 Changes in the vegetation of the Isle of Lolland during the last century (112)
 Ravnkilde, a spring in Himmerland and its flora (2)
 The vegetation of Lake Sønderø, present and past (108)
 The vegetation of some gravel-pits in South Zealand (15)
 The vegetation of Lake Øjesø (3)
 Flora and vegetation at Lindenborg Brook, North Jutland (114)
 Changes in the vegetation of Lake Lyngby Sø (77)
 The vegetation of Holmegård Moor, South Zealand (16)
 The vegetation of some springs in Himmerland, North Jutland (4)
 Alteration of vegetation in Hjarbaek Fjord (62)
 The vegetation of Vosnaes Pynt, Kalø Vig, East-Jutland (116)
 The vegetation of an old grazing-area in the hills south of Randers (117)
 Haslund forest (118)

5. Floristic and taxonomic work on the Greenland flora of some importance to the treatment of Flora Europaea:

- Pyrola grandiflora* × *minor* (5)
Orthilia secunda ssp. *obtusata* (5)
Chamaenerium angustifolium × *latifolium* (6)

6. Chromosome numbers of European flowering species:

- Arctic species (5, 6, 8, 10, 53)
 Temperate and mediterranean species (67, 68, 69, 74, 107)
 Check-list of chromosome numbers in Danish plants (72)

7. Species aggregates:

- Blechnum spicant* (73)
Lotus corniculatus etc. (67)
Sisyrinchium montanum-aggr. (7)

8. Faroe Islands:

- Botanical investigations (49)
 Vascular plants in the Faeroes (50)

9. Bibliography:

- Danish botanical literature in 1960, 1961 and 1962 (29)
 » » » » 1963, 1964 and 1965 (38)
 » » » » 1966, 1967 and 1968 (46)

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57. — (1966) — Sølv-Mælde, Atriplex sabulosa, fundet på Sjælland. *B. T.* 61: 304.
58. — (1971) — The distribution of the Oenotheraceae within Denmark. *B. T.* 66: 137-170, 14 maps.
59. — & PEDERSEN, A. (1971) — Equisetum variegatum, Liden Padderokke, i en sydsjællandsk grusgrav. *F. F.* 77: 87-88.
60. JENSEN, O. EGEDE & HANSEN, A. (1964) — «Korkfloraen» ved Pedersborg, Sorø, 1951-1963. *B. T.* 60: 129-132.
61. — & LARSEN, E. (1969) — Adventivfloraen i distr. 40 og 41 i årene 1951-1968. *F. F.* 75: 170-192.
62. JEPSEN, P. UHD (1970) — Vegetationsændringer i Hjarbaek Fjord i perioden 1967-1969. *F. F.* 76: 99-108.
63. JESSEN, K. (1968) — Flora and vegetation of the nature reserve of Vorsø in Horsens Fjord. *B. T.* 63: 1-201.
64. KAAD, P. (1967) — Om Dactylorhiza traunsteineri (Saut.) Soó på Laesø. *F. F.* 73: 1-5.
65. KRONBORG, I. (1964) — Nyt findested for Lathyrus sphaericus Retz. *B. T.* 60: 249-250.
66. LARSEN, EV. (1962) — Lidt om Søris (Zizania aquatica) i Danmark. *F. F.* 68: 56-60.
67. LARSEN, K. & ZERTOVÁ, A. (1963) — On the variation pattern of Lotus corniculatus in Eastern Europe. *B. T.* 59: 177-194.
68. — — (1969) — A taxonomic study on Lotus castellanus Boiss. & Reuter. *Fedde's Repert.* 80: 305-314.
69. — & LAEGAARD, S. (1971) — Chromosome studies of the Sicilian flora. *B. T.* 66: 249-268.
70. LAURSEN, FR. (1971) — Nat-Limurt (Silene noctiflora), en «ny» ukrudtsart i Danmark. *Ug. Agron.* 116: 306-313.
71. LAEGAARD, S. (1966) — Ranunculus ficaria ssp. fertilis in Danmark. *B. T.* 61: 295-297.

