

9. CARTOGRAPHIE FLORISTIQUE

L'Institut Floristique Belge a continué ses inventaires floristiques sur le terrain (VAN ROMPAEY, 1963 et 1964, DELVOSALLE, 1964). Diverses cartes dressées d'après sa documentation ont paru dans la Flore Générale de Belgique, Spermatophytes.

Le Jardin botanique national et l'I. F. B. ont collaboré pour préparer la publication en 1972 d'un Atlas de la Flore vasculaire belge et luxembourgeoise (VAN ROMPAEY & DELVOSALLE, 1972).

10. ORIGINE ET HISTOIRE DE LA FLORE

Le passé de la flore et de la végétation de la Belgique a fait l'objet de divers travaux.

Même des non-botanistes se sont intéressés à ces questions: ainsi LAMY (1967) pour l'époque de César, et R. NOËL (1966) pour le Moyen Age.

Toutefois, ce sont surtout les palynologistes qui ont fait des recherches dans ce sens, et il faut souligner le rôle important joué par le Laboratoire de Palynologie et de Phytosociologie dirigé par le Professeur MULLENDERS au sein de l'Université Catholique de Louvain (appuyé dans la même université par un laboratoire de datation par le radiocarbone).

Parmi les publications traitant de méthodologie ou s'étendant à une grande partie du pays, citons celles de B. BASTIN (1964a, 1968, 1969, 1969a, 1970), de BASTIN & COÛTEAUX (1966), de COÛTEAUX (1963, 1967), de DEUMER et al. (1964), de DOSSIN et al. (1962), de GILOT (1967, 1968, 1969, 1970), de GILOT et al. (1965, 1966, 1969, 1969a, datations par le radiocarbone), de HEIM (1967, 1969, 1970), de MUNAUT (1966, 1967, 1968, 1970), de PAEPE (1968, 1968a), de PAEPE & VANHOORNE (1967) et de VANHOORNE (1961, 1962, 1963a, 1969).

Un certain nombre d'études sont plus localisées; les voici classées selon les divisions naturelles du pays:

District poldérien: DE CONINCK, GREGUS & VANHOORNE (1966) ont fait l'analyse palynologique de dépôts tourbeux situés à Sta- broek, établissant notamment la présence de *Salix herbacea* et de *S. retusa* lors de l'oscillation de Bölling; DE GROOTE & MOORKENS (1970) ont fait des observations palynologiques à Uitkerke.



District flandrien: MUNAUT (1963) a fait l'analyse palynologique d'un puits romain situé à Destelbergen; VANHOORNE (1967), celle d'une tombe romaine à Huise; VANHOORNE & VERBRUGGEN (1969) ont étudié le Tardiglaciaire (vers — 11740) entre Bruges et Ghistelles.

District campinien: à signaler spécialement les travaux de DRICOT (1961, 1961a), de VANHOORNE (1963a, b, c, e. a. Alleröd à Beerse), de DE PLOEY (1963: palynologie du Pleistocène supérieur et de l'Holocène), de HACQUAERT (1964: Pleistocène inférieur à Arendonk), de MULLENDERS & COREMANS (1964: Postel) et de MULLENDERS, GULLENTOPS & COREMANS (1966: Eemien-Würm à Oevel).

District picardo-brabançon: MUNAUT (1961) a étudié l'extension de *Fagus sylvatica* à Braine-le-Château durant le subatlantique; MISSON (1963) et BASTIN (1964) se sont occupés du passé de la Forêt de Soignes; BODSON (1965) a traité de l'évolution au Moyen Age du paysage rural à Thisnes en Hesbaye, publiant l'analyse pollinique du Camp romain de Taviers par W. Mullenders; MULLENDERS, GULLENTOPS, LORENT, COREMANS & GILOT (1966) ont étudié la vallée de la Nethen; MUNAUT (1967a, 1969) a fait des analyses polliniques à Braine-le-Château et à Chaumont-Gistoux.

District mosan: plusieurs travaux ont traité des dépôts de tuf et de tourbe des environs de Treignes (MULLENDERS, DUVIGNEAUD & COREMANS, 1963, 1963a, J. DUVIGNEAUD, 1966c).

District ardennais: c'est le district qui a été le plus étudié, grâce à l'importance de ses tourbières; citons BOUILLENNE-WALRAND & BOUILLENNE (1963: Baraque-Michel), COÛTEAUX (1962a, b, c et 1965: tombelles; 1969a), DAMBLON (1969 et 1970, Fagne wallonne et Fagne de Clefay), DRICOT (1963-64, Hautes-Fagnes), FROMENT (1969), FROMENT & ROBERT (1968), GULLENTOPS et al. (1966, vallée de la Lienne), HEIM (1963; 1966, Hergenrath), MULLENDERS & GULLENTOPS (1969: pingos), MULLENDERS (1963: pingos), MULLENDERS (1962: tourbière du Grand-Passage), MULLENDERS et al. (1967), ROBERT (1963: régression des fagnes), VLECKEN (1963: Hertogenwald).

District lorrain: à citer: divers travaux de COÛTEAUX (1962a, 1963b, 1967, 1969a), un diagramme pollinique de HULSHOF et al. (1968) relatif à Vance, des recherches sur le vallon du Landbruch par WOILLARD (1971).

11. MODIFICATIONS D'AIRES

De divers côtés, on signale le recul de diverses plantes en Belgique. Dans une brochure publiée à ce sujet par DELVOSALLE, DEMARET, LAMBINON & LAWALRÉE (1969), pour dresser un tableau d'ensemble de la situation, LAWALRÉE & DELVOSALLE (1969) ont traité des *Ptéridophytes et Spermatophytes rares, disparus ou menacés de disparition en Belgique* (voir aussi LAWALRÉE, 1971, 1971a).

12. FLORA EUROPAEA

La parution des deux premiers volumes de Flora Europaea a été saluée par des articles de HEIM (1965), de LAWALRÉE (1965), de LAMBINON & DUVIGNEAUD (1965) et de J. DUVIGNEAUD & LAMBINON (1970), corrigéant certaines données de ces volumes.

Appendice A — Taxons et noms nouveaux

- Artemisia maritima* L. var. *pseudo-gallica* (Rouy) J. Duvigneaud & Lambinon in DE LANGHE et al. (1967), p. 691.
- Bromus grossus* Desf. ex Lamk. & DC. subsp. *grossus* var. *cugnacianus* Tournay (1968b).
 - — var. *grossus* f. *glabrescens* (Kirschl.) Tournay (1968b).
 - — subsp. *eburonensis* (Nyman) Tournay (1968b).
 - — var. *eburonensis* f. *arduennensis* (Reichenb.) Tournay (1968b).
 - — var. *inermis* (De Cugnac) Tournay (1968b).
 - — var. *inermis* f. *teorascensis* (De Cugnac) Tournay (1968b).
- Carex arenaria* L. var. *prostrata* De Langhe (1971).
- Carex otrubae* Podp. var. *subcontigua* (Kükenth.) De Langhe & J. Duvigneaud (1966).
- Dactylorhiza maculata* (L.) Soó subsp. *arduennensis* (Zadoks) Tournay in DE LANGHE et al. (1967).
 - subsp. *meyeri* (Reichenb. f.) Tournay in DE LANGHE et al. (1967).
- Festuca duvalii* var. *duvalii* f. *hispidula* Auquier (1969).
 - var. *multinervis* Stohr f. *barbulata* Auquier (1969).
- Festuca rubra* L. subsp. *arenaria* (Osb.) Richt. var. *arenaria* f. *glabra* Auquier (1971).
 - — var. *magnelii* (Lit.) Auquier (1971).
 - *rubra* subsp. *litoralis* (G. F. W. Mey.) Auquier (1968).
- Leontodon hysoseroides* Welw. ex Reichenb. var. *pseudo-crispus* (C. H. Schultz-Bip. ex Bischoff) J. Duvigneaud in DE LANGHE et al. (1967).
- Libanotis pyrenaica* (L.) Bourg. ex Nyman subsp. *montana* (Crantz) Lemke & Rothm. f. *callayi* J. Duvigneaud (1965).

- Myosotis caespitosa* Besser var. *neglecta* R. Schuster (1967).
Myosotis nemorosa Besser var. *hercynica* R. Schuster (1967).
Nardurus maritimus (L.) Murb. var. *muticus* (Koch) De Langhe in DE LANGHE et al. (1967).
Polygonum aviculare L. subsp. *rurivagum* (Jord. ex Boreau) Lambinon in DE LANGHE et al. (1967).
Ranunculus auricomus subsp. *baguetii*, subsp. *brabantianus*, subsp. *crassicaulis*, subsp. *delvosallei*, subsp. *grandiflorus*, subsp. *hannonianus*, subsp. *incrassatus*, subsp. *lawalreei*, subsp. *mosanus*, subsp. *monticola*, subsp. *scaldianus*, subsp. *sparsipubescens* et subsp. *vanneromii* Demarsin (1968).
Salix × *antverpiensis* Lawalrée & De Langhe (1965).
Sarothamnus scoparius (L.) Wimmer ex Koch f. *andреanu*s (A. Puissant) J. Duvigneaud (1966).
Stenactis strigosa (Mühlenb. ex Willd.) DC. var. *septentrionalis* (Fernald & Wiegand) J. Duvigneaud & Lambinon in DE LANGHE et al. (1967).
Taraxacum delanghii van Soest (1965).
— *kerneri* van Soest, Hagendijk & Zevenbergen (1968).
— *lawalreei* van Soest (1966).
— *limnanthes* subsp. *limnanthoides* van Soest f. *visserianum* van Soest (1965).
— *neo-aellenii* van Soest (1965).
— *pseudoleptodon* van Soest (1966a).

Appendice B — Taxons indigènes nouveaux

- Carex otrubae* var. *subcontigua* (DE LANGHE & DUVIGNEAUD, 1966).
Crataegus palmstruchii (LAWALRÉE, 1966b).
Festuca duvalii et taxons infraspécifiques (AUQUIER, 1969).
Festuca hervieri var. *hervieri* (récoltes anciennes: AUQUIER, 1969a).
Lamium maculatum f. *trilobum* (récolte ancienne: MENNEMA, 1968).
Plantago intermedia (DE LANGHE & VAN ROMPAEY, 1962).
Rhinanthus glaber subsp. *montanus* (J. DUVIGNEAUD, 1962).
Rumex × *digeneus* (J. DUVIGNEAUD, 1968).
— × *weberi* (J. DUVIGNEAUD, 1968).
Salix × *antverpiensis* (LAWALRÉE & DE LANGHE, 1965).
Taraxacum: voir appendice A.

Appendice C — Nouvelles plantes introduites

- Amaranthus macrocarpus* var. *pallidus* (AELLEN, 1964).
Amaranthus palmeri (LAMBINON, 1963).
Aster divaricatus (J. DUVIGNEAUD, 1970b).
Atriplex cf. *pseudocampanulata* (AELLEN, 1964).
Chenopodium album var. *microphyllum* (AELLEN, 1964).
Chenopodium album × *strictum* (AELLEN, 1964).
Chenopodium macrospermum subsp. *halophilum* (AELLEN, 1964).

- Elodea nuttallii* (DE LANGHE, 1966a, DE LANGHE & DELVOSALLE, 1967, VAN NEROM & VAN WINKEL, 1970).
- Pastinaca sativa* subsp. *urens* (LAMBINON, 1967).
- Petasites fragrans* (BUXANT, 1964).
- Schmidia kalahariensis* (L. RENARD, 1962).
- Trifolium alexandrinum* (J. DUVIGNEAUD, 1966).

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FLORISTIC REPORT ON THE CRETAN AREA

BY

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1. INTRODUCTION

ALTHOUGH the last floristic report on Greece (RECHINGER, 1963) included the Cretan area, the latter has never been the subject of a report of its own. To remedy this unsatisfactory situation, which may be responsible for numerous inaccurate range indications involving Crete, I undertook to extend this floristic report to cover the whole period since the publication of *Flora Aegaea* (RECHINGER, 1943). I have listed also some publications and records which, although prior to that date, had been omitted from RECHINGER's standard work. For the categories of records treated, this report is complementary to *Flora Aegaea* and should be used in direct association with it.

An even more time-consuming task than the updating of the inventory of the flora has been the compiling of a list of doubtful and erroneous records. I should like to lay a particular emphasis on that chapter. Errors, once reported, are incredibly resilient and, if they are allowed to spread in the literature, are almost impossible to eradicate. *Flora Europaea*, which will no doubt be one of the most conspicuous sources for all kinds of compilers in the forthcoming decades, should be particularly careful not to include new errors and not to perpetuate the former ones. I believe that an omission is ten times more easily corrected than an erroneous statement. But quite naturally many authors refrain from just dropping a literature record which they doubt, fearing the odour of ignorance. Appendix III has been set up mainly on their account and should provide them with a satisfactory alibi.

Since the end of World War II, Cretan tourism has developed to an extraordinary extent. This means, among other factors, an

ever increasing wave of botanists, amateurs as well as professionals, descending upon the island every year. The increase has been particularly conspicuous during the last decade, and an attempt to set up an inventory of botanical explorers, comparable to that in RECHINGER (1943), would now meet with considerable difficulties¹. Plant material collected in Crete is accumulating in many private as well as public herbaria, is often brought into cultivation and increasingly used in biosystematic work. Strangely enough, publication activity on the Cretan flora seems to follow a rather opposite trend: floristic publications, especially in the form of plant lists, are clearly out of fashion. This trend, which may be partly justified in the countries of central and northern Europe, is premature, however, as far as the Aegean region is concerned. The size of Appendix II, listing the additional floristic records, shows how ill-explored even Crete (still one of the better-known parts of Mediterranean Europe) actually is.

The Cretan area takes a privileged place in the research program of the Botanical Institute of the Patras University and of the Goulandris Natural History Museum. These institutions provide, for the first time, adequate centres of phytotaxonomic research within the Greek boundaries, and are expected to centralize, activate and sponsor, in the forthcoming years, the work of Greek and foreign students and especially one major publication project: a new Flora of Greece (cf. GOULANDRIS, 1971). As far as the Cretan area is concerned, the Goulandris Museum has already started a vast collecting campaign and is building a regional research center with its own laboratories and other working facilities at Rethimno. My own publication plans include an annotated floristic catalogue of the Karpathos island group (in collaboration with C.-P. HERRN) and, eventually, a similar catalogue for Crete.

The present account owes much to the helpful assistance of friends and colleagues who put valuable, often unpublished, information at my disposal and allowed me to check newly collected plant material. I am particularly indebted to Mr. and Mrs. A. GOULANDRIS, Kifisia, and to Sir COLVILLE BARCLAY, Petworth (Sussex); P. J. BROWNSEY, Leeds; N. CREUTZBURG, Freiburg i. Br.; S. R. GRADSTEIN,

¹ Information on three dozen botanists who visited Crete, mostly during the last three decades, is given in GREUTER (1973); this, however, is by no means an exhaustive account of post-war collecting activity on that island.

Utrecht; A. HANSEN, København; C.-P. HERRN, Marbach am Neckar; C. A. JERMY, London; V. A. MATTHEWS BURBIDGE, Edinburgh; H. RUNEMARK, S. SNOGERUP and collaborators, Lund; S. M. WALTERS, Cambridge; J. ZAFFRAN, Marseille; and M. ZOHARY, Jerusalem. Warm thanks are due to J. CANNON for his linguistic advice.

A first version of this report was available at the 7th Flora Europaea Symposium at Coimbra (GREUTER, 1972). Since then, an annotated list of floristic records from Crete, drawn up along the same lines as Appendix II here, has been published (GREUTER, 1973), including complete literature references and details on localities and collectors. This has made it possible to simplify considerably Appendix II (excepting the records from the Karpathos island group, not included in the above-mentioned account). In other respects, the report has been updated to cover the relevant literature which has come to my attention up to October 1974.

It would be impossible to close these introductory remarks without paying a special tribute to the work of KARL HEINZ RECHINGER. Writing up this report meant being reminded over and over again of the fact that his publications remain, in almost every field of Botany, the starting point and indispensable base for modern scientific work in our area. I take particular pleasure in dedicating the present account to him.

2. TAXONOMIC LITERATURE

Crete is too small an area to give rise to a considerable revisionary and monographic literature on a purely local basis. Most taxonomic work on Cretan plants is incorporated in papers concerned with a much wider area of study, which need not be mentioned here.

Local revisions, or revisions of endemic groups, include those of *Campanula* by PHITOS (1964), *Lyrolepis* by NORDENSTAM (1960), *Myosotis refracta* by GREUTER & GRAU (1970) and *Teucrium* sect. *Polium* by STRID (1965). Quite a few more are included in my series of papers on the South Aegean flora (GREUTER, 1965, 1967, 1967a, 1968, 1969, 1970). The revision of Aegean *Filago* (WAGENITZ, 1970) and of *Procopiania* (PAWLOWSKI, 1971) also deal with groups whose center of variability lies in the Cretan area. Single descriptions of newly discovered taxa are dealt with in section 5.

3. BIOSYSTEMATIC LITERATURE

The masterly review of the polymorphic Aegean plant groups by RECHINGER (1947) seems likely to inspire many more biosystematic studies than the few, yet notable ones, which have recently been undertaken. It appears that the difficulty of getting hold of adequate plant material for study has deterred students from embarking on Aegean biosystematics. It is hoped that, owing to easier communications and the building-up of working facilities in the country itself, this situation will rapidly improve.

Living plant material of Cretan origin has been used in a large array of biosystematic papers, mainly for chromosome counts and caryogram analyses, and in a few cases (BORRILL, 1961, SNOGERUP, 1967, STRID, 1970, STORK, 1972) also for genetic studies and crossing experiments.

Chromosome counts on Cretan plants can be traced back to BABCOCK & CAMERON (1934, *Crepis*) and UPCOTT & LA COUR (1936, *Tulipa*). I have attempted to list the papers in which information of this kind has been recently published. It must be realized, however, that the following account is by no means exhaustive.

- Achillea* — CONTANDRIOPoulos & MARTIN, 1967.
Allium — BOTHMER, 1970a, 1974.
Alyssoides — CONTANDRIOPoulos, 1969.
Alyssum — CONTANDRIOPoulos, 1969; PERSSON, 1971.
Anthoxanthum — JONES, 1964.
Arisarum — MARCHANT, 1972.
Aristolochia — CONTANDRIOPoulos & ZAFFRAN, 1969.
Arum — MARCHANT, 1972.
Asperula — FAURE & PIETRERA, 1969.
Asplenium — REICHSTEIN et al., 1973.
Aster — CONTANDRIOPoulos & ZAFFRAN, 1969.
Ballota — MIÈGE & GREUTER, 1973.
Brassica — MIÈGE & GREUTER, 1973.
Campanula — PHITOS, 1963, 1964; CONTANDRIOPoulos, 1970.
Cardamine — PERSSON, 1971.
Centaurea — RUNEMARK, 1967b.
Crepis (Melitella) — CONTANDRIOPoulos & ZAFFRAN, 1969.
Dactylis — BORRILL, 1961.
Daucus — ENGSTRAND, 1970.

- Dianthus* — MIÈGE & GREUTER, 1973.
Ebenus — MIÈGE & GREUTER, 1973.
Elymus (Agropyron) — HENEEN & RUNEMARK, 1962, 1972.
Erysimum (incl. *Cheiranthus*) — SNOGERUP, 1967; POLATSCHEK, 1973.
Filago — RUNEMARK in WAGENITZ, 1970.
Galium — FAURE & PIETRERA, 1969.
Hyoscyamus — MIÈGE & GREUTER, 1973.
Hypericum — CONTANDRIOPoulos & LANZALAVI, 1968.
Lavatera — MIÈGE & GREUTER, 1973.
Lecoquicia — CONTANDRIOPoulos & ZAFFRAN, 1969.
Leopoldia — BENTZER, 1969, 1972, 1973, 1974.
Lotus — HEYN, 1966, 1970; HEYN & HERRNSTADT, 1967.
Majorana — BOTHMER, 1970.
Matthiola — MIÈGE & GREUTER, 1973.
Micromeria — STRID, 1965.
Myosotis — GRAU, 1968.
Nigella — STRID, 1965a, 1969, 1970.
Orlaya — ENGSTRAND, 1970.
Papaver — FEINBRUN, 1963, 1963a.
Petromarula — PODLECH & DAMBOLDT, 1964.
Phleum — CONTANDRIOPoulos & ZAFFRAN, 1969.
Phlomis — STRID, 1965.
Plantago — RUNEMARK, 1967.
Ricotia — PERSSON, 1971.
Salvia — BOTHMER, 1970.
Sarcopoterium — MIÈGE & GREUTER, 1973.
Sedum — CONTANDRIOPoulos et al., 1965.
Sideritis — STRID, 1965.
Silene — DAMBOLDT & PHITOS, 1966, 1970; MIÈGE & GREUTER, 1973.
Stachys — STRID, 1965.
Symphyandra — PHITOS, 1966.
Teucrium — STRID, 1965.
Tordylium — RUNEMARK, 1968.
Viola — CONTANDRIOPoulos & ZAFFRAN, 1969.

4. PHYTOSOCIOLOGIC LITERATURE

Here again RECHINGER (1951) has laid a solid base for future work. The papers which have been published subsequently, however, are surprisingly few in number. There is, of course, the very general

study by ZOHARY & ORSHAN (1966), which includes even a vegetation map for the whole of Crete. Two weeks on the island have proved to be a quite insufficient time, however, to get a true picture of the vegetation and of its local peculiarities and problems. Some of the authors' most basic statements have been dismissed as plainly incorrect in a recent overall account of the geobotany of Crete (GREUTER, 1975). KULL (1974), in a more popular paper, came independently to some partly similar interpretations.

The cliff communities of Crete (and other regions) have received the attention of DAVIS (1947, 1951). A very thorough study of the hydrophilous vegetation of western Crete has been published recently (GRADSTEIN & SMITTENBERG, 1968), its results being particularly interesting with respect to the considerable number of floristic discoveries.

The investigation of the vegetation of the Mirtos area (Ierapetra district) by RACKHAM (1972) merits special attention, since it was carried out in an historical context and takes into consideration the evidence of the vegetable remains (charcoals, etc.) found in a settlement of the early Bronze Age. If similar analyses were carried out in other suitable sites all over Crete, this could lead to a fascinating and highly informative overall picture of the island's vegetation in an early stage of its degradation by man.

Finally, there are some scattered phytosociological relevés in the papers of CONTANDRIOPoulos et al. (1965) and ZAFFRAN (1966), being a prelude to a monograph of some of the more important vegetation types (halophytic, chasmophytic and orophytic communities) by the latter author. It can be expected that this treatise, owing to ZAFFRAN's thorough knowledge of Crete, will set new standards in the description of the island's phytosociology. A preliminary note on the orophytic plant communities has already been published (ZAFFRAN, 1972).

5.1 [FLORISTIC LITERATURE

By far the most sizeable contribution to Cretan floristics since the publication of Flora Aegaea is the account of RECHINGER's 1942 expedition to the island (RECHINGER, 1944). There has been some doubt as to the publication date of this work, and as to the correct citation of the new species described in it. Since in the «Nachtrag»

(l. c.: 181-184) several papers published in 1944 are accurately cited, and since at least one of them is explicitly said to have been published «während der Drucklegung», I am now inclined to take 1944 (instead of 1943, as stated on the title-page) as the actual date of publication. This means that the new species should be cited from a preliminary publication (RECHINGER, 1943a) which appeared at the end of 1943, and which is in turn a separately paged preprint from the «Anzeiger» of the Austrian Academy of Sciences.

Since then, only one paper dealing with the botanical results of a particular excursion has been published (DAVIS, 1953), covering both Crete and Karpathos (and also the Anatolian Mikali peninsula). Another purely floristic work providing numerous additional records (not only for Crete) is the supplement to *Flora Aegaea* (RECHINGER, 1949). ZAFFRAN (1970) produced a list of his Cretan collections of Pteridophytes. Collector's itineraries are included in RECHINGER (1944), DAVIS (1953, 1955), and GREUTER (1973).

A number of papers deal with individual floristic discoveries, mostly species new to science: GRADSTEIN & KERN (1968), SEGELEBERG (1966), STRID (1969a), TURRILL (1958), ZAFFRAN (1966, 1967), and several items of my South Aegean series cited in section 2. A good deal of such information is scattered in the «non-Cretan» literature and will be dealt with in the appendices.

There are, of course, several popular accounts in various journals, more or less devoted to Botany, some of which may have escaped my attention. The following may be noted: BARCLAY (1968), GREUTER (1966, 1968a), PATON (1966a, b), RÜCKERODT (1971) and ZAFFRAN (1968). A few older ones, prior to *Flora Aegaea* but not cited therein, contain valuable data: BARNEBY (1939), DAVIS (1937) and GRANT (1939).

Phytosociological relevés also contain floristic information, although it is rather well-known that it is not always quite reliable. Most fortunately, I was allowed to check many specimens corresponding to the papers by ZOHARY & ORSHAN (1966) and GRADSTEIN & SMITTENBERG (1968); the results of their examination have been included in the corresponding appendices, and in my 1973 account covering the Cretan floristics of the post-*Flora-Aegaea* period.

Last, one might mention the treatise of PLATAKIS (1955) on the history of Cretan floristics, which, although it is highly incongruous and full of the most awkward mistakes, contains some valuable informations not easily found elsewhere.

6. PHYTOGEOGRAPHIC LITERATURE

In an insular area like the Aegean, dealing with phytogeography means considering the history of the flora. This is clear from RECHINGER's treatises on the subject (1950, 1951), although at that time knowledge about the geology and former topography of the Aegean was still extremely scanty and hypothetical (it is somewhat more extensive, but still rather hypothetical today). The phytogeographical subdivision of the Aegean, as proposed by RECHINGER, has been fully confirmed, without any serious modification, by all further studies. As a phytogeographical area complementary to, but not conflicting with RECHINGER's, the «Cardaegean» has recently been defined (GREUTER, 1971b).

There has been a sudden rise of interest in present and past Aegean phytogeography in the last few years. A hypothetical general outline of former evolution, intended to provide a basis for discussion and further investigation, has been proposed at a symposium at Halle in 1968 (GREUTER, 1970a). Fundamental problems like the mechanisms of and obstacles to long-range migration (RUNEMARK, 1969), the composition of the flora of small islands (RUNEMARK, 1969, GREUTER, 1972b), the influence of human action on the composition of the flora (GREUTER, 1971) and the evolutionary significance of insular endemism (GREUTER, 1972a) have been discussed with particular reference to our area. Finally, the whole set of problems has been raised on an interdisciplinary level at a symposium at Lund, early in 1971 (STRID, 1971). It looks as if all this were but a humble start to intensive future investigation.

7. CORRECTIONS TO FLORA EUROPAEA

The following species are reported from the Cretan area in volumes 1 and 2 of *Flora Europaea* although they have never been recorded in floristic literature. They include a few reported as aliens (name in brackets) or as doubtful (?). In some cases these species may actually occur in Crete, and unpublished herbarium material may have been checked by the author of the account (e. g., GUIOL's specimens at BM or ATCHLEY's at Kew). However, as long as a positive statement of the source of these records is missing, they should all be regarded as errors. It might be advisable, in the future, to publish possible new records, previous to their inclusion in *Flora*

Europaea, in a special section of the «Notulae», or elsewhere. Another solution would be handing them over to the competent Regional Adviser for publication. As a matter of fact, two of the new records of my Cretan account (GREUTER, 1973) were kindly communicated to me by contributors to Flora Europaea preparing accounts for volumes 3 and 4.

Taxa whose records for the Cretan area are doubtful or erroneous, but were first published independently of Flora Europaea, are not included in this section, but are to be found in Appendix III.

Taxa whose distribution, as given in Flora Europaea, includes the Cretan area, although they have never been recorded from there (nomenclature and sequence as in Flora Europaea)

<i>Ophioglossum vulgatum</i>	<i>Alliaria petiolata</i>
<i>Thesium divaricatum</i>	<i>[Alyssum corsicum]</i>
<i>Aristolochia clematitis</i>	<i>Camelina sativa</i>
<i>A. rotunda</i>	<i>C. microcarpa</i>
<i>A. pallida</i>	<i>C. alyssum</i>
<i>A. longa</i>	<i>Biscutella laevigata</i>
<i>[Amaranthus cruentus]</i>	<i>Lepidium ruderale</i>
<i>A. lividus</i>	<i>Cercis siliquastrum</i>
<i>Moehringia trinervia</i>	<i>Vicia cracca</i>
<i>Lychnis flos-cuculi</i>	<i>Trifolium hybridum</i>
<i>Silene alba</i>	<i>T. vesiculosum</i>
<i>Saponaria officinalis</i>	<i>T. incarnatum</i>
<i>Nigella degenerii</i>	<i>Viola suavis (?)</i>
<i>Anemone blanda (?)</i>	<i>V. alba</i>
<i>A. pavonina</i>	<i>V. kitaibeliana</i>
<i>Clematis viticella</i>	<i>Tamarix dalmatica</i>
<i>Thalictrum minus</i>	<i>Hippuris vulgaris</i>
<i>Chelidonium majus</i>	<i>Apium repens</i>
<i>Fumaria judaica</i>	

On the other hand, a number of taxa are not mentioned from the Cretan area in the first 2 volumes of Flora Europaea, although they actually occur there, and are recorded in RECHINGER's Flora Aegaea. (If they are not, or only doubtfully, included there, the taxa are considered as floristic novelties and not listed in this section, but in Appendix II). In most cases, the indication «Cr» in the distribution was obviously dropped through an oversight; in a few instances, however; correct records were explicitly given as doubtful (?).

Taxa whose distribution, as given in *Flora Europaea*, does not include the Cretan area, although they occur there, and were recorded in *Flora Aegaea* (nomenclature and sequence as in *Flora Europaea*)

<i>Juniperus oxycedrus</i> subsp. <i>oxycedrus</i>	<i>Ononis natrix</i> subsp. <i>ramosissima</i>
<i>J. oxycedrus</i> subsp. <i>macrocarpa</i>	<i>O. natrix</i> subsp. <i>hispanica</i>
<i>Rumex tuberosus</i> subsp. <i>creticus</i>	<i>O. ornithopodioides</i>
<i>Atriplex tatarica</i> (recte: <i>A. recurva</i>)	<i>Melilotus messanensis</i>
[<i>Amaranthus viridis</i>]	<i>Medicago arabica</i>
<i>Portulaca oleracea</i> subsp. <i>oleracea</i>	<i>Trifolium lappaceum</i>
<i>Stellaria neglecta</i>	<i>Ornithopus pinnatus</i>
<i>Anemone hortensis</i>	<i>Linum decumbens</i>
<i>Fumaria kralikii</i>	<i>Rhamnus alaternus</i>
<i>F. officinalis</i>	<i>Thymelaea tartonraira</i> subsp. <i>tartonraira</i>
<i>Matthiola sinuata</i>	<i>Viola idaea</i> (?) = <i>V. reichenbachiana</i>
<i>Diplotaxis viminea</i>	<i>Hydrocotyle vulgaris</i>
<i>Rubus sanctus</i>	<i>Apium nodiflorum</i>
<i>Vicia tenuissima</i>	
<i>Lathyrus amphicarpos</i> (?)	

Volume 3 of *Flora Europaea* has attained a much higher degree of accuracy, with respect to the «Cr» distributional records, than its two predecessors. Of the following few remarks, one refers to an obvious printing error, and in two cases the information was received too late for inclusion.

Cyclamen persicum: Cr has been omitted, although the occurrence on Karpathos is correctly mentioned.

Cerinthe retorta (?Cr): the hitherto only record from Crete was certainly unreliable, but the species was discovered there in 1972 by I. PETAMIDHIS.

Calamintha incana (?Cr): the Cretan records of this species are indeed very dubious, but there seems to be no reason to dismiss those from Karpathos by DAVIS (1953) which had escaped my attention.

Veronica beccabunga: discovered in Kriti in 1971 by I. PETAMIDHIS (GREUTER, 1973).

Appendix I — Novelties

This Appendix lists taxa of all ranks (whether accepted or not), as well as hybrids, described from type material from the Cretan area and not mentioned in *Flora Aegaea* (RECHINGER, 1943). It also includes names of taxa transferred to a new rank since 1943, provided that their type is from the

Cretan area. Invalid yet effectively published names are included, but designated as such. The sequence is alphabetical.

- Adonis aestivalis* subsp. *cretica* (Huth) Steinberg 1971: 318 = *A. dentatus* subsp. *creticus* (Huth) Riedl 1963: 76.
- Alcea pallida* subsp. *cretica* (Weinm.) D. A. Webb in Heywood 1967: 27.
- Alyssum campestre* var. *subumbellatum* Rechinger 1944: 77.
— *fragillimum* (Bald.) Rechinger 1943a: 3; 1944: 77.
- Ammanthus*: vide *Anthemis*.
- Androcymbium rechingeri* Greuter 1967a: 248.
- Anemone hortensis* subsp. *heldreichii* (Boiss.) Rechinger 1944: 74.
- Anthemis ammanthus* Greuter 1968: 145.
— — subsp. *paleacea* Greuter 1968: 146.
— *filicaulis* f. *discoidea* Greuter 1968: 148.
— *glaberrima* (Rech. fil.) Greuter 1968: 148 = *Ammanthus glaberrimus* Rechinger 1943a: 7; 1944: 145.
— *tomentella* Greuter 1968: 148.
- Arabis serpyllifolia* subsp. *cretica* (Boiss. & Heldr.) B. M. G. Jones in Heywood 1964: 60.
- Arenaria saponarioides* subsp. *Boissieri* (Pax) McNeill 1963: 289.
- Asperula idaea* var. *fallax* Rechinger 1944: 133.
— — var. *lassitica* Rechinger 1944: 133.
— — var. *tournefortii* var. *majori* (Barbey) Rechinger 1944: 132.
— — var. *revoluta* Rechinger 1944: 132.
- Asplenium aegaeum* Lovis & al. in Reichstein & al. 1973: 141.
— *creticum* Lovis & al. in Reichstein & al. 1973: 145.
— *scolopendrium* subsp. *antri-jovis* (Kümmerle) Brownsey & Jermy 1973: 346.
- Aster* sect. *Aegaeaster* Rechinger 1949: 212.
- Astragalus austro-aegaeus* Rechinger 1949: 202 = *A. tauricola* subsp. *austro-aegaeus* (Rech. fil.) Ponert 1973: 620.
- Bellevalia brevipedicellata* Turrill 1940: 264.
- Biarum davisii* Turrill 1938: 437.
- Bolanthus creutzburgii* Greuter 1965: 210.
- Bromus caroli-henrici* Greuter 1971a: 83.
- Bufonia stricta* subsp. *cecconiana* (Bald.) Rechinger 1947: 159.
- Bupleurum kakiskalae* Greuter 1967: 250.
- Callitricha pulchra* Schotsman 1967: 40.
- Campanula aizoides* Zaffran 1966: 71, *nomen invalidum*, ex Greuter 1972: 15
(typus: Zaffran s. n., 16.7.1965, herb. Greuter = *C. aizoon* subsp. *aizoides* (Zaffran ex Greuter) Fedorov in Heywood 1973: 281).
- *creutzburgii* Greuter in Greuter & Rechinger 1967: 134 = *C. drabifolia* subsp. *creutzburgii* (Greuter) Fedorov in Heywood 1973: 281.
— *pinatzzii* Greuter & Phitos in Greuter & Rechinger 1967: 134 = *C. drabifolia* subsp. *pinatzzii* (Greuter & Phitos) Fedorov in Heywood 1973: 281.
— *spatulata* subsp. *filicaulis* (Halász) Phitos 1964a: 228.
- Carex cretica* Gradstein & Kern 1968: 242.
- Carlina barnebiana* Burtt & Davis 1949: 103.

- *diae* (Rech. fil.) Meusel & Kästner 1972: 228 = *Lyrolepis diae* Rechinger 1943a: 7; 1944: 147.
- subgen. *Lyrolepis* (Rech. fil.) Meusel & Kästner 1972: 228 = *Lyrolepis* Rechinger 1943a: 7; 1944: 147.
- Carthamus leucocaulos* var. *subarachnoideus* Davis 1953: 128.
- *rechingeri* Davis 1953: 128.
- Centaurea argentea* var. *brachythysana* Rechinger 1944: 151.
- — var. *macrothysana* Rechinger 1944: 151.
- *poculatoris* Greuter 1967: 252.
- *spruneri* subsp. *minoa* (Bolss.) Rechinger 1944: 151.
- Cerastium brachypetalum* subsp. *doerfleri* (Hayek) P. D. Sell & Whitehead in Heywood 1964: 18.
- Chaenorhinum idaeum* Rechinger 1943a: 4; 1944: 111 = *Ch. minus* subsp. *idaeum* (Rech. fil.) R. Fernandes in Heywood 1971: 229.
- Clematis elisabethae-carolae* Greuter 1965: 213.
- Colchicum cousturieri* Greuter 1967a: 247.
- *cretense* Greuter 1967a: 246.
- *macrophyllum* Burtt 1951: 433.
- Convolvulus argyrothamnos* Greuter 1967: 251.
- *oleifolius* var. *scopulorum* Rechinger 1944: 107.
- Corydalis rutifolia* subsp. *uniflora* (Sieber) Cullen & P. H. Davis in Cullen 1963: 45.
- Cotyledon umbilicus-veneris* var. *lassithiensis* (Gand.) Rechinger 1949: 201.
- Crataegus aegeica* Pojarkova 1960: 188 = *C. monogyna* subsp. *aegeica* (Pojark.) Franco in Heywood 1968: 37.
- Crepis foetida* subsp. *sitiaca* Rechinger 1943a: 8; 1944: 163.
- *tybakiensis* var. *flexiscapa* (Rech. fil.) Greuter 1972: 16 = *C. flexiscapa* Rechinger 1943a: 8; 1944: 164.
- Crocus oreocreticus* B. L. Burtt in Rechinger 1949: 224.
- Cuscuta atrans* Feinbrun 1970: 22.
- Cymbalaria microcalyx* subsp. *dodekanesi* Greuter in Greuter & Rechinger 1967: 108.
- — var. *heterosepala* (Cuf.) Cufodontis 1947: 151 = *Linaria microcalyx* var. *heterosepala* Cuf. in Rechinger 1944: 110.
- Dianthus aciphyllus* var. *bauhinorum* Greuter 1965: 190.
- *juniperinus* subsp. *heldreichii* Greuter 1965: 187.
- *pulviniformis* Greuter 1965: 189.
- Eloides*: vide *Hypericum*.
- Elymus diae* Heneen & Runemark 1962: 550, *nomen nudum*.
- Erysimum candicium* Snogerup 1967a: 34.
- — subsp. *carpathum* Snogerup 1967a: 38.
- Euphorbia dimorphocaulon* P. H. Davis in Rechinger 1949: 196.
- *rechingeri* Greuter 1965: 170.
- Filago aegaea* Wagenitz 1970: 126.
- Fumana paphlagonica* subsp. *alpina* (Janchen) Greuter 1972: 26.
- Galium graecum* subsp. *pseudo-canum* Ehrendorfer 1958: 254.
- *incanum* subsp. *creticum* Ehrendorfer 1951: 453.
- Herniaria parnassica* subsp. *cretica* Chaudhri 1968: 333.
- — var. *cretica* Chaudhri 1968: 333.