72. LAEGAARD, S. (1971) — A check-list of chromosome numbers counted in Danish plants. Arhus (1-18).
73. LÖVE, A. & LÖVE, D. (1966) — The variation of *Blechnum spicant*. *B. T.* 62: 186-196.
74. LAANE, M. MOTZFELDT (1968) — Cyto-ecological studies in Norwegian *Campanula* species. *B. T.* 63: 319-341.
75. MIKKELSEN, V. H. & LAURSEN, F. (1966) — Field weeds in Denmark in the beginning of the 1960s. *B. T.* 62: 1-26.
76. MOLLER, C. (1971) — Rosmarinpil, *Salix rosmarinifolia* L., i distrikt 11. *F. F.* 77: 64.
77. OLSEN, S. (1964) — Changes in the vegetation of Lake Lyngby Sø. A contribution to the knowledge of the influences of civilization on aquatic and swamp vegetation. *B. T.* 59: 273:300.
78. PEDERSEN, A. (1961) — Plants with northern distribution in Jutland. *F. F.* 67: 26-47.
79. — (1961) — The distribution of the Compositae within Denmark. *B. T.* 57: 81-289, 84 maps.
80. — (1962) — The xerothermic flora element of the Danish Southern Inner Waters. *F. F.* 68: 17-42.
81. — (1963) — *Odontites verna* ssp. *pumila* emend., en ny underart for svenske og danske strandenge. *B. T.* 58: 290-296.
82. — (1963) — The distribution of the Scrophulariaceae and Orobanchaceae within Denmark. *B. T.* 59: 1-140, 70 maps.
83. — (1963) — Floristiske meddelelser. *Alchemilla mollis*, *Alchemilla subglobosa*, *Alchemilla obtusa* og *Alchemilla glabra*. *B. T.* 59: 255-257.
84. — (1963) — *Alchemilla glomerulans*, Nøgleblomstret Løvefod, ny for Danmark. *B. T.* 59: 257-259.
85. — (1964) — *Potentilla collina*, *Potentilla subargentea* og *Potentilla subarenaria* i Danmark. *B. T.* 60: 90-98.
86. — (1964) — *Sedum sexangulare*, Seksradet Stenurt, hjemmehørende i Danmark? *B. T.* 60: 246-249.
87. — (1965) — *Anthyllis vulneraria* ssp. *vulneraria* var. *langei* og *Lotus uliginosus* ssp. *vestitus*, to økologiske racer fra de jyske klitter. *F. F.* 71: 149-157.
88. — (1965) — The distribution of the Rosaceae within Denmark. I. *B. T.* 61: 145-270, 55 maps.
89. — (1966) — *Callitriche platycarpa* i Danmark. *B. T.* 61: 298-303.
90. — (1966) — The distribution of the Cannabaceae, Urticaceae, Santalaceae, Aristolochiaceae, Resedaceae and Cistaceae within Denmark. *B. T.* 62: 85-122, 10 maps.
91. — (1966) — The distribution of the Callitrichaceae within Denmark. *B. T.* 62: 123-145, 7 maps.
92. — (1966) — *Lathyrus maritimus* (L.) Fries i Danmark, en deling i to underarter. *F. F.* 72: 125-129.
93. — (1967) — De danske former af *Thymus serpyllum* L.; Mill. *F. F.* 73: 45-54.
94. — (1967) — Was ist *Chenopodium suecicum* Murr. (*C. viride* L. sensu Aellen)? *F. F.* 73: 127-131.