- — var. *hirtella* Chaudhri 1968: 333.
- Hypericum aciferum* (Greuter) N. K. B. Robson in Heywood 1967: 23 = *Elodes acifera* Greuter 1965: 215.
- Inula candida* subsp. *decalvans* (Halász) P. W. Ball in Heywood 1973: 282.
- *pseudolimonella* (Rech. fil.) Rechinger 1943a: 7; 1944: 140.
- Lamium bifidum* subsp. *albimontanum* Rechinger 1943a: 5; 1944: 120.
- Leopoldia dionysica* (Rech. fil.) Greuter 1972: 17 = *Muscati dionysicum* Rechinger 1943a: 8; 1944: 167.
- Limonium graecum* var. *stenotatum* Rechinger 1944: 105.
- *hierapetrae* Rechinger 1943a: 4; 1944: 104.
- *sitiacum* Rechinger 1943a: 4; 1944: 103.
- Linaria*: vide *Cymbalaria*.
- Lolium crassiculme* Rechinger 1943a: 9.
- Lyrolepis*: vide *Carlina*.
- *piae* Nordenstam 1960: 452.
- Majorana leptoclados* Rechinger 1943a: 6; 1944: 125 = *Origanum × minoanum* Davis 1953: 137.
- *onites* var. *cylindricus* Rechinger 1944: 127.
- Medicago* sect. *Heyniana* Greuter 1970: 189.
- *heyniana* Greuter 1970: 190.
- Melittella rechingeri* Zaffran 1967: 808.
- Mentha longifolia* f. *rivularum* Petrak in Rechinger 1944: 128.
- *pulegium* f. *acutifolia* Petrak in Rechinger 1944: 129.
- *villosa* f. *crenulata* Petrak in Rechinger 1944: 128.
- — f. *parvifolia* Petrak in Rechinger 1944: 128.
- *viridis* f. *frivaldszkyana* Briq. ex Petrak in Rechinger 1944: 129.
- — f. *undulata* Petrak in Rechinger 1944: 129.
- Micromeria*: vide etiam *Thymbra*.
- *carpatha* Rechinger 1949: 208.
- *tapeinantha* Rechinger 1943a: 6; 1944: 123.
- Muscati*: vide etiam *Leopoldia*.
- *amoenocomum* Rechinger 1943a: 9; 1944: 168.
- Myosotis refracta* subsp. *aegagrophila* Greuter & Grau 1970: 8.
- Nepeta sphaciotica* Davis 1953: 136.
- Nigella arvensis* subsp. *brevifolia* Strid 1970: 44.
- *carpatha* Strid 1970: 49.
- *stricta* Strid 1970: 63.
- Noccaea cretica* (Degen & Jávorka) F. K. Meyer 1973: 466.
- Odontites linkii* subsp. *cretica* (Boiss.) Greuter 1973: 51.
- Onobrychis sphaciotica* Greuter 1965: 213.
- Ononis spinosa* subsp. *diacantha* (Reichenb.) Greuter in Greuter & Rechinger 1967: 75.
- Ophrys cretica* (Vierh.) Nelson 1962: 146.
- — subsp. *karpathensis* Nelson 1962: 148, *nomen invalidum*.
- *fusca* subsp. *omegaifera* (Fleischm.) Nelson 1962: 209.
- *holosericea* subsp. *maxima* (Fleischm.) Greuter in Greuter & Rechinger 1967: 185.
- Origanum*: vide *Majorana*.

- Paronychia macrosepala* var. *cretica* Chaudhri 1968: 280.
Petrorhagia candica Ball & Heywood 1964: 141.
Phagnalon graecum var. *glabrifolium* Rechinger 1944: 140.
Phlomis × *commixta* Rechinger 1943a: 5; 1944: 117.
— *lanata* var. *cardiostegia* Rechinger 1944: 117.
Pimpinella tragium subsp. *depressa* (DC.) Tutin in Heywood 1968: 62.
Procopiana cretica var. *squamulata* Pawłowski 1971: 45.
— *insularis* Pawłowski 1971: 45.
Ptilostemon chamaepeuce var. *elegans* Greuter 1973a: 117.
Rhamnus oleoides subsp. *microphylla* (Halász) Davis 1953: 115.
Rubus sanctus var. *chaniensis* Scheffer in Rechinger 1944: 89.
— — var. *cretensis* Scheffer in Rechinger 1944: 88.
Salsola carpatha Davis 1953: 139.
Sanguisorba minor subsp. *psiloritica* Rechinger 1943a: 4; 1944: 90.
Satureja thymbra var. *hirsutissima* Rechinger 1944: 121.
Scabiosa albocincta Greuter 1967a: 242.
— *atropurpurea* subsp. *chaniotica* Rechinger 1944: 137 = *S. purpurea* subsp. *chaniotica* Rechinger 1943a: 6.
— *cretica* subsp. *carpatha* Davis 1953: 126.
— *minoana* (P. H. Davis) Greuter 1967a: 241 = *S. cretica* subsp. *minoana* Davis 1953: 126.
— — subsp. *asterusica* Greuter 1967a: 241.
— *sphaciotica* subsp. *decalvans* (Halász) Rechinger 1944: 136.
Scaligeria halophila (Rech. fil.) Rechinger 1965: 186 = *S. cretica* subsp. *halophila* Rechinger 1943a: 4; 1944: 102.
Sedum hierapetrae Rechinger 1943a: 4; 1944: 86.
— *laconicum* subsp. *insulare* (Rech. fil.) Greuter & Rechinger 1967: 67 = *S. laconicum* var. *insulare* Rechinger 1944: 87 = *S. idaeum* D. A. Webb in Heywood 1961: 20.
Serapias Rassenkreis orientalis var. *cordigeroides* Nelson 1968: 14, 18, *nomen invalidum*.
— *vomeracea* subsp. *orientalis* Greuter 1972: 19 = *S. Rassenkreis orientalis* Nelson 1968: 16, *nomen invalidum* (diagnosis), subsp. *orientalis* Nelson 1968: 17, *nomen invalidum* (typus).
Serratula cichoracea subsp. *cretica* Turrill 1958: 391.
Seseli gummiferum subsp. *aegaeum* Davis 1953: 120.
Silene ammophila subsp. *carpathae* Chowdhuri 1957: 278.
— *dictaea* Rechinger 1943a: 3; 1944: 72.
Telephium imperati var. *pauciflorum* Greuter 1965: 179.
Teucrium alpestre subsp. *gracile* (Barbey & Major) D. Wood in Heywood 1972: 261.
— *gossypinum* Rechinger 1943a: 5; 1944: 115.
— *montbretii* subsp. *heliotropifolium* (Barbey) Davis 1953: 138.
— — var. *crenatum* Davis 1953: 139.
Thymbra sect. *Neothymbra* Rechinger 1962: 69.
— *calostachya* (Rech. fil.) Rechinger 1962: 64 = *Micromeria calostachya* Rechinger 1943a: 6; 1944: 122.
Tragopogon lassithicus Rechinger 1943a: 8; 1944: 156.

Trifolium physodes var. *mirabile* Rechinger 1944: 96.

— *rechingeri* Rothmaler 1944: 438.

Tulipa bakeri Hall 1939: 316.

Veronica kavusica Rechinger 1943a: 5; 1944: 112.

Appendix II — Additional records

The following list is arranged in the order of Flora Aegaea (RECHINGER, 1943), since it is intended as a supplement to that work, as far as the Cretan area is concerned. It contains three kinds of records:

- Records published previous to Flora Aegaea, but not included in that work.
- New records published since 1943.
- Records of taxa whose occurrence in the Cretan area was doubtful according to RECHINGER (1943), or had not been confirmed since SIBTHORP's and SIEBER's times, but which have been recently rediscovered.

Only species, subspecies and hybrids have been included. The taxonomy and nomenclature do not follow a particular work, but are based, as a rule, on personal judgement. The appropriate status of new records has been carefully considered and, in most cases, specimens have been checked in order to avoid the propagation of new errors. Apparent new records, due only to synonymous name changes (or to former very general misnaming), have been dismissed; locally misnamed taxa, however, have been included. A number of records from the genera *Allium*, *Arenaria*, *Asperula*, *Athamanta*, *Hypericum*, *Mentha* and *Myosotis* unfortunately had to be omitted, since they refer to new taxa as yet unnamed.

The names of plants recorded from Crete and the neighbouring islands are followed by a number in boldface print, which refers to the numbering in my more extensive list (GREUTER, 1973) giving literature sources, localities, collectors etc. Records from the Karpathos island group (**Kp** = Karpathos, **Ks** = Kasos, **Sa** = Saria) include collector's name (in italics, for unpublished records only) and literature references. Names of taxa not native to the Cretan area are in brackets. Those of taxa not recorded for «Cr» in Flora Europaea (TUTIN et al., 1964-1972) are preceded by an asterisk (*).

Pteris vittata L.: 1.

* *Pteridium aquilinum* (L.) Kuhn subsp. *brevipes* (Tausch) Wulf: 2.

* *Woodwardia radicans* (L.) Sm.: 3.

* *Christella dentata* (Forsskål) Brownsey & Jermy: Brownsey & Jermy 1973.

* *Cyclosorus dentatus* (Forsskål) R. C. Ching: 4.

* *Asplenium viride* Hudson: 5.

* *A. trichomanes* L. subsp. *inexpectans* Lovis: 6.

* *A. obovatum* Viv.: 7.

* *A. ruta-muraria* L.: 8.

* *A. creticum* Lovis et al.: 9.

- * *A. aegaeum* Lovis et al.: 10.
- * *A. lepidum* C. Presl: 11.
- * *A. haussknechtii* Godet & Reuter: 12.
- A. trichomanes* L. subsp. *quadrivalens* D. E. Meyer \times *A. creticum* Lovis et al.: 13.
- A. trichomanes* L. subsp. *quadrivalens* D. E. Meyer \times *A. lepidum* C. Presl (*A. \times aprutianum* Lovis et al.): 14.
- A. ruta-muraria* L. \times *A. lepidum* C. Presl (*A. \times javorkae* Kümmerle): 15.
- A. ruta-muraria* L. \times *A. haussknechtii* Godet & Reuter: 16.
- Polystichum lonchitis* (L.) Roth: 17.
- * *P. setiferum* (Forsskål) Woynar: 18.
- * *Ulmus canescens* Melville: 19.
- * *Celtis tournefortii* Lam.: 20.
- Rumex conglomeratus* Murray \times *R. pulcher* L. subsp. *divaricatus* (L.) Murb.: 21.
- * *Polygonum longipes* Halácsy & Charrel: 22.
- P. arenarium* Boreau: 23.
- Fallopia convolvulus* (L.) A. Löve: 24.
- Euphorbia dimorphocaulon* P. H. Davis: 25.
- E. aleppica* L. («*Tithymalus ciparissias creticus*», Alpino 1627?): Greuter, Ks
- E. rechingeri* Greuter: 26.
- * *Beta macrocarpa* Guss.: Greuter, Kp.
- * *Atriplex triangularis* Willd. (agg.): «*A. cf. hastata*», 27.
- * *Halimione portulacoides* (L.) Aellen: 28.
- Arthrocnemum perenne* (Miller) Moss: 29; Herrn!, Kp.
- Salicornia europaea* L.: 30.
- Salsola carpatha* P. H. Davis («*S. vermiculata*», Major & Barbey 1894, 1895; Stefani et al. 1895): 31; Davis 1953, Greuter, Kp, Sa.
- S. aegaea* Rech. fil.: 32; Davis 1953, Runemark 1969; Ks.
- * *Noaea mucronata* (Forsskål) Ascherson & Schweinf.: Greuter, Ks.
- * [*Amaranthus albus* L.]: 33; Herrn!, Kp.
- * [*Aptenia cordifolia* (L. fil.) N. E. Br.]: Crete, distr. Mirambello, Ajios Nikolaos, 17.5.1966, Zaffran 4229!, et 17.10.1973, Hansen 1077! (not in Greuter 1973).
- * *Montia fontana* L. subsp. *chondrosperma* (Fenzl) Walters: 34.
- * *Spergularia lycia* Monnier & Quézel: 35
- * *Scleranthus verticillatus* Tausch: 36.
- Minuartia mesogitana* (Boiss.) Hand.-Mazz. (var. *orphanidis* (Boiss.) McNeill): 37.
- Arenaria aegaea* Rech. fil.: 38; Runemark 1969, Kp.
- * *A. gucciardii* Boiss.: 39.
- Saponaria glutinosa* Marsch. Bieb.: 40.
- * *Bolanthus creutzburgii* Greuter: 41.
- * *Petrorhagia illyrica* (L.) P. W. Ball & Heywood subsp. *taygetea* (Boiss.) P. W. Ball & Heywood: 42.
- P. candica* P. W. Ball & Heywood: 43.
- * *Dianthus pulviniformis* Greuter: 44.
- * *D. juniperinus* Sm. subsp. *heldreichii* Greuter: 45.
- * *D. cinnamomeus* Sm. («*D. xylorrhizus*», Major & Barbey 1894!); Greuter 1971b, Greuter, Ks.

- Silene ammophila* Boiss. & Heldr. subsp. *carpathae* Chowdhuri: Chowdhuri 1957!, Greuter; Kp.
- * *S. macrodonta* Boiss.: Greuter, Kp.
- * *S. fuscata* Link: Crete, distr. Pedhias, c. 15 km E. of Iraklio, coll. by a Cambridge student, det. A. O. Chater, comm. S. M. Walters (not in Greuter 1973).
- * *S. cerastoides* L.: 46.
- * *S. discolor* Sm. («*S. bipartita?*», Stefani et al. 1895!): Greuter, Kp.
- S. dictaea* Rech. fil.: 47.
- * *S. holzmannii* Boiss.: 48.
- * *Aristolochia parvifolia* Sm.: Greuter, Ks.
- * *Cytinus hypocistis* (L.) L. subsp. *hypocistis*: 50; Greuter, Kp.
- * *C. ruber* (Fourr.) Komarov: 51; Greuter, Kp, Ks.
- * *Garidella unguicularis* Lam.: 52.
- * *Nigella carpatha* Strid: Strid 1970!, Kp.
- * *N. stricta* Strid: 53.
- * *Clematis elisabethae-carolae* Greuter: 55.
- * *Ranunculus saniculifolius* Viv.: 56.
- Nymphaea alba* L.: 57.
- * *Ceratophyllum demersum* L.: 58.
- * *Papaver pseudo-haussknechtii* Fedde: 59.
- * *P. nigrotinctum* Fedde: Greuter, Kp.
- * *P. apulum* Ten.: 60.
- * *Fumaria petteri* Reichenb. subsp. *thuretii* (Boiss.) Pugsley: 61.
- * *Erysimum candicum* Snogerup: 62.
- * *E. candicum* Snogerup subsp. *carpathum* Snogerup: («*Cheiranthus corinthius*», Stefani et al. 1895!): Snogerup 1967; Kp, Sa.
- * *Isatis lusitanica* L.: Greuter, Kp.
- * *Fibigia lunarioides* (Willd.) Sm.: 64.
- * *Aurinia saxatilis* (L.) Desv. subsp. *megalocarpa* (Hausskn.) Dudley: 65.
- * *Alyssum smyrnaeum* C. A. Meyer: 66.
- A. umbellatum* Desv.: 67.
- A. strigosum* Banks & Solander: Persson 1971, Sa.
- * *A. siculum* Jordan: 68.
- Draba muralis* L.: 69.
- Teesdalia coronopifolia* (J. P. Bergeret) Thell.: 70.
- * *Helianthemum stipulatum* (Forsskål) C. Chr.: 71.
- * *Fumana paphlagonica* Bornm. & Janchen subsp. *alpina* (Janchen) Greuter: 72.
- Hypericum aciferum* (Greuter) N. K. B. Robson: 73.
- H. trichocaulon* Boiss. & Heldr. × *H. kelleri* Bald.: 74.
- [*Gossypium arboreum* L.]: 75.
- Alcea pallida* (Willd.) Waldst. & Kit. subsp. *cretica* (Weinm.) D. A. Webb: 76.
- A. setosa* (Boiss.) Alef.: 77.
- * *Radiola linoides* Roth: 78.
- * [*Oxalis corymbosa* DC.]: 79.
- Erodium hirtum* (Forsskål) Willd.: 80.
- * [*Ailanthes altissima* (Miller) Swingle]: 81.
- Cotinus coggygria* Scop.: 82.

- Rhus coriaria* L.: 83.
Sedum hierapetrae Rech. fil.: 84.
S. laconicum Boiss. subsp. *insulare* (Rech. fil.) Greuter & Rech. fil.: 85.
Umbilicus rupestris (Salisb.) Dandy: 86.
* *Saxifraga graeca* Boiss.: 87.
* *Agrimonia eupatoria* L.: Greuter, Herrn!; Kp.
Crataegus aegeica Pojark. («*C. monogyna*» et «*C. oxyacantha*», Stefani et al. 1895!; «*C. monogyna*», Rechinger 1943 partim!): Pojarkova 1960!, Greuter, Stamatiadhou!: Kp.
* [*Gleditsia triacanthos* L.]: 88.
Astragalus austro-aegaeus Rech. fil. («*A. tauriculus*», Major & Barbey 1894a!, Rechinger 1943; *A. tauriculus* var. *niveus* Barbey, Barbey 1886!, Stefani et al. 1895!): Rechinger 1949, Greuter, Stamatiadhou!: Kp, Ks.
* *Pisum pumilio* (Meikle) Greuter: 90.
* *Trigonella graeca* (Boiss. & Spruner) Boiss.: 93.
T. rechingeri Sirj.: 94.
* *Medicago heyniana* Greuter: Greuter 1970, Kp.
Melilotus italicica (L.) Lam.: 95; Greuter, Kp.
* [*Trifolium alexandrinum* L.]: 96.
* *T. ligusticum* Loisel.: 97.
Anthyllis aegaea Turrill: 98.
* *Hippocrepis multisiliquosa* L.: Greuter, Kp.
Onobrychis sphaciotica Greuter: 100.
* *Epilobium lanceolatum* Sebastiani & Mauri: 101.
Callitricha pulchra Schotsman: 102.
C. cophocarpa Sendlner: 103.
* *Eryngium amorginum* Rech. fil.: 104.
* *Bupleurum kakiskalae* Greuter: 105.
B. gracile Urv.: 106; Snogerup 1962, Greuter; Kp, Ks, Sa.
* *Ridolfia segetum* Moris: Herrn!, Kp.
Carum multiflorum (Sm.) Boiss.: 107; Greuter, Kp, Ks, Sa.
* *Pimpinella pretenderis* (Heldr.) Halász («*P. tragium*», Stefani et al. 1895!; «*P. tragium*» var. *depressa*, Rechinger 1943 partim): «*P. tragium*» aff. var. *depressae*, Davis 1953; Greuter; Kp.
Selinum silaifolium (Jacq.) G. Beck: 109.
[*Anethum graveolens* L.]: 110.
* *Tordylium hirtocarpum* Candargy: Runemark 1968, Greuter; Kp, Sa.
* *Elaeoselinum asclepium* (L.) Bertol. («*Ferulago asparagifolia*», Stefani et al. 1895!): Kp.
Scandix australis L. subsp. *balcanica* Vierh.: 111.
Scaligeria halophila (Rech. fil.) Rech. fil.: 112.
[*Plumbago capensis* Thunb.]: 113.
Ipomoea stolonifera (Cyr.) J. F. Gmelin: 116.
* [*I. acuminata* (Vahl) Roemer & Schultes]: Crete, distr. Mirambello, Kalo Horio, 16.10.1973, Hansen 1040 (not in Greuter 1973).
Convolvulus argyrothamnos Greuter: 117.
C. libanoticus Boiss.: 118.
C. siculus L.: 119; Greuter, Kp.

- Calystegia soldanella* (L.) R. Br.: 120.
Cuscuta atrans Feinbrun: 121.
C. brevistyla A. Braun: 122.
Procopiana insularis Pawl. («*Psilotemon orientale*», Stefani et al. 1895!): «*Symphtym creticum*», Runemark 1967a partim; Pawłowski 1971; Greuter, Stamatiadhou!; Kp, Ks, Sa.
Myosotis congesta Shuttlew.: 124.
M. refracta Boiss. subsp. *paucipilosa* Grau: 125.
M. refracta Boiss. subsp. *aegagrophila* Greuter & Grau: 126.
*[*Solanum elaeagnifolium* Cav.]: Yannitsaros & Economidou 1974, Crete (not in Greuter 1973).
* [*Datura innoxia* Miller]: Crete, distr. Mirambello, Elounda, 17.10.1973, Hansen 1063 (not in Greuter 1973).
Verbascum sinuatum L. × *V. macrurum* Ten.: 127.
Chaenorrhinum idaeum Rech. fil.: 128.
[*Cymbalaria muralis* P. Gaertner et al.]: 129.
C. microcalyx (Boiss.) Wettst. subsp. *dodekanesi* Greuter («*Linaria microcalyx*», Stefani et al. 1895!; *id.*, Rechinger 1943 partim!); *id.*, Davis 1953; Greuter & Rechinger 1967; Greuter, Stamatiadhou!; Kp, Sa.
Veronica sartoriana Boiss. & Heldr.: 130.
* *V. beccabunga* L.: 131.
Odontites linkii Boiss. subsp. *cretica* (Boiss.) Greuter: 132; «*O. linkii*», Davis 1953; Greuter; Kp.
Utricularia cf. *vulgaris* L.: 133.
Orobanche oxyloba (Reuter) G. Beck: 134.
O. sanguinea C. Presl: 135.
Teucrium flavum L. subsp. *gymnocalyx* Rech. fil.: 136.
Nepeta sphaciotica P. H. Davis: 137.
Phlomis cretica C. Presl × *Ph. lanata* Willd. (*Ph. × commixta* Rech. fil.): 138.
Lamium bifidum Cyr. subsp. *albimontanum* Rech. fil.: 139.
Micromeria tapeinantha Rech. fil.: 140.
Calamintha incana (Sm.) Boiss. (Gandoger 1916, 1920??): Davis 1953, Kp.
Clinopodium vulgare L. subsp. *orientale* Bothmer: 142.
Thymbra calostachya (Rech. fil.) Rech. fil.: 143.
Amaracus tournefortii (Aiton) Bentham: 144.
Majorana microphylla Bentham × *Origanum heracleoticum* L.: 145.
Mentha viridis L.: 146.
Plantago altissima L.: 147.
Periploca angustifolia Labill.: 148.
Cynanchum acutum L.: 149.
Asperula taygetea Boiss. & Heldr.: Crete, distr. Kissamos, Falasarna, 20.4.1973, B. & V. Burbidge 324! (not in Greuter 1973).
Galium heldreichii Halácsy: 150.
G. amarginum Halácsy («*G. aureum*», Stefani et al. 1895!): 151; «*G. incurvum*», Davis 1953; Greuter; Kp.
G. incanum Sm. subsp. *creticum* Ehrend.: 152.
G. graecum L. subsp. *pseuo-canum* Ehrend.: 153.
Knautia integrifolia (L.) Bertol. subsp. *mimica* (Borbás) Greuter: 155.

- Scabiosa minoana* (P. H. Davis) Greuter subsp. *minoana*: 156.
S. minoana (P. H. Davis) Greuter subsp. *asterusica* Greuter: 157.
S. albocincta Greuter: 158.
Campanula creutzburgii Greuter: 160.
C. pinatzzii Greuter & Phitos («*C. drabifolia*», Major & Barbey 1894!; *id.*, Stefani et al. 1895!): Greuter & Rechinger 1967; *Phitos, Greuter, Stamatiadhou!*; **Kp, Ks, Sa**.
C. aizoides Zaffran: 161.
[*Eupatorium adenophorum* Sprengel]: 162.
Aster tripolium L.: 163.
[*A. squamatus* (Sprengel) Hier.]: 164.
[*Conyza canadensis* (L.) Cronq.]: 165.
Filago eriosphaera (Boiss. & Heldr.) Chrtek & Holub: Wagenitz 1969, **Kp**.
F. aegaea Wagenitz subsp. *aegaea* («*F. spathulata* f. *cretensis*», Rechinger 1943 partim): 167; Wagenitz 1970; **Kp** (Sa: transitional to the following).
F. aegaea Wagenitz subsp. *aristata* Wagenitz («*Evax cretensis*», Rechinger 1943 partim): 168; Wagenitz 1970; **Kp**.
E. cretensis Gand. subsp. *cycladum* Wagenitz: Wagenitz 1970, **Sa**.
Dittrichia graveolens (L.) Greuter: 169; *Herrn!*, **Kp**.
[*Xanthium saccharatum* Wallr.]: «*X. brasiliicum*» (lapsu!), 170.
[*X. spinosum* L.]: 171.
Anthemis scopulorum Rech. fil. (agg.): Greuter, **Kp**.
A. ammanthus Greuter subsp. *paleacea* Greuter: 172.
A. tomentella Greuter: 173.
A. glaberrima (Rech. fil.) Greuter: 174.
A. rigida Heldr. subsp. *liguliflora* (Halász) Greuter («*A. peregrina* var. *heracleotica*», Stefani et al. 1895!): *Herrn!*; **Kp**.
Carlina diae (Rech. fil.) Meusel & Kästner: 175.
Carduus argentatus L. («*Tyrimnus leucographus*», Major & Barbey 1894a!; *id.*, Stefani et al. 1895!): 176; «*Carduus acicularis*», Kazmi 1964; Greuter, *Stamatiadhou!*; **Kp, Ks, Sa**.
Ptilostemon gnaphaloides (Cyr.) Soják subsp. *pseudofruticosus* (Pamp.) Greuter: 177.
Serratula cichoracea (L.) DC. subsp. *cretica* Turrill: 179.
Centaurea poculatoris Greuter: 180.
C. melitensis L. (*C. lyra*, Sieber 1820, 1821a?): Greuter, **Kp**.
Aegialophila pumilio (L.) Boiss. & Heldr.: 181.
Carthamus rechingeri P. H. Davis (an *C. leucocaulos* Sm. × *C. boissieri* Halász?); Davis 1953 (cf. Hanelt 1963); **Kp**.
Cichorium pumilum Jacq. × *C. spinosum* L. (*C. × hybridum* Halász): 182.
Hyoseris lucida L.: 183.
Tragopogon lassithicus Rech. fil.: 184.
Reichardia orientalis (L.) Hochreutiner: 185.
Lactuca saligna L.: 185a.
Crepis pusilla (Sommier) Merxm.: 186.
Potamogeton lucens L.: 187.
P. trichoides Cham. & Schlecht.: 188.
Androcymbium rechingeri Greuter: 189.

- Colchicum cousturieri* Greuter: 190.
C. cretense Greuter: 191.
C. macrophyllum B. L. Burtt: 192.
Gagea commutata C. Koch: 193.
G. amblyopetala Boiss. & Heldr.: 194.
G. bohemica (Zauschner) Roemer & Schultes: 195.
Allium cupanii Raf.: 196.
A. callimischon Link: 197.
A. paniculatum L.: 198; Davis 1953, Kp.
[*Lilium candidum* L.]: 199.
Fritillaria graeca Boiss. & Heldr.: 200.
Ornithogalum visianicum Tommasini: 201.
Bellevalia brevipedicellata Turrill: 202.
Leopoldia dionysica (Rech. fil.) Greuter: 203.
Muscari commutatum Guss.: 204.
M. aff. atlanticum Boiss. & Reuter: 205.
M. parviflorum Desf.: 206.
Muscarimia macrocarpa (Sweet) Garbari: 207.
Iris planifolia (Miller) Durand & Schinz: 208.
Juncus effusus L.: 209.
J. heldreichianus Parl.: 210; Greuter, Kp, Sa.
J. littoralis C. A. Meyer: 211.
Cyperus flavescens L.: 212.
C. fuscus L.: 213.
Schoenoplectus tabernaemontani (C. C. Gmelin) Palla: 214.
Fuirena pubescens (Poiret) Kunth: 215.
Eleocharis multicaulis (Sm.) Sm.: 216.
E. uniglumis (Link) Schultes: 217.
Cladium mariscus (L.) R. Br.: 218.
Carex distachya Desf.: 219.
C. cretica Gradstein & Kern: 220.
C. punctata Gaudin: 221.
Bromus racemosus L.: 222.
B. caroli-henrici Greuter: 223; Greuter 1971a, Kp.
Brachypodium glaucovirens (Murb.) Fritsch: 224.
B. sylvaticum (Hudson) Pal. Beauv.: 225.
Elymus rechingeri (Run.) Run.: 226; Heneen & Runemark 1962, Kp.
E. striatulus Run.: Heneen & Runemark 1972, Crete (not in Greuter 1973).
E. diae, nomen nudum: 227.
E. elongatus (Host) Greuter: 228.
Triticum umbellatum (Zukovsky) Bowden: 229.
Melica bornmuelleri (Papp) Hempel: 230.
Aeluropus lagopoides (L.) Thwaites: 231.
Poa palustris L.: 232.
Festuca sipylea (Hackel) I. Markgraf: 233.
F. gigantea (L.) Vill.: 234.
Hainardia cylindrica (Willd.) Greuter: 235; Greuter, Kp.
Parapholis marginata Run.: 236; Runemark 1962, Greuter; Kp, Ks.



- Avenula cycladum* (Rech. fil. & Scheffer) Greuter: 237.
Agrostis stolonifera L.: 238.
A. gigantea Roth: 239.
Polypogon monspeliensis (L.) Desf. × *P. viridis* (Gouan) Breistr. (*P. × adscendens* Guss.): 240.
Crypsis aculeata (L.) Aiton: 241.
Aristida caerulescens Desf.: 242.
[*Eleusine indica* (L.) Gaertner]: Crete, distr. Apokoronas, Jeorjioupolis. 5.7.1973,
Stamatiadhou 17422! (not in Greuter 1973).
Dactyloctenium aegyptium (L.) Pal. Beauv.: Herrn!, Kp.
Echinochloa eruciformis (Sm.) Reichenb.: Herrn!, Kp.
Setaria glauca (L.) Pal. Beauv.: Herrn!, Kp.
Hemarthria altissima (Poiret) Stapf & Hubbard: Herrn!, Kp.
Ophrys argolica Fleischm.: Nelson 1962, Kp, Ks.
O. spruneri Nyman: 243.
Himantoglossum hircinum (L.) Sprengel cf. subsp. *caprinum* (Marsch. Bieb.)
Richter: 244.
Spiranthes spiralis (L.) Chevall.: 245.
Phoenix theophrasti Greuter: 246.
Arum maculatum L.: 247.
Biarum davisii Turrill: 248.
B. zelebori Schott: 249.
Sparganium neglectum Beeby: 250.

Appendix III — Excluded records

Erroneous and doubtful literature records are particularly numerous for the Cretan area. The main reasons for this are the early start (16th century) of floristic activity in Crete, the meticulous yet not sufficiently critical compilations of subsequent workers (especially RAULIN) and the lack of critical re-investigation of the doubtful cases in more recent times. The necessary verifications are very time-consuming, in many instances quite impossible owing to the lack of herbarium specimens. In the context of this report, they could be carried out only on a limited scale. At least, the suspect records have been tracked down to their original literary source, which should ease the task of future investigators and permit an easier weighing of their reliability.

The pre-Linnean records were taken into the modern literature almost exclusively on the base of their interpretation by RAULIN (1869). This contains, of course, many errors. Some of them have been corrected by BALDACCI & SACCARDO (1900) in a paper which has not received sufficient attention. TOURNEFORT and

GUNDELSHEIMER have left herbarium material (P, B, M), for which modern revision would be most desirable.

SIETHORP's records, as reproduced by SMITH (1806-1816), have proved to be in error in so many instances that they should be dismissed altogether. Nobody having read the paper by STEARN (1967) would dare to regard them as trustworthy. SIEBER was a remarkable collector, but apparently some of his collections got mixed up during dispatch (see CELAKOVSKY, 1883). It may be worth remembering that he travelled from Crete to Egypt and Palestine. Many of his small printed labels are without localities, and quite similar labels accompany SIEBER's plants from Corsica, Austria and Italy — which in some cases has caused errors in the work of subsequent writers. Checking is possible by comparison with SIEBER's plant catalogues, of which three significantly different editions are known to exist (SIEBER, 1820, 1821a, b).

It is suggested that plants not collected in Crete since SIEBER's times should be regarded as doubtfully recorded. But even more recent publications are not reliable throughout. Numerous wrong determinations are included, for instance, in papers by RAULIN (1869), WEISS (1869), BARBEY (in STEFANI et al., 1895; MAJOR & BARBEY, 1894, 1894a, 1895), RIKLI & RÜBEL (1923), LAKOWITZ (1929), and especially GANDOGER (1916, etc.). GANDOGER's herbarium at LY (duplicates also at G, K, and elsewhere) seems unfortunately to be incomplete; his specimens are badly collected and often so rudimentary that his gross misnamings (e. g., *Peucedanum creticum* instead of *Carum multiflorum*; *Althaea hirsuta* for *Malva cretica*) are almost understandable.

Since two of the more active Cretan collectors are known to have distributed, at some time in their lives, specimens with false labels, it may not be superfluous to state that no evident fakes involving Cretan exsiccata have come to my attention. However, the exact localities and dates provided by these collectors, namely REVERCHON (cf. BURNAT, 1881, 1883, and manuscript documents in the archives at G) and GANDOGER (ROTHMALER, 1956: 84), may sometimes be inaccurate.

Taxa (species and subspecies) are listed by their correct name, in the sequence of Flora Aegaea. If the name is in brackets, without further reference, the species is not native to Crete, but has been treated as such in previous floras (RECHINGER, 1943, TUTIN et al., 1964-1972). Records which have been considered as doubtful,

erroneous, or put into synonymy, already in Flora Aegaea, are not included, unless they have been taken up again, as correct, in Flora Europaea or other recent publications.

- ? doubtful record, needing confirmation; should be mentioned as «?Cr» in Flora Europaea
- ?? very doubtful record, almost certainly wrong; should be omitted from Flora Europaea
- ! erroneous record; specimen has been checked, or unambiguous circumstantial evidence found
- * recorded, as a native, from Cr in Flora Europaea.

- * *Equisetum sylvaticum*: HAYEK, 1924 ??
- * *E. palustre*: GANDOGER, 1916, 1920?; ZAFFRAN, 1970!
- * *E. hyemale*: GANDOGER, 1916??
- Polypodium vulgare*: RAULIN, 1869?; GANDOGER, 1916?; ZOHARY & ORSHAN, 1966?; BROWNSEY & JERMY, 1973?
- * *Pteris cretica*: RAULIN, 1869!
- Cheilanthes marantae*: *Acrostichum*, SMITH, 1816??
- * *Phyllitis scolopendrium* subsp. *scolopendrium*: *Scolopendrium officinale*, BOISSIER, 1884!; *S. vulgare*, HALÁCSY, 1904!; *Ph. scolopendrium*, ZAFFRAN, 1970 (! REICHSTEIN).
- * *Ph. sagittata*: *Scolopendrium hemionitis*, HALÁCSY, 1904, 1908!; *Phyllitis hemionitis*, VIERHAPPER & RECHINGER, 1935??; *id.*, RECHINGER, 1944!; ZAFFRAN, 1970 (! REICHSTEIN).
- * *Asplenium fontanum*: *Aspidium*, RAULIN, 1869??
- * *A. adiantum-nigrum*: GANDOGER, 1916?; ZAFFRAN, 1970?
- A. fissum*: ZAFFRAN, 1970??
- * *Gymnocarpium dryopteris*: *Polypodium*, SIEBER, 1823??
- * *Dryopteris filix-mas*: *Aspidium*, SMITH, 1816??; «felce maschio», BALDACCI, 1895: 51?; *Polystichum*, GANDOGER, 1916!
- * *Pinus nigra*: *P. laricio*, RAULIN, 1869??; *id.*, GANDOGER, 1920??; ZOHARY & ORSHAN, 1966??
[*P. halepensis* Miller].
- * [*P. pinea* L.]
- * *Juniperus excelsa*: MAJOR & BARBEY, 1894!; STEFANI et al., 1895!; DAVIS, 1953??
- * [*Castanea sativa* Miller].
- * [*Quercus macrolepis* Kotschy].
- * *Q. cerris*: subsp. *austriaca*, SCHWARZ in RECHINGER, 1943?
- * [*Juglans regia* L.]
- [*Populus alba* L.]
- * [*P. nigra* L.]
- * *Ulmus minor*: *U. campestris*, SMITH, 1806?; *id.*, REGEL, 1941?
- * [*Celtis australis* L.]
- * *Parietaria officinalis*: *P. erecta*, GANDOGER, 1916??
- Cynomorium coccineum*: BOISSIER, 1879??
- Rumex vesicarius*: GANDOGER, 1916??
- Atraphaxis spinosa*: ZOHARY & ORSHAN, 1966??