95. — (1968) — Nogle kritiske danske *Atriplex*-arter. *B. T.* 63: 289-303.
96. — (1968) — Tre underarter af *Montia fontana*. *B. T.* 63: 369-371.
97. — (1969) — Den danske forekomst af *Alopecurus arundinaceus*, Sort Raevehale. *F. F.* 75: 25-30.
98. — (1969) — To arter af slægten *Polypodium* i Danmark. *B. T.* 64: 195-204.
99. — (1969) — The distribution of the Labiatae and Verbenaceae within Denmark. *B. T.* 64: 285-379, 50 maps.
100. — (1970) — Et nyt vadegraes, *Spartina anglica* Hubbard, påvist i Danmark. *F. F.* 76: 66-68.
101. — (1970) — Ejendommelig form af Hvid Okseøje, *Chrysanthemum leucanthemum* f. *tubiflorum*. *F. F.* 76: 132.
102. — (1971) — *Spergula morisonii*, Vår-Spergel, fundet på Djursland. *F. F.* 77: 64.
103. — (1971) — *Sedum anglicum*, Engelsk Stenurt, fundet på Bornholm. *F. F.* 77: 102.
104. — (1971) — Nye bidrag til Fanø's flora. *B. T.* 66: 171-181.
105. RASMUSSEN, S. M. (1965) — The distribution of the Boraginaceae within Denmark, *B. T.* 60: 261-315, 23 maps.
106. SAND, K. (1964) — Vegetationen i klitheden og dens lavninger på Rømø. *F. F.* 70: 129-135.
107. SORENSEN, TH. & CHRISTIANSEN, H. (1964) — Contribution to the chromosome cytology of Petasites. *B. T.* 59: 311-314.
108. THORNBERG, M. (1967) — Sønder søens planteverden før og nu. *F. F.* 73: 81-98.
109. TILLGE, L. (1971) — Løg- og knoldplanter i Danmark. *Medd. Havebrugshist. Selsk.* 1: 9-28, maps.
- 109a. TURESSON, G. (1963) — *Sedum anglicum* Huds. funnen på Christiansö. *Bot. Notiser* 116: 105-106.
110. WARNCKE, E. (1968) — Murruden på nyt dansk voksested. *B. T.* 63: 377.
111. WEBER, H. E. (1971) — Supplerende bemaerkninger til Bornholms brombaerflora. *F. F.* 77: 20-21.
112. WORSOE, E. (1965) — Om ændringer i Lollands vegetationsforhold gennem de sidste 100 år. *F. F.* 71: 115-134.
113. — (1967) — Om vegetationen på Vensholm i Langelandsbaeltet. *F. F.* 73: 41-43.
114. — (1968) — Flora og vegetation ved Lindenberg Aa i Rold Skov. *F. F.* 74: 131-143.
115. — (1969) — Vegetationen på Fjandø i Nissum Fjord. *F. F.* 75: 57-60.
116. — (1970) — Kystfloraen på Vosnaes Pynt ved Kalø Vig. *F. F.* 76: 125-131.
117. — (1971) — Et gammelt graesningsareal i bakkerne syd for Randers. *F. F.* 77: 35-44.
118. — (1971) — Haslund Krat. *F. F.* 77: 116-118.
119. ØDUM, S. (1961) — Hirsholmenes vegetation. *B. T.* 57: 53-61.
120. — (1968) — The distribution of trees and shrubs in Denmark. *B. T.* 64: 1-118, 50 maps.
121. ØLLGAARD, B. (1965) — Et nyt fund af *Carex chordorrhiza*. *B. T.* 61: 113.
122. ØLLGARD, H. (1970) — To Maelkebøtte-arter, nye for Danmark. *F. F.* 76: 28-29.

LA FLORISTIQUE VASCULAIRE DE LA BELGIQUE DE 1961 À 1971

PAR

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1. INTRODUCTION

B IEN que conçu un peu différemment, l'aperçu que voici — couvrant la période fin 1961 à 1971 — fait suite au rapport présenté devant le deuxième Symposium Flora Europaea, en mai 1961, sur l'étude de la flore vasculaire de la Belgique (LAWALRÉE, 1963a).

La botanique, et plus particulièrement la floristique, est restée active dans le pays, bien qu'il faille déplorer vivement le manque de situations ouvertes aux jeunes chercheurs, plus nombreux que jamais. Il est impossible de citer toutes les publications parues durant les dix dernières années et traitant de la flore ou de la végétation de la Belgique. Sans doute y aura-t-il ci-dessous des oublis regrettables mais involontaires dont je demande pardon. Mais c'est consciemment que j'ai dû taire des centaines de comptes rendus d'excursions ou de séances, d'articles de vulgarisation, de pages souvent militantes et méritantes consacrées à la conservation des sites botaniques: on y glanerait beaucoup de choses certes, mais force est de se limiter.

2. PÉRIODIQUES NOUVEAUX

- 1°) *Mémoires de la Société royale de Botanique de Belgique*; sans périodicité; premier mémoire publié en 1963; édité par la Société royale de Botanique de Belgique, rue Royale 236, B 1030 Bruxelles.
- 2°) *Travaux du Service des Réserves Naturelles domaniales et de la Conservation de la nature*; premier numéro en 1965; publié par le «Service des Réserves Naturelles domaniales et de la

Conservation de la Nature», Ministère de l'Agriculture, Administration des Eaux et Forêts, boulevard Bischoffsheim 32, B 1000 Bruxelles.

- 3°) *Schakel*; organe du Kontaktkomitee van de Kringen voor Natuurstudie en Natuurbescherming in het Antwerpse; premier numéro en juin 1963; trimestriel; administration et rédaction: G. Myncke, Walenstraat 27, B 2000 Antwerpen.
- 4°) *Stentor*; organe du Belgische Jeugdbond voor Natuurstudie, créé en 1962, éditeur responsable actuel: J. Cappelle, Zonnebloemstraat 44, B 8800 Roeselaere.

3. FLORES, LISTES FLORISTIQUES

A. Couvrant toute la Belgique

Dans la *Flore Générale de Belgique, Spermatophytes*, publiée par le Jardin botanique de l'Etat (devenu Jardin botanique national), trois fascicules ont paru depuis le précédent rapport; établis d'après la classification de la 11^e édition du Syllabus der Pflanzenfamilien d'Engler, les fascicules 2 (1963) et 3 (1964) du tome IV traitent des *Papilionaceae* (seconde partie) aux *Rhamnaceae* (LAWALRÉE, 1963-64). Le fascicule 1 du tome V, dernier fascicule paru, traite des *Tiliaceae*, *Malvaceae*, *Guttiferae*, *Elatinaceae*, *Cistaceae*, *Violaceae* et *Thymelaeaceae* (LAWALRÉE, 1966).

Le manque de travailleurs a retardé la préparation de la suite, mais cette oeuvre se continuera bientôt.

Le fait marquant de la période envisagée, c'est la publication d'une Flore manuelle, par une équipe réunie à l'initiative du Professeur W. Mullenders (DE LANGHE et al., 1967). Cet ouvrage est actuellement épuisé et le Jardin botanique national de Belgique prépare la publication d'une nouvelle Flore manuelle qui sortira sans doute de presse en 1973 et qui est due à une équipe plus restreinte.

Pour mémoire, il faut signaler l'ouvrage d'URSING (1967).

B. N'intéressant qu'une partie du territoire

La récente Flore d'Allemagne de SCHMEIL & FITSCHEN (1968) (édition 81 par RAUH & SENGHAS) englobe une partie du territoire belge, non sans erreurs, celles-ci corrigées par PARENT (1972).

Signalons en outre:

District maritime: J. DUVIGNEAUD & LAMBINON (1963) ont étudié l'estuaire de l'Yser, HERBAUTS (1971) la réserve du Westhoek.

District flamand: VAN ROMPAEY a publié l'inventaire floristique de la vallée du Damsloot, près de Gand (1966: environ 300 espèces) et celui de la région du Moyen-Escaut (1967: environ 600 espèces).

District campinien: VANNEROM a publié une note sur la répartition des plantes dans le Limbourg (1963) et une autre concernant des observations faites aux environs de Diest entre 1880 et 1918 (1965).

District picardo-brabançon: P. DE ZUTTERE a publié une liste floristique d'un faubourg de Bruxelles (1966); VAN SCHEPDAEL (1968), une liste de la vallée de l'Orneau.

District mosan: vallée de la Sambre de Landelies à Lobbes (J. DUVIGNEAUD, 1966*d*), vallée du Viroin (DELVOSALLE, 1963), la Montagne Saint-Pierre (TRAETS, 1964, BERTEN, 1970, PETIT & RAMAUT, 1970), les environs de Han-sur-Lesse (MATON, 1966), le pays de Herve (DE LEVAL, 1966: plantes rudérales).

Districts ardennais et lorrain: outre l'importante publication de D'ANSEMBOURG et al. (1967) sur le sud de l'Ardenne et le district lorrain, il faut signaler aussi les travaux de PARENT (1965: environs de Tintange; 1967*a*: Torgny), de ROISIN (1966: environs de Chimay) et de NOËL (1968: marais de Vance).

4. REVUE BIBLIOGRAPHIQUE

Le principal outil bibliographique des botanistes belges est l'excellente «*Bibliographie de l'Histoire naturelle en Belgique, B, Botanique*» publiée en supplément à la revue *Natura Mosana* (Responsable: J. Duvigneaud, route de Beaumont 319, B 6030 Marchienne-au-Pont).

5. REVISIONS, TRAVAUX MONOGRAPHIQUES

Arctium (DE LANGHE, 1966).

Bromus groupe *B. grossus*-*B. secalinus* (TOURNAY, 1968*b*).

Cruciata (GABRIËLS, 1965).

Dactylorhiza maculata (TOURNAY, 1968).

- Festuca* (AUQUIER, 1964, 1967, 1968, 1969, 1970, 1970a, 1971, 1971a).
Galium (GABRIËLS, 1965).
Mentha (LEBEAU, 1966).
Pastinaca (LAMBINON, 1967).
Polypodium (BECKERS, 1966).
Ranunculus groupe auricomus (DEMARSIN, 1968).
Ranunculus subg. *Batrachium* (DELVOSALLE et al., 1970).
Rubus (VANNEROM, 1967).
Seseli libanotis (J. DUVIGNEAUD, 1965).
Thymus (STAES, 1963).