- * *Polygonum aviculare*: *P. erectum*, GANDOGER, 1916?; VIERHAPPER & RECHINGER, 1935?; RECHINGER, 1944?; subsp. *aviculare*, DAVIS, 1953?
- * *Euphorbia apios*: auct. in RECHINGER, 1943! (cf. DAVIS in RECHINGER, 1949). *E. segetalis*: SMITH, 1809?; RAULIN, 1869?; GANDOGER, 1916?
- * *E. myrsinifolia*: RECHINGER, 1944! (cf. GREUTER, 1965).
- E. rigida*: *E. biglandulosa*, DESFONTAINES, 1808! (cf. GREUTER, 1965). [*Chenopodium ambrosioides* L.].
- Kochia scoparia*: GANDOGER, 1916!
- * *Arthrocnemum fruticosum*: *Salicornia*, WEISS, 1869?; id., HALÁCSY, 1908; id., GANDOGER, 1916!, 1920?; id., LANGERON, 1927?; id., RECHINGER, 1944? [verisim. *A. perenne* (Miller) MOSS].
- * *Suaeda maritima*: RAULIN, 1869?
- Salsola vermiculata*: auct. in RECHINGER, 1943!
- [*Amaranthus hybridus* L.].
- [*A. paniculatus* L.].
- [*A. retroflexus* L.].
- [*A. viridis* L.].
- * *Paronychia capitata*: STEFANI et al., 1895!; GANDOGER, 1916??; VIERHAPPER & RECHINGER, 1935!; RECHINGER, 1944! (cf. GREUTER, 1965).
- * *P. chionaea*: «*P. capitata*», BOISSIER, 1867! (cf. GREUTER, 1965).
- * *Spergularia media*: RAULIN, 1869??; GANDOGER, 1916?? (cf. RECHINGER, 1943).
- * *Scleranthus annuus*: RAULIN, 1869? (verisim. *S. verticillatus* Tausch). *Minuartia thymifolia*: *Alsine*, SMITH, 1809??
- * *M. verna*: *Alsine*, GANDOGER, 1916?? (est *M. attica*; cf. MCNEILL, 1963).
- * *Sagina procumbens*: GANDOGER, 1916?
- * *Moenchia mantica*: GANDOGER, 1916??.
- * *Cerastium ligusticum*: *C. campanulatum*, MÖSCHL, 1936! (cf. RECHINGER, 1943).
- * *C. pumilum* subsp. *litigiosum*: *C. litigiosum*, MÖSCHL, 1936! (cf. RECHINGER, 1943).
- * *Myosoton aquaticum*: *Cerastium*, SMITH, 1809??.
- Petrorhagia graminea*: Tunica, HAYEK, 1927!
- P. cretica*: Tunica auct. in RECHINGER, 1943!; id., RECHINGER, 1944, 1949! (cf. DAVIS, 1957).
- * *P. glumacea*: Tunica, RAULIN, 1869!; id., HALÁCSY, 1908!
- Dianthus rupicola*: TURRILL, 1933??
- * *Silene trinervia*: GANDOGER, 1916??
- * *S. pendula*: SMITH, 1809??
- * *S. noctiflora*: SMITH, 1809??
- * *Paeonia mascula*: *P. corallina*, HUTH, 1892!; id., GANDOGER, 1916, 1920??
- Anemone × fulgens*: GANDOGER, 1916, 1920??
- Clematis orientalis*: MAJOR & BARBEY, 1894a!
- * *C. flammula*: GANDOGER, 1916?
- * *Ranunculus demissus*: BOISSIER, 1888.
- * *R. velutinus*: RAULIN, 1869??; ZOHARY & ORSHAN, 1966!
- * *R. aquatilis*: auct. in RECHINGER, 1943? (cf. COOK, 1966).
- Papaver syriacum*: *P. rhoeas* var. *syriacum*, STEFANI et al., 1895??
- * *P. commutatum*: GANDOGER, 1916??
- * *P. somniferum* subsp. *setigerum*: *P. setigerum*, GANDOGER, 1916?; *P. siculum*, RIKLI & RÜBEL, 1923?

- Erysimum graecum*: HALÁCSY, 1900? (an reverā e Cretā?).
- * *E. cheiri*: *Cheiranthus*, GANDOGER, 1916??; *id.*, RIKLI & RÜBEL, 1923!; *id.*, RECHINGER, 1944! (cf. SNOGERUP, 1967).
 - * *E. corinthium*: *Cheiranthus*, BOISSIER, 1888!; *id.*, STEFANI et al., 1895! (cf. SNOGERUP, 1967).
 - Nasturtium microphyllum*: GANDOGER, 1916??
 - * *Arabis muralis*: RECHINGER, 1944!
 - * [*Matthiola incana* (L.) R. Br.].
 - * *Alyssum alyssoides*: GANDOGER, 1916??; var. *depressum*, CONTANDRIOPoulos, 1969?? (cf. PERSSON, 1971).
 - * *A. murale*: HALÁCSY, 1908!
 - [*Raphanus sativus* L.].
 - * *Iberis odorata*: auct. in RAULIN, 1869!
 - * *Thlaspi microphyllum*: «var.», BALDACCI, 1903!
 - * *Th. graecum*: HALÁCSY, 1900!; VIERHAPPER & RECHINGER, 1935! (est *Th. graecum* subsp. *creticum* (Degen & Jávorka) Greuter 1972: 44 = *Th. microphyllum* subsp. *creticum* Degen & Jávorka in Jávorka 1922: 25 = *Noceaea cretica* (Degen & Jávorka) F. K. Meyer 1973: 466).
 - * *Reseda arabica*: GANDOGER, 1921??
 - * *Helianthemum ledifolium*: SIEBER, 1820, 1821a??; GANDOGER, 1916?
 - * *H. nummularium* subsp. *tomentosum*: *H. tomentosum*, GANDOGER, 1916, 1920! (cf. RECHINGER, 1944).
 - Fumana ericoides*: *Helianthemum*, GANDOGER, 1916!
 - * *F. procumbens*: RAULIN, 1869??; BALDACCI, 1895!; *Helianthemum fumana*, GANDOGER, 1916??
 - * *Viola hirta*: GANDOGER, 1916?
 - Bryonia cretica* subsp. *dioica*: *B. sicula*, GANDOGER, 1916, 1920??; *B. dioica*, RIKLI & RÜBEL, 1923??
 - * *Hypericum tetrapterum*: var. *corsicum*, BOISSIER 1867!
 - * *Abutilon theophrasti*: *Sida abutilon*, SIEBER, 1820, 1821a?
 - * [*Gossypium hirsutum*]: SIEBER, 1820, 1821a?
 - * [*G. barbadense*]: *G. vitifol.*, SIEBER, 1821b?
 - Alcea rosea*: *Althaea*, auct. in RECHINGER, 1943??; *id.*, RECHINGER, 1944?? (cf. MEIKLE, 1954).
 - * *Malope malacoides*: SMITH, 1813??
 - Geranium brutium*: *G. villosum*, VIERHAPPER & RECHINGER, 1935?
 - * *G. pusillum*: GANDOGER, 1916?
 - * *Erodium chium*: SMITH, 1813!; *E. muricum*, GANDOGER, 1916!
 - * *E. ciconium*: GANDOGER, 1916?
 - * *E. acaule*: *E. romanum*, GANDOGER, 1916?
 - Peganum harmala*: SMITH, 1809??
 - * *Fagonia cretica*: auct. in RAULIN, 1869? (collected by BELLi in the late 16th century, possibly as a casual; no first-hand record since 1620; extinct?).
 - * *Haplophyllum buxbaumii*: BOISSIER, 1867!
 - Acer monspessulanum*: TURRILL, 1932??
 - Rhamnus lycioides* subsp. *graeca*: *Rh. graeca*, auct. in RECHINGER, 1943??;
 - Rh. oleoides* subsp. *graeca*, DAVIS, 1953! (cf. GREUTER & RECHINGER, 1967).
 - * *Sedum cepaea*: *S. cotyledon*, SIEBER, 1820, 1821a, b!

- * *S. stellatum*: SMITH, 1809?; GANDOGER, 1916?
- * *S. dasypodium*: SMITH, 1809??
- * *S. ochroleucum*: «*S. rupestre*», SMITH, 1809??
- * *S. caespitosum*: *S. rubrum*, VIERHAPPER & RECHINGER, 1935!
- * *Umbilicus chloranthus*: BOISSIER, 1872!; *Cotyledon*, HALÁCSY, 1901!; GANDOGER, 1916, 1920??
- * *Saxifraga rotundifolia*: SMITH, 1809!
- * *Rubus ulmifolius*: auct. in RECHINGER, 1943 (est *R. sanctus*).
R. heteromorphus: *R. ulmifolius* subsp. *dalmaticus*, VIERHAPPER & RECHINGER, 1935?
- R. sanguineus*: *R. ulmifolius* var. *anatolicus*, STEFANI et al., 1895; *id.*, «*f. diminuta*», HALÁCSY, 1900?; *id.*, RECHINGER, 1943?; *R. anatolicus*, VIERHAPPER, 1915?; *R. ulmifolius* subsp. *anatolicus*, DAVIS, 1953?
- * *R. canescens*: *R. tomentosus*, BALDACCI, 1895!; *id.*, GANDOGER, 1916?
- Rosa moschata*: HALÁCSY, 1900??
- R. andegavensis*: GANDOGER, 1916??
- R. agrestis*: f. *ditrichopoda*, RECHINGER, 1943?; ZOHARY & ORSHAN, 1966!
- * *R. pouzinii*: GANDOGER, 1916?
[*Pyrus communis* L.]
- * *Crataegus heldreichii*: GANDOGER, 1916, 1920?; RIKLI & RÜBEL, 1923?
- * *C. laciniata*: GANDOGER, 1916?
- C. × polyacantha*: GANDOGER, 1916??; *C. insegnae*, GANDOGER, 1916??
- * *Astragalus haarbachii*: LAKOWITZ, 1929??
A. tauricola: MAJOR & BARBEY, 1894a!; STEFANI et al., 1895!; RECHINGER, 1943!
(cf. RECHINGER, 1949).
- * [*Glycyrrhiza glabra* L.]
- * *G. echinata*: SMITH, 1813??
Vicia sativa subsp. *amphicarpa*: *V. amphicarpa*, GANDOGER, 1916, 1920?
[*V. sativa* L. subsp. *sativa*, subsp. *nigra* (L.) Ehrh., subsp. *macrocarpa* (Moris) Arcangeli].
- * *V. pinetorum*: GANDOGER, 1916, 1920?
- V. tenuifolia*: MAJOR & BARBEY, 1894a?; *V. elegans*, GANDOGER, 1916, 1920?; var. *elegans*, RECHINGER, 1943, 1944? (omnia verisim. *V. dalmatica* KERNER).
- V. incana*: *V. canescens*, GANDOGER, 1916, 1920??
- V. tetrasperma*: RAULIN, 1869!; *Ervum*, GANDOGER, 1916?
- * [*V. ervilia* (L.) Willd.]
- * *Lathyrus articulatus*: *L. tenuifolius*, GANDOGER, 1916, 1920?
- * [*L. ochrus* (L.) DC.].
[*L. sativus* L.]
- L. stenophyllus*: GANDOGER, 1916! (est «*L. sativus* var. *stenophyllus*», Weiss, 1869).
- * *L. angulatus*: GANDOGER, 1916?
- L. hirsutus*: GANDOGER, 1916?
- * *L. grandiflorus*: GANDOGER, 1916?
- * *Ononis natrix* subsp. *natrix*: *O. natrix*, STEFANI et al., 1895!
- * *O. variegata*: LAKOWITZ, 1929??

- Trigonella cretica*: *Pocockia* auct. in RAULIN, 1869!; RECHINGER, 1944! (cf. GREUTER & RECHINGER, 1967).
- T. corniculata* subsp. *occidentalis*: «*T. corniculata*», RAULIN, 1869?? (cf. GREUTER & RECHINGER, 1967).
- [*T. foenum-graecum* L.].
- * *Melilotus segetalis*: *M. compacta*, RAULIN, 1869?
- * *Trifolium aurantiacum*: «*T. agrarium*», SMITH, 1813??; VIERHAPPER & RECHINGER, 1935?
- * *T. repens* subsp. *orphanideum*: *T. orphanideum*, GANDOGER, 1916?
- * *T. sclerorrhizum*: GANDOGER, 1916, 1920??
- * *T. smyrnaeum*: STEFANI et al., 1895!
- * *T. hirtum*: LAKOWITZ, 1929??
- * *Anthyllis barba-jovis*: *A. splendens*, WILLDENOW, 1802!
- * [*Lupinus albus* L.].
- * *Coronilla emerus* subsp. *emeroides*: «*C. emerus*», SMITH, 1813??; *C. emeroides*, GANDOGER, 1916??
- * *C. varia*: SMITH, 1813??
- Scorpiurus vermiculatus*: GANDOGER, 1916??
- Onobrychis crista-galli*: *Hedysarum*, SIEBER, 1821b??; RIKLI & RÜBEL, 1923??
- Daphne gnidiooides*: GANDOGER, 1916, 1920??
- * *Myrtus communis* subsp. *tarentina*: *M. tarentina*, GANDOGER, 1916?
- * *Epilobium tetragonum*: RAULIN, 1869?
- Callitricha truncata*: VIERHAPPER & RECHINGER, 1935! (cf. SCHOTSMAN, 1967).
- C. platycarpa*: GRADSTEIN & SMITTENBERG, 1968!
- Bupleurum flavum*: auct. in RECHINGER, 1943!; RECHINGER, 1944! (cf. SNOGERUP, 1962).
- Pimpinella tragium* subsp. *tragium*: *P. tragium*, STEFANI et al., 1895!; id., RECHINGER, 1944!
- P. anisum*: RAULIN, 1869??
- Bonannia graeca*: *Sium*, SIEBER, 1820, 1821a, b??
- Ferulago campestris*: *Ferula ferulago*, SMITH, 1806??
- * *F. asparagifolia*: STEFANI et al., 1895!
- * *Tordylium byzantinum*: *Ainsworthia*, GANDOGER, 1916?
- * *Daucus broteri*: WEISS, 1869?
- Scandix iberica*: STEFANI et al., 1895!
- S. grandiflora*: «*S. falcata*», RAULIN, 1869??; RIKLI & RÜBEL, 1923??
- * *Smyrnium perfoliatum*: SMITH, 1806??; SIEBER, 1820, 1821a, b??; RAULIN, 1869??; RIKLI & RÜBEL, 1923??
- * *Limonium vulgare* subsp. *serotinum*: «*Statice limonium*», SIEBER, 1821b.
- Cyclamen linearifolium*: «*C. europaeum*», RAULIN, 1869??; *C. neapolitanum*, SIEBER ex RECHINGER, 1943!; id., SCHWARZ, 1955?
- Convolvulus betonicifolius*: *C. hirsutus*, SIEBER, 1821b!
- C. lanatus*: SMITH, 1806??; GOULIMIS, 1956! (rev. STACE).
- Heliotropium bocconeii*: HAYEK, 1928??
- H. suaveolens*: STEFANI et al., 1895!
- Trachystemon orientale*: *Psilotemone*, STEFANI et al., 1895!
- Anchusa sartorii*: ZOHARY & ORSHAN, 1966??
- Nonea ventricosa*: RAULIN, 1869!

- * *Myosotis stricta*: GANDOGER, 1916? ?
- Onosma halacsyi*: «*O. helveticum*», HALÁCSY, 1902!
- O. frutescens*: RAULIN, 1869??; SAMUELSSON, 1933??
- * *Echium vulgare*: *E. pustulatum*, WEISS, 1869??; *id.*, GANDOGER, 1916?
- Lycium europaeum*: GANDOGER, 1916, 1920??
- L. afrum*: RAULIN, 1869??; GANDOGER, 1916??; BALDACCI, 1903??
- [*L. barbarum* L.]
- Hyoscyamus niger*: RAULIN, 1869?
- [*H. aureus* L.]
- Verbascum mucronatum*: RAULIN, 1869??; GANDOGER, 1916?
- Antirrhinum siculum*: RAULIN, 1869??
- [*A. majus* L.]
- Scrophularia canina*: SMITH, 1809??
- Odontites* subsp. *linkii*: *O. linkii*, DAVIS, 1953!
- Orobanche lavandulacea*: *Phelipaea*, GANDOGER, 1916?; *Ph. fraasii*, GANDOGER, 1916, 1920?
- O. schultzii*: STEFANI et al., 1895!; *Phelipaea pyramidalis*, GANDOGER, 1916?
- O. coelestis*: BECK, 1930?
- O. attica*: RECHINGER, 1944!
- * *O. picridis*: BECK, 1930?
- Sideritis lanata*: BENTHAM, 1834??
- S. romana*: auct. in RECHINGER, 1943!; RECHINGER, 1944! (cf. GREUTER & RECHINGER, 1967).
- S. purpurea*: RAULIN, 1869!; MAJOR & BARBEY, 1894!
- Prunella laciniata*: SMITH, 1809??; GANDOGER, 1916? (verisim. omnia *P. cretensis* Gand.).
- P. × pinnatifida*: *P. laciniata* × *vulgaris*, HAYEK, 1929??
- Lamium bifidum* subsp. *bifidum*: *L. bifidum*, RAULIN, 1869?; *L. cryptanthos*, GANDOGER, 1916!
- Micromeria microphylla*: STEFANI et al., 1895!; auct. in RECHINGER, 1943! (est *M. sphaciotica* Boiss. & Heldr.).
- * *M. graeca*: *Satureja*, SMITH, 1809??; *id.*, SIEBER, 1820, 1821a, b!; RAULIN, 1869?; HALÁCSY, 1908?; GANDOGER, 1916? (cf. RECHINGER, 1944).
- Clinopodium vulgare* subsp. *vulgare*: *Calamintha vulgaris* auct. in RECHINGER, 1943!; *id.*, RECHINGER, 1944! (cf. BOTHMER, 1967).
- Thymbra spicata*: SMITH, 1809??
- * *Mentha suaveolens*: *M. rotundifolia*, SMITH, 1809??; *id.*, RAULIN, 1869?
- M. suaveolens* × *M. microphylla*: *M. digenea* var. *orphanidis*, PETRAK in RECHINGER, 1944?
- M. villosa*: var. *cladodes*, f. *crenulata*, f. *parvifolia*, PETRAK in RECHINGER, 1944?
- M. piperita*: GANDOGER, 1916?
- Plantago coronopus* subsp. *coronopus*: *P. coronopus* auct. in RECHINGER, 1943?; *id.*, RECHINGER, 1944?
- Vinca difformis*: *V. media*, GANDOGER, 1916?
- Crucianella graeca*: GANDOGER, 1916??
- Asperula rivalis*: SMITH, 1806??
- A. lutea*: RAULIN, 1869!; var. *abbreviata*, HALÁCSY, 1901!, 1908!; GANDOGER, 1916?? (cf. RECHINGER, 1944).