Voir aussi la rubrique 6 et l'appendice A.

6. BIOSYSTEMATIQUE ET CYTOTAXONOMIE

- Acer pseudoplatanus* (GALOUX & FALKENHAGEN, 1965).
Armeria (C. LEFEBVRE, 1967, 1970, 1971, 1971a; P. DUVIGNEAUD et al., 1971).
Asplenium × *alternifolium* (BOUHARMONT, 1966).
Asplenium trichomanes (BOUHARMONT, 1968).
Aster tripolium (P. DUVIGNEAUD & JACOBS, 1971).
Betula verrucosa (GADELLA & KLIPHUIS, 1966).
Cardamine palustris (LAMBINON & MOUTSCHEN, 1963).
Chrysosplenium oppositifolium (GADELLA & KLIPHUIS, 1966).
Fagus sylvatica (GALOUX, 1966a).
Fraxinus excelsior (DAGNELIE et al., 1969: dendrométrie).
Helianthemum × *sulphureum* (BOUHARMONT, 1968a).
Quercus petraea et *Q. robur* (GATHY, 1970).
Teucrium scorodonia (FRESON-LASKAR, 1966).

7. ECOLOGIE, PHYTOSOCIOLOGIE, CARTOGRAPHIE DE LA VÉGÉTATION

C'est le domaine où l'activité botanique est la plus intense en Belgique. Les travaux commencés avant 1961 par le Centre d'Ecologie et de Phytosociologie (Gembloux), ont continué sous la direction du Professeur NOIRFALISE. Le Centre National d'Ecologie Générale a groupé autour des Professeurs P. DUVIGNEAUD et GALOUX (Université Libre de Bruxelles) des chercheurs qui s'intéressent surtout à l'Ecosystème Forêt. Au Laboratoire d'Ecologie végétale

dirigé par le Professeur J. LEBRUN (Université Catholique de Louvain), divers problèmes ont été étudiés, et les travaux continuent entre autres dans le cadre d'un programme étendu relatif à l'Ardenne. Ailleurs encore, des jeunes chercheurs se vouent à l'étude écologique et phytosociologique du pays.

Citons les publications principales:

A. Débordant le cadre d'un district géobotanique belge:

ANDRIES et VAN SLIJCKEN (1962, herbages); J. DE SLOOVER, LEBRUN & MARYNEN (1965, 1965a); DENAEYER-DE SMET (1964, 1964a, 1966, 1967a, 1970a: minéraux dans les plantes); P. DUVIGNEAUD (1963 exposé d'ensemble sur l'écosystème forêt et les travaux du Centre national d'écologie générale); P. DUVIGNEAUD & DENAEYER-DE SMET (1970a); GALOUX (1967, 1969); GOSSUIN (1971a); LEBRUN (1968); MALAISSE (1964: phénologie des hêtraies); MELOTTE & RAMAUT (1970: *Thlaspi sylvestre* subsp. *calaminare*); NOIRFALISE (1963, 1966, 1966a, 1968, 1969, 1970, 1970b et 1971); NOIRFALISE & DETHIOUX (1970); REMACLE (1965: myxomatose et végétation); ROISIN (1969: domaine atlantique); SCHNOCK (1967); SCHNOCK & GALOUX (1967a); STRYCKERS (1967: Flandre orientale) STRYCKERS & DELPUTTE (1965: *Alopecurus myosuroides*); VYNCKE (1969).

B. Relatifs à un district géobotanique belge:

Districts maritime et poldérien: DEPUYDT (1967: réserve du Westhoek); HERBAUTS (1971: réserve du Westhoek); JONCKHEERE (1968: réserve du Westhoek); BOSSIER (1969: dunes de Wenduine); LIPPENS (1968: réserve du Zwin); J. DE SLOOVER (1970: peuplements de *Cladium mariscus*); STIEPERAERE (1968: criques de Sint-Jan-in-Eremo); en outre DENAEYER, LEJOLY & P. DUVIGNEAUD (1968) ont étudié les halophytes, et VANDEN BERGHEN (1964) a publié un remarquable exposé sur la végétation du littoral atlantique européen.

District flamand: ANDRIES & VAN SLIJCKEN (1964: St-Pauwels et Sleidinge); STOCKMANS (1964: Flandre méridionale); MUYLDERMANS (1965: Berg); MATON (1966a: vallée du Damsloot, près de Gand); STIEPERAERE (1966 et 1969, sites à *Erica cinerea* près de Bruges).

District campinien: DE CONINCK & TRAETS (1962: prairies de la Campine anversoise); DE LANGHE (1962 et 1970: bruyère de

Kalmthout); TRAETS (1962 et 1965: Zutendaal; 1965-66: Opoeteren); RUWET (1963: réserve de Genck-Diepenbeek); LOENDERS (1965: réserve «Ten Haagdoornheide» à Zonhoven); GULLENTOPS et al. (1966: Diepenbeek); DETHIOUX (1967a: Walebos, près d'Aarschot); VAN ROMPAEY (1969a, bassin de la Nèthe); VERPRAET (1969: bruyère de Kalmthout); WILLEMS (1969: sites limbourgeois à *Erica cinerea*).

District picardo-brabançon: NOIRFALISE & SOUGNEZ (1963) et FALKENHAGEN (1968) ont étudié les forêts des environs de Mons; VAN WINGHE (1965), le bois de Dieleghem; DEPASSE et al. (1970), la Mer de Sable à Stambruges; HAVRENNE (1970), la réserve de Claire-Fontaine à Gouy-lez-Piéton; FROMENT (1968), la colonisation des boues résiduelles d'une usine de pâte à papier; DEBEHAULT (1968, 1969 et 1969a), DENAEYER-DE SMET & DUVIGNEAUD (1971) et P. DUVIGNEAUD, TANGHE et al. (1971), la végétation des crassiers de charbonnages.

District mosan:

- a) en général: NOIRFALISE (1962), DETHIOUX (1969) et GRULOIS & VYNCKE (1970) ont étudié divers types de forêts.
- b) Entre-Sambre-et-Meuse: voir les travaux de J. DUVIGNEAUD (vallée de la Sambre: 1966d; Lompret: 1965a; Olloy: 1963a; Fagnolle: 1970; association à *Littorella* et *Eleocharis*: 1971), de DETHIOUX (Olloy: 1963a, 1964-65, Sautour: 1963; Roly: 1970), de DE ZUTTERE et al. (Bois de Châtelet: 1968), de MALTER (Roly: 1970), de BOUXIN (chênaie: 1971) et les nombreux travaux qui étudient d'une façon approfondie l'écosystème d'une chênaie mélangée calcicole de Virelles-Blaimont, e. a. AMBROES (1969), DENAEYER-DE SMET (1966a, 1968, 1969), P. DUVIGNEAUD (1968a), P. DUVIGNEAUD et al. (1969), FROMENT (1971), FROMENT & TANGHE (1967), GALOUX (1967a), GALOUX et al. (1967, 1967a, 1968), GRULOIS (1967, 1968, 1969, 1969a), GRULOIS & SCHNOCK (1967), GRULOIS & VYNCKE (1969), SCHNOCK (1967a, 1967b, 1967c, 1968), SCHNOCK & GALOUX (1967), VANSEVEREN (1969a), VANSEVEREN & AMBROES (1971).
- c) Montagne Saint-Pierre et environs: MARÉCHAL & PETIT (1963).
- d) à l'est de la Meuse: on consultera avec profit l'étude des forêts de plateaux par NOIRFALISE (1969a); celle de la vallée

inférieure de la Lesse par VANSEVEREN (1969); celle des Fonds de Leffe par VANDEN BERGHEN (1963); les travaux sur l'écosystème d'une chênaie de Mesnil-Eglise par DENAEYER-DE SMET (1967), par FROMENT et al. (1970), HERBAUTS (1970), par MOMMAERTS-BILLIET & FROMENT (1969) et par TANGHE & FROMENT (1968); ceux relatifs au bois de Wève par P. DUVIGNEAUD (1968, 1970); traitant de la Calestienne par TANGHE (1971); de la Famenne par ROISIN & THILL (1962), par SOUGNEZ & LIMBOURG (1963), par THILL (1964-1966) et par VAN SCHEPDAEL (1968a); du Condroz par LAMBINON (1964, 1965), par SAINTENOY-SIMON (1965, 1965a) et par THILL (1966-67, 1968, 1968a, 1968-69); ainsi que l'étude de LAMBINON & AUQUIER (1963) sur les terrains calaminaires.