- Galium mollugo*: GANDOGER, 1916??; *G. elatum*, GANDOGER, 1916??
G. incanum subsp. *incanum*: *G. incanum* auct. in RECHINGER, 1943!; *id.*, RECHINGER, 1944! (cf. EHRENDORFER, 1951).
G. canum subsp. *canum*: *G. canum* auct. in RECHINGER, 1943!; *id.*, RECHINGER, 1944!; *id.*, EHRENDORFER in DAVIS, 1953 (cf. EHRENDORFER, 1958).
G. spurium: *G. vaillantii*, GANDOGER, 1916?
G. suberosum: SMITH, 1806??; RAULIN, 1869??
G. elongatum: RAULIN, 1869?
[*Sambucus nigra* L.].
Lonicera caprifolium: GANDOGER, 1916!
Valerianella locusta: GANDOGER, 1916?
V. costata: GANDOGER, 1916?
V. carinata: RAULIN, 1869?
Valeriana dioscoridis: HALÁCSY, 1911??
[*Centranthus ruber* (L.) DC.].
Knautia integrifolia subsp. *integrifolia*: *K. integrifolia*, incl. var. *hybrida* et
«var. *urvillei*», auct. in RECHINGER, 1943??; *K. integrifolia*, RECHINGER,
1944! (cf. GREUTER & RECHINGER, 1967).
Scabiosa cretica: auct. in RAULIN, 1869!; BALDACCI, 1903! (cf. DAVIS, 1953).
Campanula drabifolia: MAJOR & BARBEY, 1894a!; STEFANI et al., 1895! (cf.
GREUTER & RECHINGER, 1967).
C. spatulata subsp. *sprunerana*: *C. spruneri*, RAULIN, 1869!; *C. spruneriana*,
HALÁCSY, 1912??; *id.*, GANDOGER, 1916, 1920!; RECHINGER, 1944! (cf.
PHITOS, 1964).
[*Conyza bonariensis* (L.) Cronq.].
Filago asterisciflora: EVAX, GANDOGER, 1916?
F. anatolica: EVAX, STEFANI et al., 1895?
F. exigua: EVAX, GANDOGER, 1916??
F. lutescens: RAULIN, 1869??; GANDOGER, 1916??
F. micropodioides: GANDOGER, 1916?? (cf. WAGENITZ, 1970).
Gnaphalium uliginosum: GRADSTEIN & SMITTENBERG, 1968?
Pulicaria vulgaris: HALÁCSY, 1902?
Anthemis heracleotica: *A. peregrina* var. *heracleotica*, STEFANI et al., 1895!
Anacyclus radiatus: RAULIN, 1869!
Senecio leucanthemifolius: MAJOR & BARBEY, 1895! (cf. RECHINGER, 1949);
S. crassifolius et *S. humilis*, GANDOGER, 1916??; var. *pedunculosus*,
TURRILL, 1955?
S. vernalis: HAYEK, 1931??
S. lividus: GANDOGER, 1916?
Calendula aegyptiaca: HALÁCSY, 1902? (cf. MEUSEL & OHLE, 1966).
C. bicolor: GANDOGER, 1916??
Carduus acicularis: KAZMI, 1964!
Onopordon sibthorpiatum: *O. macracanthum*, SMITH, 1813??; *id.*, RAULIN,
1869??; STEFANI et al., 1895!; GANDOGER, 1916, 1920?
Centaurea salonitana: *C. collina* var. *macracantha*, RAULIN, 1869?; *C. collina*,
GANDOGER, 1916?

- Carthamus lanatus* subsp. *lanatus*: *C. lanatus*, SMITH, 1813??; *id.*, SIEBER, 1820, 1821a, b??; *id.*, STEFANI et al., 1895?; *Kentrophyllum lanatum*, RAULIN, 1869?; *id.*, GANDOGER, 1916? (cf. HANELT, 1963).
- Scolymus maculatus*: SIEBER, 1821b?; RAULIN, 1869?
- Hyoseris radiata*: WEISS, 1869??; GANDOGER, 1916?? (cf. RECHINGER, 1944).
- Leontodon fasciculatus*: RAULIN, 1869?
- Scorzonera mollis*: *Podospermum villosum*, RAULIN, 1869??; *id.*, GANDOGER, 1916!; BALDACCI, 1903??; HALÁCSY, 1908??
- Reichardia tingitana*: *Picridium*, GANDOGER, 1916, 1920??; RECHINGER, 1944! (cf. RECHINGER, 1949).
- Launaea nudicaulis*: *Crepis*, SIEBER, 1820, 1821a! (cf. BABCOCK, 1947); *Microrhynchus*, RAULIN, 1869??; ZOHARY & ORSHAN, 1966??
- Sonchus tenerrimus*: SMITH, 1813??; *S. lacerus*, SIEBER, 1821b??; RAULIN, 1869!; RECHINGER, 1943?
- Crepis neglecta*: MAJOR & BARBEY, 1894a!; STEFANI et al., 1895!; GANDOGER, 1916??; RECHINGER, 1944?? (cf. BABCOCK, 1947).
- C. fuliginosa*: *C. neglecta* var. *fuliginosa*, RAULIN, 1869?; GANDOGER, 1916?; *C. neglecta* var. *graeca*, VIERHAPPER & RECHINGER, 1935?; *id.*, RECHINGER, 1944?; «minor variant 1», BABCOCK, 1947! (cf. BABCOCK, 1947).
- Potamogeton natans*: SMITH, 1806??; RAULIN, 1869!; BALDACCI, 1903?; *P. cf. natans*, GRADSTEIN & SMITTENBERG, 1968?
- Colchicum cupanii*: TURRILL, 1940??; RECHINGER, 1944!, 1949??; *C. creticum*, BLAKELOCK & TURRILL, 1939! (cf. GREUTER, 1967a).
- C. byzantinum*: *C. latifolium* auct. in RECHINGER, 1943!; *id.*, RECHINGER, 1944, 1949! (cf. BURTT, 1951).
- C. variegatum*: SIEBER, 1820, 1821a, b!; GANDOGER, 1916, 1920! (cf. GREUTER, 1967a).
- Gagea reticulata*: VIERHAPPER, 1916? (cf. HEYN & DAFNI, 1971).
- Allium rotundum*: *A. multiflorum*, GANDOGER, 1916, 1920?; LAKOWITZ, 1929?
- A. gomphrenoides*: RECHINGER, 1943!
- A. weissii*: GANDOGER, 1916?
- A. cyrilli*: RIKLI & RÜBEL, 1923?
- Tulipa hageri*: RÜCKBRODT, 1971??
- Scilla hyacinthoides*: RAULIN, 1869??
- Ornithogalum sphaerocarpum*: *O. pyrenaicum*, SMITH, 1809??
- Hyacinthus orientalis*: HAYEK, 1932??
- Bellevalia trifoliata*: RIKLI & RÜBEL, 1923?
- B. dubia*: MAJOR & BARBEY, 1894a?
- Muscaria pulchellum*: RECHINGER, 1944??
- Crocus olivieri*: «*C. moesiacus*», RAULIN, 1869??
- C. cretensis*: «*C. veneris*» auct. in RECHINGER, 1943??; BURTT in RECHINGER, 1949?? (cf. GREUTER & RECHINGER, 1967).
- C. biflorus*: GANDOGER, 1916??
- [*Iris germanica* L.]
- [*I. florentina* L.]
- I. pallida*: BOISSIER, 1884??
- I. sintenisii*: «*I. graminea*», WEISS, 1869??
- Gladiolus illyricus*: MAJOR & BARBEY, 1894a?

- Juncus conglomeratus*: RECHINGER, 1944!
- Cyperus longus*: SIEBER, 1821b?; *C. preslii*, GANDOGER, 1916?
- [*C. esculentus* L.].
- C. difformis*: HALÁCSY, 1904??
- Isolepis setacea*: RIKLI & RÜBEL, 1923??
- Schoenoplectus mucronatus*: *Scirpus*, BALDACCI, 1895??
- S. lacustris*: *Scirpus*, SMITH, 1806??
- Carex illegitima*: GANDOGER, 1916?
- C. vulpina*: RAULIN, 1869?; GANDOGER, 1916?
- Bromus secalinus*: GANDOGER, 1916?
- B. alopecuroides*: WEISS, 1869??; VIERHAPPER, 1916!; VIERHAPPER & RECHINGER, 1935! (cf. GREUTER, 1971a).
- Elymus varnensis*: *Agropyron*, RECHINGER, 1944?
- E. panormitanus*: *Agropyron*, GANDOGER, 1916?
- Triticum triunciale*: *Aegilops*, GANDOGER, 1916?
- Hordeum spontaneum*: *Secale creticum*, SIEBER, 1820, 1821a??; *id.*, GANDOGER, 1916? (sed cf. TURRILL, 1930).
- [*Arundo donax* L.].
- Melica uniflora*: GANDOGER, 1916??
- Cynosurus callitrichus*: GANDOGER, 1916?
- Schismus arabicus*: RIKLI & RÜBEL, 1923?
- Koeleria pubescens*: *K. villosa*, WEISS, 1869?; *id.*, GANDOGER, 1916?; *K. intermedia*, GANDOGER, 1916?
- Aira intermedia*: GANDOGER, 1916?
- A. provincialis*: GANDOGER, 1916?
- Gastridium scabrum*: *G. muticum*, RAULIN, 1869?; GANDOGER, 1916? (cf. RECHINGER, 1944).
- Agrostis alba*: STEFANI et al., 1895??; RECHINGER, 1943??, 1944!; var. *scabriglumis*, RECHINGER, 1944!
- Phleum echinatum*: *Ph. felinum*, RAULIN, 1869?
- Ph. paniculatum*: *Ph. asperum*, RAULIN, 1869?
- Ph. graecum*: *Ph. exaratum*, WEISS, 1869?; GANDOGER, 1916?
- Stipa lagascae*: *S. juncea*, SMITH, 1806??; *id.*, SIEBER, 1821b?
- Aristida adscensionis*: RECHINGER, 1944! (cf. RECHINGER, 1949); ZOHARY & ORSHAN, 1966!; RACKHAM, 1972??
- Phalaris truncata*: GANDOGER, 1916?
- Ph. canariensis*: GANDOGER, 1916?
- Ph. brachystachys*: GANDOGER, 1916?
- Ophrys attica*: RÜCKBRODT, 1971?
- O. ferrum-equinum*: *O. tabanifera*, SIEBER, 1820, 1821a??; RAULIN, 1869??; GANDOGER, 1916, 1920??
- O. speculum*: VIERHAPPER, 1916? (cf. NELSON, 1962).
- Serapias cordigera*: RAULIN, 1869?; HALÁCSY, 1904?; GANDOGER, 1916?; RENZ in RECHINGER, 1943? (cf. NELSON, 1968).
- S. vomeracea* subsp. *vomeracea*: *S. vomeracea*, excl. f. *platypetala*, auct. in RECHINGER, 1943?; *id.*, RECHINGER, 1944 (cf. NELSON, 1968).
- Himantoglossum affine*: Aceras, GOULIMIS, 1956?
- Gymnadenia conopsea*: STEFANI et al., 1895??

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TAXONOMIC AND FLORISTIC PROGRESS ON THE CZECHOSLOVAK FLORA AND THE CONTRIBUTION OF CZECHOSLOVAK AUTHORS TO KNOWLEDGE OF THE EUROPEAN FLORA (1961-1972)

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1. INTRODUCTION

IT is generally acknowledged that the flora of Czechoslovakia is reasonably well known. Nonetheless, floristic research in the past decade yielded many important results, revealing new facts and substantially enriching the existing body of knowledge. This progress was made possible by generous subsidy from the Government authorities and is also due to the ever increasing number of persons, both amateur and professional, interested in botany and associated in the Czechoslovak Botanical Society. The existence of a number of botany-oriented institutions, the foundation of Botanical Institutes of the Czechoslovak and Slovak Academies of Sciences, respectively, and the organization of a network of the Society's branches constitute a material basis for the unprecedented advancement of botanical research. A multitude of periodicals, both national and Czech or Slovak, specializing in natural history or botany, provide an ample opportunity for relatively speedy publication. There exist also many regional, institutional and popular journals. The many activities of the Czechoslovak Botanical Society (lectures, conferences, floristic courses, supervising of amateur research) also bring important results. Floristic research was stimulated by several large-scale projects, such as the Flora of Czechoslovakia, Flora of Slovakia, Grid Atlas of the Flora of the Czech lands and other summarizing works on the Czechoslovak flora. The past decade also saw the employment in taxonomy of new methods and principles, such as chromosome number studies, biosystematic and chemotaxonomic approaches, etc.

Of the chief projects, both current and prepared, the following should be mentioned: Preliminary list of Czechoslovak plants

(HOLUB), Excursion Flora of Czechoslovakia (HOLUB et al.), Flora of Slovakia (FUTÁK et al.; two volumes published, FUTÁK/ed./1966a, b), Chromosome number index of Slovak plants (two parts published, MÁJOVSKÝ et al., 1970a, b, cf. MÁJOVSKÝ, FERÁKOVÁ & MURÍN, 1972), Grid Atlas of the Czech lands (SLAVÍK & MLADÝ, cf. SLAVÍK, 1972a), and Index of subspecific names of Central European plant species (HOLUB). Work on the comprehensive «Flora of Czechoslovakia» had to be deferred, owing to problems of either personal or editorial character.

The present review does not contain brief floristic reports of very local character. These are covered by bibliographical surveys compiled under the guidance of Z. NEUHÄUSLOVÁ-NOVOTNÁ. Works of foreign botanists concerning the flora of Czechoslovakia are included; of taxonomic papers only those based on material from our range or those containing new information on the Czechoslovak flora have been included.

2. NEW PERIODICALS

Since 1961, a considerable number of new periodicals have been initiated in which taxonomic, floristic and geobotanical papers may be found. A list of these is given in each volume of the Bibliography of Czechoslovak Botany (NEUHÄUSLOVÁ-NOVOTNÁ et al., see below in section on bibliography).

The most important new periodicals are:

Campanula, Ostrava. Devoted to research of the Jeseníky protected area; 1 (1970) — 2 (1971); summaries in world languages.

Folia Geobotanica Phytotaxonomica, Praha (Academia, Publishing House of the Czechoslovak Academy of Sciences). 1 (1966) — 7 (1972); all papers in world languages.

Opera corcontica, Praha (Agriculture Publishing House). Devoted to research of the Krkonoše National Park. 1 (1964) — 9 (1972); summaries in world languages.

Zprávy Československé botanické společnosti pri CSAV, Praha. Edited by Czechoslovak Botanical Society; 1 (1966) — 7 (1972). Contains predominantly floristic articles in Czech or Slovak, some with brief summaries in English or German. Also collective contributions summarizing floristic material. Four appendices have been published for the use of the Society's members: (1) a translation of the International Code of botanical nomenclature, (2) a trans-

lation of the International Code of nomenclature of cultivated plants, (3) Geobotanical terminology, and (4) Latin vocabulary to facilitate reading and writing herbarium labels.

Comprehensive geobotanical works are published in the book series *Vegetace CSSR* (Vegetation of Czechoslovakia). This appears in two groups (A, B) covering the Czech lands and Slovakia, respectively.

The Society's branches publish their own Bulletins (mostly mimeographed). These are designed for the use of the members and contain mostly floristic articles, sometimes determination keys.

The following is a list of the most important Czechoslovak journals publishing papers on our flora and vegetation:

- Acta Fac. Rer. Natur. Univ. Comen., Bot. (Bratislava).*
Acta Fytotechnica Nitra (Bratislava).
Acta Rer. Natur. Mus. Nation. Slov., Ser. Natur. (Bratislava).
Acta Sci. Natur. Acad. Sci. Bohemoslov. (Brno).
Acta Univ. Carol., Biol. (Praha).
Acta Univ. Palack. Olomuc., Biol. (Praha).
Biológia (Bratislava).
Biol. Práce (Bratislava).
Cas. Morav. Muz. Brno, Ser. Natur. (Brno).
Cas. Národ. Muz., Ser. Natur. (Praha).
Cas. Slez. Muz. Opava, Ser. A (Opava).
Cas. Slez. Muz. Opava, Dendr. (Opava)
Cs. Ochrana Prír. (Bratislava).
Dendrol. Sdělení (Praha, etc.).
Folia Fac. Sci. Natur. Univ. Purkyn. Brunensis (Brno).
Folia Geobot. Phytotax. (Praha).
Lesn. Cas. (Praha).
Mostecko-Litvinovsko, Reg. Studie, Sect. Natur. (Most).
Novit. Bot. Horti Bot. (Inst. Bot.) Univ. Carol. Pragensis (Praha).
Ochrana Prír. (Praha).
Opera Corcont. (Praha).
Práce Muz. Hradec Králové, Ser. A (Hradec Králové).
Práce Oboru Bot. (Brno).
Práce Vyzk. Úst. Lesn. (Praha).
Preslia (Praha).
Rozpravy Cs. Akad. Věd, Ser. Mat.-Natur. (Praha).
Sborn. Jihočes. Muz., Sci. Natur. (Ceské Budějovice).

- Sborn. Práce TANAP (Martin).*
Sborn. Národ. Muz., Ser. B (Praha).
Sborn. Severočesk. Muz. (Liberec).
Sborn. Vlastivěd. Prací Podblanicka (Jemniste).
Sborn. Vys. Skoly Zeměděl. Brno, Ser. C (Brno).
Vlastivěd. Zpravodaj Polabí (Poděbrady).
Spisy Prírodrovéd. Fak. Univ. Purkyně Brno, Ser. L (Brno).
Zpravodaj Chrán. Kraj. Obl. Sumava (České Budějovice et Plzen).
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Ziva (Praha).

3. NEW LOCAL FLORAS

No flora manual covering the entire territory of Czechoslovakia has been published during the period discussed here. The first two volumes of Flora of Slovakia (FUTÁK [ed.] 1966a, b) have appeared, the first one containing a morphological vocabulary (with Latin terminology), the other including Pteridophytes and Gymnosperms. Of the regional floras, the most comprehensive one is that of the Krkonose Mts. by SOUREK (1969a). Three local floras appeared in Western Bohemia, concerning the Rokycany (PESEK et al., 1966), Plzen (HADAC, E., SOFRON & VONDRAČEK, 1968) and Horazdovice (VANEČEK, 1969) areas, respectively. The lower Jizera riverside is dealt with by C. NOVOTNÝ (1971-1972, divided into several parts). Slovakia received a flora of the Muránska vysocina Mts. by HENDRYCH (1969a). Regional floristic works also include several comprehensive contributions discussing floras of extensive regions of Bohemia and Slovakia. These cover for instance Halštrovské hory Mts. and Smrciny Mts. in Western Bohemia (SKALICKÝ, MLADÝ & SKALICKÁ, 1971), vicinity of Mariánské Lázně (SKALICKÝ, CHRTEK & GILL, 1966), Blatná region (SKALICKÝ et al., 1961), vicinity of Sahy and Krupina (CHRTEK, 1961a), Modry Kamen (HENDRYCH & CHRTEK, 1964), Filakovská vrchovina Hills (HOLUB & MORAVEC, 1965, HENDRYCH, 1968c), vicinity of Safárikovo (HENDRYCH, 1963a), etc. A pictorial flora of Slovakia is currently issued by MÁJOVSKÝ & KREJCA (1965, 1966, 1968); taxa are arranged by their habitats. A species list of plants of Czech lands (i. e. West Czechoslovakia) is substituted, for the time being, by the List of Central European plant species (EHRENDORFER et al., 1967), compiled also in collaboration with Czech botanists.

4. BIBLIOGRAPHICAL REVIEWS

Czechoslovak botanists are fortunate in having a comprehensive bibliography of botany, covering the time span from the beginning of botanical exploration of the country to 1952 (FUTÁK & DOMIN, 1960). This is followed by a bibliography for 1958 (SKALICKY et al., 1960-1961), published, as was customary, in *Preslia*. Bibliographical work was then taken up by the Botanical Institute of the Czechoslovak Academy of Sciences and bibliographies are currently published covering two year periods each (NEUHÄUSLOVÁ-NOVOTNÁ & KUCEŘOVÁ, 1967, NEUHÄUSLOVÁ-NOVOTNÁ & WINKLER, 1968, 1969, NEUHÄUSLOVÁ-NOVOTNÁ, WINKLER & PIVONKOVÁ, 1970, NEUHÄUSLOVÁ-NOVOTNÁ, PIVONKOVÁ & WINKLER, 1972). The 1952-1957 interval has also been covered and the volume is being prepared at the Botanical Institute of the Czechoslovak Academy of Sciences (SKALICKY & HOLUBOVÁ ined.). The present state of botanical bibliography, documentation and libraries was discussed by SKALICKY & NEUHÄUSLOVÁ-NOVOTNÁ (1966, 1969); important literature sources and the state of bibliographical work were dealt with by NEUHÄUSLOVÁ-NOVOTNÁ (1966b). In addition to this basic bibliographical effort, a number of specialized bibliographies have appeared, devoted to particular subjects or geographical areas. A survey of taxonomic and floristic research in 1945-1960 was given by J. DOSTÁL (1963), selected geobotanical works from the same period have been reviewed by JENÍK (1961b), whereas DOVOLILOVÁ et al. (1962) compiled a comprehensive survey of phytocoenological literature. A list of vegetation maps was prepared by KRIPPELOVÁ & NEUHÄUSL (1963) and NEUHÄUSL (1966). HOLUB (1972h) reported on the progress of taxonomic and chorological research in Czechoslovakia in 1961-1972 and a survey of coenotaxonomic studies in the same period was prepared by NEUHÄUSL (1972a). A review of studies on alien flora in Czechoslovakia was written by JEHLÍK (1972) and the history of hydrobotany was discussed by HEJNY (1972). Regional bibliographies have been published for the following areas: Bohemian-Moravian Highlands (SMEJKAL et al., 1961; supplemented by RUZICKA, I., 1970b), Brdy Mts. and Podbrdsko area (STEPÁN, 1969), Southern Bohemia (HOUFEK & SKALICKY, 1963; supplemented by KUCERA, KURKA & SKALICKY, 1968), Jizerské hory Mts. (NEVRILY, 1969), Eastern Bohemia (KOBRLE, 1967), Moravian Karst (VANECKOVÁ & GRÜLL, 1967), and Pieniny Mts. (REPCÁK, 1969). A bibliography

of staff members of the Botany Department of Charles University, Prague, is published every year in the journal *Novitates botanicae Praha* (SKALICKY, 1967a, 1968a, 1971b). A supplement to the Futák & Domin Bibliography covering N. W. Bohemia was compiled by KUBÁT (1972). UJCÍK & HOUFEK (1970) published a list of Czechoslovak herbaria, both public and private. A list of early botanical literature deposited in the State (University) Library in Prague was provided by HENDRYCH & SKALICKY (1967-1968). For a biographical index of botanists who have been engaged in the botanical exploration of the Czech lands from the Middle Ages to the present time, see KLÁSTERSKY, HRABETOVÁ & DUDA (1970).

Floristics in the Czech lands is also covered by the bibliography edited as a supplement to the Hegi's Flora von Mitteleuropa (HOLUB in HAMANN & WAGENITZ, 1970).

5. REVISIONS AND MONOGRAPHS

The following is an alphabetical list of Czechoslovak (or European) taxa which have been subject to a more detailed taxonomic study by Czechoslovak botanists. The publications listed are essentially monographic studies aiming at a taxonomic treatment. Other papers of chronological and taxonomic character are listed in chapter 14.

- Aconitella* = *Delphinium* p. p. (SOJÁK, 1969b), conspectus of species.
- Antennaria carpatica* agg. (CHRTEK & POUZAR, 1962), European species.
- Agrimonia* (SKALICKY, 1962a) — European species; 1971a — infrageneric classification.
- Ajuga chamaepitys* (SMEJKAL, 1961b), Czechoslovakia.
- Avenochloa* [= *Helictotrichon* p. p.] (HOLUB, 1962a), a new genus, conspectus of species; (1962b), Czechoslovak species.
- Bellardiochloa* = *Poa violacea* (CHRTEK, 1970c), Europe.
- Bidens* (LHOTSKÁ, 1968a), Czechoslovak species.
- Bilderdykia* — see *Fallopia*.
- Brassicaceae** *Hesperidae* (DVORÁK, 1972).
- Bupleurum longifolium* (SOURKOVÁ, 1970a), Czechoslovakia.
- Callitricha* (ZAHRADNÍKOVÁ-ROSETZKÁ, 1968a), Slovakia.
- Camelina* (SMEJKAL, 1971), Czechoslovakia.

- Campanula* sectio *Heterophyllae* (KOVANDA, publ. var.), Czechoslovakia.
- Carex bigelowii* (HOLUB, 1968), Europe.
- Centaurea* s. l. (DOSTÁL, 1971; HOLUB, 1972d; SOJÁK, 1972a), classification on generic level.
- Chamerion* = *Chamaenerion* (HOLUB, 1972c), review of the genus.
- Chrysanthemum* — see *Leucanthemum*.
- Cochlearia* (SMEJKAL, 1968a), Czechoslovakia.
- Corothamnus* [= *Cytisus* p. p.] (SKALICKÁ, 1967), classification of the genus, conspectus of species.
- Corynephorus* s. l. (JIRÁSEK & CHRTEK, 1962b), classification on generic level, conspectus of species.
- Cotoneaster* (HRABETOVÁ-UHROVÁ, 1962a, b), Czechoslovakia.
- Crataegus* (HRABETOVÁ-UHROVÁ, publ. var.), Czechoslovakia.
- Cuscuta* s. l. (HADAC & CHRTEK, 1970), classification on generic level.
- Cytisus* s. l. (HOLUBOVÁ-KLÁSKOVÁ, 1964), classification on generic level.
- Cynosurus* s. l. (JIRÁSEK & CHRTEK, 1964), classification on generic level.
- Cytisus* — see *Corothamnus*, *Lembotropis*.
- Daphne arbuscula* (HENDRYCH, 1965a), endemism.
- Delphinium* — vide *Aconitella*.
- Deschampsia caespitosa* (CHRTEK & JIRÁSEK, 1965a), infraspecific classification.
- Echium* (KLOTZ, 1963), Czechoslovakia.
- Epilobium* — see *Chamerion*.
- Epipactis* (HOLUB, 1970d), autogamous species in Czechoslovakia.
- Equisetum* s. l. (NOVÁK & HOLUB, 1971), Czechoslovakia; (HOLUB, 1972b), classification on generic level.
- Erysimum* (KONETOPSKY, 1963), Czechoslovak species.
- Euphorbia* — see *Tithymalus*.
- Euphorbia* s. l. (SOJÁK, 1972b), classification on generic level.
- Euphorbia austriaca* agg. (CHRTEK & KRÍSA, 1970b), Czechoslovakia.
- Euphrasia* (SMEJKAL, 1963b), problems of the phenological races; (1963a), Czechoslovak species.
- Evax* (CHRTEK & HOLUB, 1963), review of the genus.
- Fallopia* (HOLUB, 1971a), review of the genus.
- Festuca psammophila* and *F. vaginata* (SCHWARZOVÁ, 1967).
- Filago* s. l. (HOLUB & CHRTEK, 1962), nomenclature; (CHRTEK & HOLUB, 1963), classification on generic level.

- Galeobdolon* (DVORÁKOVÁ, 1966a), Czechoslovakia.
- Galeopsis* s. l. (SLAVÍKOVÁ, Z., 1963a), classification on generic level.
- Helictotrichon* — see *Avenochloa*.
- Hesperis* (DVORÁK, F., publ. var.), Czechoslovakia, Europe.
- Hierochloe odorata* agg. (CHRTEK & JIRÁSEK, 1964a), Europe.
- Inula germanica* (HROUDA, 1972), Czechoslovakia.
- Juncus effusus* agg. (KRÍSA, 1962), Czechoslovakia, employment of ecological and phenological properties for characterisation of species.
- Koeleria tristis* (SOJÁK & CHRTEK, 1963), endemism.
- Lactuca* (FERÁKOVÁ, 1970, 1971b), Europe.
- Lamium* (DVORÁKOVÁ, 1965), Czechoslovakia.
- Lastrea* — see *Oreopteris*.
- Lembotropis* (SKALICKÁ, 1969), review of the genus.
- Leucanthemum rotundifolium* (ZELENY, 1970), Europe.
- Leucanthemum vulgare* agg. (ZELENY, 1972), Czechoslovakia.
- Lotus* (ZERTOVÁ, CHRTKOVÁ-ZERTOVÁ, publ. var.), Czechoslovakia, Europe.
- Luzula spicata* agg. (CHRTEK & KRÍSA, 1962), Europe; (1964), Italy; (1965), Mediterranean region.
- Lycopus* (SKALICKÝ, 1968b), Europe.
- Malcolmia* (DVORÁK, F. & KONARÍKOVÁ, 1968; DVORÁK, F., 1970d; DADÁKOVÁ & DVORÁK, 1971), review of the genus.
- Molinia* (JIRÁSEK, 1965a, 1966b; JIRÁSEK & JELÍNKOVÁ, 1970) review of the genus, infraspecific classification.
- Nasturtium officinale* agg. (HOLUB & TOMSOVIC, 1967), Czechoslovakia.
- Oreopteris* (HOLUB, 1969), review of the genus.
- Oxalis* (SMEJKAL, 1965a), Czechoslovakia.
- Oxalis* — see *Xanthoxalis*.
- Petasites* (SOUŘEK, 1962), Czechoslovakia; (TOMAN, J., 1972b), world revision.
- Petasites kablikianus* (TOMAN, J. & STARY, 1965a, 1966), Europe.
- Peucedanum carvifolia* (CHRTEK & HENDRYCH, 1962), Europe.
- Pleconax* = *Silene** *Conosilene* (SOURKOVÁ, 1972), review of the genus.
- Poa* — see *Bellardiochloa*.
- Poa* sect. *Ochlopoa* (CHRTEK & JIRÁSEK, 1962b), Europe.
- Poa cenisia* agg. (CHRTEK, 1969a), Europe.
- Poa pratensis* s. l. (JIRÁSEK, 1964c), Czechoslovakia.

- Pyrola* (KRÍSA, publ. var.), Czechoslovakia, Europe.
- Rapistrum* (SMEJKAL, 1967a), Czechoslovakia.
- Rorippa* (TOMSOVIC, 1969), Czechoslovakia.
- Rosa* (KLÁSTERSKY, publ. var.; KLÁSTERSKY in SOJÁK [ed.] 1972a),
Czechoslovakia, Europe.
- Salix* (CHMELAR, 1971, 1972), Czechoslovakia.
- Soleranus* (SMEJKAL, 1965b), Czechoslovakia.
- Senecio paludosus* (HOLUB, 1962d), Europe.
- Silene* — see *Pleconax*.
- Sorbus* (KOVANDA, 1961a), classification of the genus; (1961b),
hybrids in Czechoslovakia.
- Sorbus aria* agg. (KOVANDA, 1962a), Czechoslovakia.
- Stipa* (MARTINOVSKY, publ. var.), Czechoslovakia, Europe.
- Thelypteris* — see *Oreopteris*.
- Thesium* (HENDRYCH, publ. var.), Czechoslovakia, Europe.
- Tithymalus* (CHRTEK & KRÍSA, publ. var.), Czechoslovakia, Europe.
- Trifolium* (HENDRYCH, publ. var.), Czechoslovakia.
- Trisetum* (CHRTEK, publ. var.), Czechoslovakia, Europe.
- Viola* sect. *Hypocarpae* (SKALICKÝ, 1966c), Czechoslovakia.
- Xanthoxalis* (HOLUB, 1972e), Europe.

Monographic approach is prevalent in the following genera:

- Cytisus* s. l. (SKALICKÁ); *Hesperis* (DVORÁK, F.); *Lotus* (CHRTEKOVÁ-ZERTOVÁ); *Petasites* (TOMAN, J.); *Pyrola* (KRÍSA); *Rosa* (KLÁSTERSKY); *Stipa* (MARTINOVSKY); *Thesium* (HENDRYCH); *Trisetum* (CHRTEK).

6. BIOSYSTEMATIC, CYTOTAXONOMIC AND OTHER EXPERIMENTAL STUDIES

Biosystematic, cytotaxonomic, genetical and experimental methods have long been neglected by Czechoslovak botanists. They have been gradually adopted only in the period covered by the present review but failed, at least for the time being, to become as widespread as in many other countries. Most useful results have been obtained by chromosome number studies on the Czechoslovak flora. It may suffice to mention the work on the Index to chromosome numbers of Slovak flora, carried out in Bratislava and supervised by J. MÁJOVSKY. Two lists have been published, including in all

500 species (see MÁJOVSKÝ et al., 1970a, b) and 400 other species are ready for publication (MÁJOVSKÝ, FERÁKOVÁ & MURÍN, 1972). A similar research was also launched at the Botanical Institute of the Czechoslovak Academy of Sciences at Pruhonice. About 600 species have been counted of which 60, each with detailed comments on karyology, taxonomy and nomenclature, have been published (HOLUB, MESICEK & JAVURKOVÁ, 1970-1972). HINDÁKOVÁ & CINCURA (1967) carried out chromosome number and karyotype studies on East Slovak plants. FERÁKOVÁ (1972) gives chromosome numbers in plants from the vicinity of Hlohovec, and VÁCHOVÁ (1970a) published some chromosome counts on material not previously examined karyologically. Data on chromosome numbers will also be found in taxonomic and other studies of particular taxa. These have been listed below:

- Achillea millefolium* agg. (HÁBEROVÁ, 1963).
Anagallis arvensis agg. (SVEREPOVÁ, 1968b, 1972).
Arabidopsis thaliana (MESÍCEK, 1967), chromosome morphology.
Arabis hirsuta agg. (KLÁSTERSKY & NOVOTNÁ, 1962; NOVOTNÁ, 1962; CZAPIK & NOVOTNÁ, 1967, 1969, 1972).
Campanula rotundifolia agg. (KOVANDA, 1966b, c, 1970).
Cardaminopsis arenosa agg. (MESÍCEK, 1970).
Cerasus — cultivated taxa (HRUBY, 1962a).
Corydalis cava (MICHALKOVÁ, 1967).
Cichoriaceae sp. div. (FERÁKOVÁ, 1971a).
Cichorium intybus (JAVORCIKOVÁ, 1970).
Deilosma [= *Hesperis tristis*] (DVORÁK, F., 1965a).
Erysimum odoratum (MICHALKOVÁ, 1971).
Festuca pseudodalmatica (CINCURA, 1967).
Hesperis (DVORÁK, F., 1964e, 1965e), relationship between the pollen grain size and ploidy level.
Hesperis — vide *Deilosma*.
Hieracium auricula et *H. bauhinii* (UHRÍKOVÁ, 1970a).
Homogyne alpina (UHRÍKOVÁ, 1970b).
Iva xanthifolia (FERÁKOVÁ, 1966, 1968b).
Jasione montana (KOVANDA, 1968b).
Lactuca quercina (FERÁKOVÁ, 1968a).
Leucanthemum rotundifolium (ZELENY, 1965b).
Lotus (CHRTKOVÁ-ZERTOVÁ, 1967a).
Potentilla sp. div. (WALTERS, 1967).

- Prunella* (VÁCHOVÁ, 1970b).
Primula (VALENTINE, 1966), material from Slovakia.
Ranunculus lateriflorus (HINDÁKOVÁ, 1965), karyotype.
Rorippa (JAVURKOVÁ-KRATOCHVÍLOVÁ & TOMSOVIC, 1972).
Rosa (KLÁSTERSKÁ, 1969).
Seseli (CINCURA & HINDÁKOVÁ, 1963), Slovak species.
Thymus (TRELA-SAWICKA, 1970).
Tragopogon (CINCURA & HINDÁKOVÁ, 1964), Slovak species.
Trifolium bonannii (CINCURA, 1964).
Trifolium diffusum (ZÁBORSKY, 1971).
Trifolium sarosense (CINCURA, 1965).
Vicia (CINCURA, 1962), Slovak species; (1970), extra-Slovak species.
Vicia incana (ZERTOVÁ, 1963).

A few counts made on Czechoslovak material have been published in the IOPB Chromosome Number Reports in *Taxon*.

Few Czechoslovak botanists have undertaken to employ the more sophisticated biosystematic methods. An account of experimental taxonomy was compiled by KLÁSTERSKY (1961) and a review of biosystematics in Czechoslovakia since 1961 may be found in MESICEK (1972). The Czechoslovak Botanical Society, celebrating its 50th anniversary in 1962, held a special meeting devoted entirely to problems of biosystematics (see *Preslia* 34, 1962; HRUBY [ed.] 1962c). The following taxa have been studied in detail within the past decade:

- Anagallis arvensis* agg. (SVEREPOVÁ, 1964, 1967a, 1970a, 1972).
Arabidopsis thaliana (MESÍCEK, 1971).
Arabis hirsuta agg. (NOVOTNÁ; CZAPIK & NOVOTNÁ; publ. var.).
Hesperis (DVORÁK, F., publ. var.), hybridisation.
Lactuca sect. *Lactucopsis* (FERÁKOVÁ, 1970).
Melica nutans agg. (SVEREPOVÁ, 1967b, 1968a), hybridisation.

Ecotypes and ecomorphoses of *Phragmites communis* have been discussed by DYKYJOVÁ (1971). A graphical method of comparison of plant habits, designed to compare different populations or individuals, has been used for comparison of hybrid progenies in *Arabis hirsuta* agg. (NOVOTNÁ, 1966).