District ardennais: après avoir signalé la synthèse phytogéographique de l'Ardenne par VANDEN BERGHEN (1970), citons, parmi les nombreuses publications consacrées à la végétation de l'Ardenne: BOUILLENNE (1966: Hautes-Fagnes), DENAEYER-DE SMET (1970), DENAEYER-DE SMET & P. DUVIGNEAUD (1970), DETHIOUX (1969: hêtraie), J. DUVIGNEAUD (1964: vallée de l'Our, 1970c: vallée de la Houille), P. DUVIGNEAUD & DENAEYER-DE SMET (1970), P. DUVIGNEAUD & FROMENT (1969), FROMENT (1963, 1963a, 1964, 1966, 1966a, 1967, 1967a), FROMENT & ROBERT (1968, 1970), GOSSUIN (1971: phénologie de *Vaccinium myrtillus*), KESTEMONT (1970, 1971, 1971a, 1971b), KOEMOTH (1970), LAMBERT (1962-63, 1965, 1965a: prairies), LELOUP & JACQUEMART (1963), MALBROUCK (1966), MANIL (1963: hêtraie), MATON (1967: Vielsalm-Baraque Fraiture), NANSON (1962: hêtraie), NOIRFALISE (1970a), PARENT (1968), C. RENARD (1965, 1971: Samrée), ROISIN (1962), SCHUMACKER & FROMENT (1971: Hohe Mark, etc.); STEPERAERE (1969b), TANGHE (1964, 1964a, 1968, 1970, 1970a: forêts), TANGHE & DUVIGNEAUD (1968: Neufchâteau), VAN BENEDEN (1962: Baraque-Michel), WEISSEN & SACRE (1968: hêtraie).

District lorrain: ANONYME (1964), COÛTEAUX (1962, 1963a, 1969); DETHIOUX (1965, 1966, 1966-68, 1967, 1968-69); DETHIOUX & VANDEN BERGHEN (1965-66); MATAGNE (1969); NOËL (1965, 1968); PARENT (1967, 1968, 1968a, 1968b, 1968c, 1969); SOUGNEZ (1967: forêts); TANGHE (1964a, 1967); TRAETS (in ANONYME, 1964); WOILLARD (1971).

8. FLORISTIQUE ET PHYTOGEOGRAPHIE

DELVOSALLE & DUVIGNEAUD (1963) ont publié un article sur la Flore atlantique européenne dans lequel ils précisent la distribution d'une quarantaine d'espèces de Belgique ou des contrées limitrophes.

DE LANGHE et al. (1967) ont proposé une nouvelle division de la Belgique en territoires géobotaniques; TOURNAY (1968) en a proposé une autre.

Le domaine atlantique a fait par ailleurs le sujet d'un livre intéressant de ROISIN (1969).

Voici une liste de plantes ayant fait l'objet d'observations floristiques importantes, liste que l'on complétera par les listes des points 5 et 6 ci-dessus, et par celles des Appendices A, B et C.

PTERIDOPHYTA:

Pteridophyta en général (VANNEROM, 1964: province du Limbourg).

Asplenium fontanum (douteux pour la Belgique: LAVALRÉE, 1966a).

Asplenium viride (DE ZUTTERE & WANSART, 1967).

Dryopteris × *tavelii* (LAVALRÉE, 1963, VANNEROM, 1964, 1964a).

Equisetum (VAN COTTHEM, 1966, 1967, 1969 et 1970).

Lycopodiaceae (BRASSEUR, 1962, PARENT, 1964).

Oreopteris limbosperma (ROISIN, 1966).

Osmunda (VAN ROMPAEY, 1964).

Polypodium (VAN ROMPAEY, 1969).

SPERMATOPHYTA:

Aconitum (SIEBERTZ, 1967, donnée douteuse; SETTZ, 1969).

Arabis halleri (L. RENARD, 1962a).

Arabis sagittata (J. DUVIGNEAUD, 1966d).

Armeria maritima (LEFEBVRE, 1969).

Arum maculatum (VANDEN BERGHEN, 1962).

Asperula odorata (PARENT, 1969a).

Bidens (DEBRAY, 1964).

Blackstonia perfoliata (HAVRENNE, 1968).

Bunias erucago (RONCART, 1967).

- Bunium bulbocastanum* (BERNARD, 1966).
Buxus sempervirens (SAINTENOY-SIMON, 1965, MICHEL, 1966, DELHAYE & J. DUVIGNEAUD, 1967, J. DUVIGNEAUD, 1969).
Callitriche (LAWALRÉE, 1968).
Campanula rhomboidalis (DE LANGHE, 1966a).
Capsella rubella (DE LANGHE, 1966a).
Cardamine palustris (J. DUVIGNEAUD, 1970a).
Carduus (KAZMI, 1964).
Chelidonium majus var. *pleniflorum* (LEBEAU, 1967).
Cicuta virosa (REMY, 1963).
Circaea intermedia (DELVOSALLE & DUVIGNEAUD, 1971).
Cirsium groupe *tuberosum* (DELVOSALLE, 1967).
Cladium mariscus (DE SLOOVER, 1970).
Clematis recta (LE PAS, 1966).
Cotoneaster integerrimus (LAMBINON, 1966).
Crataegus palmstruchii (LAWALRÉE, 1966b, LEBEAU, 1967).
Crepis sancta (VAN KASTEEL, 1967).
Drosera intermedia (SACRÉ, 1961).
Elatine triandra (LAWALRÉE, 1968a).
Epilobium adenocaulon (LEBEAU, 1967).
Eranthis hyemalis (J. DUVIGNEAUD, 1963, SCHMITTEL, 1962).
Erica cinerea (STIEPERAERE, 1966, 1969 et 1969a, WILLEMS, 1969).
Fraxinus excelsior (MISSON, 1967, THILL, 1968a et 1970).
Helleborus (NOIRFALISE, 1962a).
Hepatica triloba (LEBEAU, 1967).
Heracleum mantegazzianum (RONCART, 1967, LEBEAU, 1967).
Impatiens parviflora (J. DUVIGNEAUD, 1971a).
Isatis tinctoria (autrefois cultivé: JORIS, 1963).
Iva xanthiifolia (LEBEAU, 1967).
Juncus effusus (LIMBOURG, 1969).
Juniperus communis (TRAETS, 1962a).
Lathraea squamaria (DIJKSTRA, 1968).
Leucoium aestivum (MENNEMA, 1965a et b, 1967).
Leucoium vernum (DE ZUTTERE & J. DUVIGNEAUD, 1968).
Ludwigia palustris (DE LANGHE, 1964, SPIKES, 1966).
Melilotus wolgicus (DE LANGHE, 1966).
Mentha (LEBEAU, 1966, 1967, 1967a, 1969).
Ophrys sphegodes (MARÉCHAL, 1966).
Orchidaceae (PELEMAN, 1963, PETTIT in MARÉCHAL & PETTIT, 1963).

- Oxycoccus* (REMY, 1961).
Oxycoccus macrocarpus (DE LANGHE, 1966).
Philadelphus coronarius (LEBEAU, 1967).
Populus nigra (LIEKENS, 1963).
Prunus cerasifera (J. DUVIGNEAUD & LEBEAU, 1970).
Puccinellia distans (FROMENT, 1968).
Pulsatilla (LEBRUN, 1961, MAYNÉ, 1962).
Pyrola media (KERGER & PARENT, 1971).
Ranunculus subg. *Batrachium* (DELVOSALLE et al., 1970).
Rhynchospora alba (SACRÉ, 1961).
Rorippa (JONSELL, 1968).
Rosa agrestis (DE LANGHE, 1966).
Rosa pimpinellifolia (KLASTERSKY, 1967).
Rumex pulcher (J. DUVIGNEAUD, 1969b).
Salix × *ambigua* (LAWALRÉE, 1962).
Salix × *antverpiensis* (DE LANGHE, 1966).
Saxifraga sponhemica (LAMBINON, 1966, DE ZUTTERE, DUVIGNEAUD & WANSART, 1967).
Scilla non-scripta (RENARD, 1962, DELVOSALLE & DUVIGNEAUD, 1963, ROISIN, 1969).
Scutellaria altissima (LAWALRÉE, 1970).
Senecio congestus (DELVOSALLE, 1967, TAHON et al., 1969, HOUWEN, 1969).
Senecio vernalis (J. DUVIGNEAUD, 1966).
Seseli libanotis (J. DUVIGNEAUD, 1965).
Sinapis alba (HAVRENNE, 1970).
Sisymbrium supinum (LAWALRÉE, 1969).
Sonchus palustris (DE LANGHE, 1963).
Spergularia marina et media (STERK, 1968).
Taxus baccata (J. DUVIGNEAUD, 1965).
Thymus (STAES, 1963).
Trichophorum caespitosum (FOERSTER, 1963, FROMENT, 1966).
Ulmus laevis (J. DUVIGNEAUD, 1968).
Vaccinium myrtillus f. *leucocarpum* (LAWALRÉE, 1966).
Vallisneria spiralis (ANT, 1970).
Vicia narbonensis f. *serratifolia* (HEIM & DUVIGNEAUD, 1966).
Viola palustris (ROISIN, 1966).