Chemotaxonomic research also started to develop (see TOMAN, J., 1972a). Examples are studies of the genera *Petasites* (NOVOTNY, L.

et al., 1966; NOVOTNY, L., TOMAN & HEROUT, 1968, terpenoids and phylogeny of the group) and *Adenostyles* (TOMAN, J., HARWATHA & NOVOTNY, 1968, chemophylogeny and of the family Asteraceae (TOMAN, J. & NOVOTNY, 1971, a chemotaxonomic contribution to the subdivision of the family). KLOZ, KLOZOVÁ & TURKOVÁ (1966) examined the genus *Phaseolus*, with special regard to proteins. Papers on *Geranium* (LEIFERTOVÁ, BUCKOVÁ & NATHEROVÁ, 1970), *Geranium pyrenaicum* (LEIFERTOVÁ, BUCKOVÁ & EISENREICHOVÁ, 1970), *G. sanguineum* (LEIFERTOVÁ & BUCKOVÁ, 1968, tannins) and *Hypericum* (LEIFERTOVÁ, 1966, flavonoids) are rather more phytochemical than chemotaxonomic. The same may be said of studies on some sedges (MEDOVIC, 1969 — *Carex flacca*; 1971 — *C. mucicata* agg.).

7. ECOLOGY, PHYTOSOCIOLOGY AND VEGETATION MAPPING

Geobotany developed successfully in period discussed, providing useful data to applied research (forest management, regional planning, weed control, etc.) and enjoying a favourable situation as regards manpower. Publications are abundant and only a selection of them can be discussed in this account. Those included are important sources of information on floras and vegetation types of particular areas. For convenience the Czechoslovak territory has been subdivided into three lands (Bohemia, Moravia and Slovakia), each consisting arbitrarily of five parts (West, South, East, North and Central); the same subdivision is also used in the section on floristics and phytogeography. When a publication included relates to two adjacent areas or might be referred to either, it is cited only once but a reference is made in the other place.

Western Bohemia

MARTINOVSKY (1967d) gives a vegetation sketch of steppe communities of continental character on the Oblík Hill near Louny. A phytocoenological characterisation of the Boren Hill near Bilina was published by SEKERA (1971), that of Sedlo Hill by KOLBEK & PETRÍČEK (1972). Colonization of clay dumps near Most was described by TOBERNÁ (1969). A description of the Soos Fen near Frantiskovy Lázně will be found in HOSTICKA (1967). Peat-bogs

near Krásno in the Slavkovsky les Mts. were dealt with by DOHNAL & MEJSTRIK (1963); a vegetation sketch of some peat-bogs in the Krusné hory Mts. was given by VÁNA (1963-1964) and MEJSTRIK (1967). Plant communities of higher situations of those mountains were studied by HEYNERT (1964). Woods of the Branzovsky hvozd Hills and those on SW Bohemian amphibolites have been described by MORAVCOVÁ-HUSOVÁ (1964b) and HUSOVÁ (1968a). An account of wood and shrub communities in the Berounka riverain was published by SOFRON (1967a) who also worked in the Upper Úhlava riverain (SOFRON, 1967b). In the Sumava Mts. relict pine woods were examined by MIKYSKA (1964c), vegetation of the rocky walls of glacial cirques by SOFRON & STEPÁN (1971a), riverside plant communities along the Upper Otava by SOFRON & STEPÁN (1971b). A short vegetation sketch of the Ostruzná riverain was given by SOFRON (1972). For an account of weed communities, see VOLF (1965), for information on ruderal vegetation of Susice, PYSEK (1972a).

Southern Bohemia

A concise vegetation survey of the Sumava Mountains and promontories is provided by MORAVEC (1972c); of the Novohradské hory Mts., by KUCERA (in CHÁBERA et al., 1972). In the Sumava Mts., attention has been paid to forest communities (PISTA, 1972), particularly to those of the Boubín Primaeval Forest (SAMEK, 1961b) and of the Mt. Klet (VOREL, 1961), to meadows in the central part of the mountains (MORAVEC, 1965a), to *Caricetum davallianae* (MORAVEC & RYBNICKOVÁ, 1964) and to peat-bogs (HOLUBICKOVÁ, 1961a, SOFRON & SANDOVÁ, 1972). In the foothills, studies were made on deciduous woods; (MORAVCOVÁ-HUSOVÁ, 1963, 1964a, MORAVEC, 1964a, *Carpinion*); also in the vicinity of Písek (MORAVCOVÁ-HUSOVÁ, 1966, beech woods), in the Lužnice and Vltava riverains (Husová, 1968b, scree woods) and in the basin of České Budějovice and Vodnany (PISTA, 1970). Woods with *Goodyera repens* in the undergrowth were sketched by MORAVEC (1972b) who also described phytocoenology of localities with *Arctostaphylos uva-ursi* (MORAVEC, 1967a). Acidophilous and xerophilous communities of grasses and herbs in warmer parts of Southern Bohemia were studied by MORAVEC (1967b). GAZDA (1967) studied *Caricetum davallianae* in the southern part of the Predsumaví region; the association has also been reported from the Trebon Basin (RYBNÍČEK

& RYBNÍČKOVÁ, 1970). A concise survey of meadow communities of the southern Predsumaví region was published by GAZDA (1972). Peat-bogs of the Trebon Basin have also been subject to phytocoenological observations (HOLUBICKOVÁ, 1961b, BREZINA et al., 1963) and so were reed-swamps and *Magnocaricetea* (NEUHÄUSL, 1965, JÍLEK, 1972). Phytocoenological conditions of the fish-ponds near Jarosov were described by HROUDOVÁ (1972). An association *Trifolio hybrido-Juncetum bufonii* on soils with oscillating moisture was described by GAZDA (1963).

Central Bohemia

A study of mesophilous and subxerophilous woods was undertaken (NEUHÄUSL & NEUHÄUSLOVÁ-NOVOTNÁ, 1968b). Considerable attention has been paid to the Bohemian Karst district, resulting in accounts of wood communities (SAMEK, 1964a; BLAZKOVÁ, 1962, ROHON, 1972, vicinity of Roblín), xerothermous grass communities (JANKO, 1971) and forest steppe vegetation (KUBÍKOVÁ, 1971, ecological gradients). Reed-swamps of the Berounka riverside were described by KOPECKÝ (1961a). In the Labe riverain, phytocoenological work centered around riverside forests (NEUHÄUSLOVÁ, 1965; NEUHÄUSLOVÁ-NOVOTNÁ, 1965a, also Ohre riverside) and basiphilous wet meadows (HOLUBICKOVÁ, 1970). A detailed description of the Vídřholec Wood (East of Prague) is given by NEUHÄUSL & NEUHÄUSLOVÁ-NOVOTNÁ (1966a); of the «Kunraticky les» (wood South of Prague) by NEUHÄUSL & NEUHÄUSLOVÁ-NOVOTNÁ (1971b). Wood communities of the Hrebeny Mts. were described by SAMEK (1962a), those of the Lower Sázava river valley by MRÁZ (1963). In the Middle Vltava river valley, studies were performed on *Robinia pseudoacacia* woods and screewoods (BLAZKOVÁ, 1961) and on acidophilous xerothermous vegetation (KOSINOVÁ-KUCEROVÁ, 1964). PIVNICKOVÁ (1970) examined the more basiphilous vegetation on spilites along Lower Vltava river. The anthropogenic vegetation of Prague was studied by HEJNY (1971c).

Northern Bohemia

A special attention was bestowed on mountains, particularly on the Krkonoše Mts. Research covered alpine and subalpine vegetation (JENÍK, 1961a, theory of anemo-orographical systems),

peat-bog communities (HADAC, E. & VÁNA, 1967, 1969; FERDA & MEJSTRÍK, 1964), communities of springs (HADAC, E. & VÁNA, 1971), communities with *Molinia coerulea* (VÁLEK, 1961), mountain meadows and pastures (KROPÁCOVÁ & SYKOROVÁ-HRUBCOVÁ, 1972), mountain beech forests (SYKORA, T., 1967b) and Norway spruce forests (STÖCKER, 1969). WAGNEROVÁ & SÍROVÁ (1971) described an interesting association *Saxifrago (oppositifoliae)*—*Festucetum versicoloris*. In the Jizerské hory Mts., attention was paid to forests (RABSTEINEK, 1969) and raised peat-bogs (NEVRILY, 1963; SYKORA, T., 1969b, Jizerka). A detailed description of the Novy Dim peat-bog (Krusné hory Mts.) will be found in VÁNA (1969). T. SYKORA (1967c) gives an outline of vegetation of the Jestěd Mts. As far as the sandstone district is concerned, woods of the Hradcany plateau were examined by T. SYKORA (1970), swamp communities along the Brehyně pond by NEUHÄUSL & NEUHÄUSLOVÁ-NOVOTNÁ (1965b) and a rare aquatic association of *Sparganiagetum minimi* in the Český ráj (Czech Paradise) area by SLAVÍK (1969a). A discussion of meadow communities in the Libunka Valley near Turnov is given by VALLOVÁ-STOLCOVÁ (1965). Colonization of ruins of abandoned settlements in northermost Bohemia was studied by JEHLÍK (1971). Interesting communities of woodland roads were described by T. SYKORA (1971).

Eastern Bohemia

Phytocoenologists attention was focused on lowlands and hills East of the Upper Elbe river (Zálabí area). Woods were studied by MIKYSKA (1963, 1967a, b, 1968, 1971) who also discussed changes in the structure of some communities studied by him almost 40 years ago (MIKYSKA, 1964a). Woods in the Jaroměř area have been dealt with by FIEDLER (1965), those of the eastern Elbe riverain by NEUHÄUSL & NEUHÄUSLOVÁ-NOVOTNÁ (1967a). Vegetation other than sylvestrine was examined by KOPECKÝ (1962, fen meadows; 1963, drained bottoms of ponds; 1972b, riverside communities with *Carex buckii*). Accounts of pine woods have been provided by MIKYSKA (1970), and NEUHÄUSL & NEUHÄUSLOVÁ-NOVOTNÁ (1972a, vicinity of Proseč). Publications concerning the Orlické hory Mts. include a note on the so-called summit phenomenon (KADLUS, 1967) and accounts of forests (MIKYSKA, 1972, also adjacent areas covered) and peat-bogs (PROCHÁZKA, 1972b). Protected localities in the

vicinity of Pardubice have been studied phytocoenologically by FIEDLER (1972), woods of the Bohemian-Moravian Highlands by MRÁZ (1965).

Western Moravia

Research in the Bohemian-Moravian Highlands covered mainly peat-bogs (RYBNÍČEK, 1964). In the highest zones of the Highlands, i. e. in the Jihlavské vrchy Mts. and Zdarské vrchy Mts., attention was given to both peat-bogs (RYBNÍČEK & RYBNÍČKOVÁ, 1961, Jihlavské vrchy Mts.; HOLUBICKOVÁ, 1961c, NEUHÄUSL, 1972b, Zdarské vrchy Mts.) and woods (KRONTORÁD & MÁLEK, 1961, Jihlavské vrchy Mts.; HORNÍK, 1967, vicinity of Brtnice). Peat-bogs were described by MÁLEK (1970b). VICHEREK & KORÁB (1969b) published on fen and meadow communities of Svitavy area. Woods of S. W. Moravia have been examined by MÁLEK (1961, 1970a), State nature reserves in the Moravian part of the Highlands by J. SMARDA (1969). The vegetation at the dam near Mostistě was studied by SEDA (1967).

Northern Moravia (including Silesia)

Much phytocoenological work was done in the Hraby Jeseník Mts., resulting in studies of alpine and subalpine vegetation (JENÍK, 1961a), subalpine scrub (REJMÁNEK, SYKORA & STURSA, 1971), Norway spruce forests (STÖCKER, 1971) and a discussion of problems of timberline (BEDNÁR et al., 1966; ALBLOVÁ, 1970). There are also accounts of woods in the foothills of the Hraby Jeseník Mts. (TICHÝ, 1970), in Silesian Uplands (NEUHÄUSL & NEUHÄUSLOVÁ-NOVOTNÁ, 1971a), in Ostrava area (TICHÝ, 1968), in eastern Silesia (NEUHÄUSL, 1963b) and in the Mionsí Primaeval Forest (SAMEK & JAVUREK, 1964). A description of *Carpinion* communities is given by NEUHÄUSL & NEUHÄUSLOVÁ-NOVOTNÁ (1972b). Studies on meadows covered the source area of the Odra River (DUDA & SULA, 1964), Odra riverside (BALÁTOVÁ-TULÁČKOVÁ, 1969b), and Opava riverside (BALÁTOVÁ-TULÁČKOVÁ, 1965b, 1972a). Weed communities in the vicinity of Osoblaha were studied by KÜHN (1965), vegetation of Ostrava dumps by J. SMARDA (1964c), littoral vegetation of Zermanice Dam by SEDA (1967).

Central Moravia

The focus of phytocoenological interest was Upper Morava riverain where accounts are now available of fen vegetation (BEDNÁR & VELÍSEK, 1963; BEDNÁR, JÍLEK & VELÍSEK, 1964; JÍLEK, B. & VELÍSEK, 1963; VELÍSEK, 1968), riverside forests (BEDNÁR, 1964a, b) and of xerothermous vegetation in the vicinity of Grygov (BEDNÁR & VELÍSEK, 1967). Woods of the Drahanská vrchovina Mts. were described by J. HORÁK (1961). An outline of vegetation of the Moravian Karst is given by J. SMARDA (1967a, b). Woods of the Chřiby Hills have been dealt with by PRUDIC (1967), those belonging to *Carpinion* also by NEUHÄUSL & NEUHÄUSLOVÁ-NOVOTNÁ (1972b). GRÜLL (1961) paid attention to meadows of the Zdánicky les Hills. Information on anthropophilous vegetation of Brno will be found in GRÜLL (1971). For an account of neophytes along watercourses, see KOPECKÝ (1967a).

Southern Moravia

In the south of Moravia there were studied mesophilous woods (NEUHÄUSL & NEUHÄUSLOVÁ-NOVOTNÁ, 1968c), woods and other vegetation on sands (SMARDA, F., 1961c), meadows (BALÁTOVÁ-TULÁČKOVÁ, 1966; VICHEREK, 1962, Lower Dyje riverain, complete hydroseries; 1965, subhalophilous meadows; 1967b, *Caricetum davallianae*) and halophilous vegetation (VICHEREK, 1962b). Plant succession on sands has been dealt with by F. SMARDA (1961b).

Eastern Moravia

Except for an account of woods of the Hostynské vrchy Mts. (PRUDIC, 1963), no phytocoenological work covering Eastern Moravia seems to have appeared. Of publications relating to adjacent areas, the following two should also be considered here: SAMEK & JAVUREK (1964, concerning Mionsí Primaeval Forest) and FAJMONOVÁ (1971b, concerning woods of the Javorníky Mts.).

Western Slovakia

In the Middle Váh riverain (from Zilina to Piestany) there were studied woods of the Javorníky Mts. (FAJMONOVÁ, 1971b, *Vaccinio-Abietion*), Mt. Vrsatec (FAJMONOVÁ, 1972b, beech-woods)

and Strázovská hornatina Mts. (FAJMONOVÁ, 1971a, 1972a, calciphilous beechwoods; FAJMONOVÁ & SIMEKOVÁ, 1972, woods with *Sesleria albicans*). Pastures of the *Cynosurion* alliance in the Strázovská hornatina Mts. have been dealt with by JURKO (1969a). Fragments of communities belonging to the *Quercion pubescantis* alliance have been reported from the northern part of the Biele Karpaty Mts. (FAJMONOVÁ, 1969), a xerothermous grass community *Carici humilis* — *Seslerietum calcariae* was examined in the Tematín Hills (MAGLOCKY, 1970). Research in the Kysucká vrchovina Mts. included acidophilous beechwoods (HANCINSKY, 1969) and pastures (URBANOVÁ, 1971), in N. W. Slovakia also communities of the *Polygonion avicularis* alliance (JURKO, 1967). In the Záhorie area attention was given to pine woods (Ruzicka, 1961, 1964b), basiphilous alderwoods (KRIPPEL, 1967, forest and sand vegetation (KRIPPEL, 1965a), peat-bogs (RAUCINA, 1962), and plant communities of the Abrod Nature Reserve (BOSÁCKOVÁ, 1970). Woods of the Malé Karpaty Mts. have been reviewed by NEUHÄUSLOVÁ-NOVOTNÁ (1970a, 1971), those of Dubník Wood on the Lower Váh River by MICHALKO & DZATKO (1965), acidophilous oakwoods of the Tribecské pohorie Mts. by HUSOVÁ (1967), the locality «Pohanská hora» in Malé Karpaty Mts. by KRIPPEL (1972).

Southern Slovakia

Phytocoenological work here centered around the Zitny ostrov area (KRIPPELOVÁ, 1965, halophilous vegetation; ZAHRADNÍKOVÁ-ROSETZKÁ, 1965, fen meadows; KRIPPELOVÁ & JURKO, 1965, a vegetation sketch; KRIPPELOVÁ, 1967a, pastures, reconstruction of vegetation; SOMSÁK in JENÍK [ed.] 1964, riverside forests). An autochthonous Pannonic forest with *Populus alba* and *Juniperus communis* has been reported from sands at Cenkov near Sturovo (KARPÁTIOVÁ, V. et al., 1961), forests in the northern part of Danube Lowlands were studied by DZATKO (1972), the vegetation in the vicinity of Levice by NEUHÄUSLOVÁ-NOVOTNÁ & NEUHÄUSL (1966). Riverside vegetation of the Lower Hron river was studied by SOMSÁK (1972), meadows in the valley of the Slaná river by REHOREK (1971a). For literature concerning S. W. Slovakia, see Western Slovakia, for S. E. Slovakia, see Eastern Slovakia.

Central Slovakia

A study of the association *Alnetum incanae* in Central Slovakia (in a broader sense) was undertaken (JURKO, 1961a). Pastures were studied in the Kremnické pohorie Mts. (JURKO, 1970), woods in the Stiavnické pohorie Mts. (NEUHÄUSL & NEUHÄUSLOVÁ-NOVOTNÁ, 1964b) and adjacent Krupinská vrchovina Hills (NEUHÄUSLOVÁ-NOVOTNÁ, 1965b). An account of xerothermous vegetation on andesitic tuffs on the locality Boky on the Middle Hron river was published by MAGIC (1968a). Studies carried out in the Slovenské Rudohorie Mts. cover pastures related to the *Nardo-Agrostidion* alliance (SOMSÁK, 1971), woods dominated by *Festuca drymeia* (MAGIC, 1968b), woods of the Mt. Klenovsky Vepor (MIADOK, 1969, Norway spruce forests; 1971a, beech forests) and peat-bogs in Mt. Trstie (TURCANOVÁ-CVACHOVÁ, 1972). SOMSÁK (1961) gives a characteristic of alderwoods in the Spissko-Gemerské Rudohorie Mts. and at Bacúch on the Upper Hron (SOMSÁK, 1967). HÁBEROVÁ (1968) published on basiphilous wet meadows on the Upper Hron, BANÁSOVÁ (1970) on colonization of asbestos dumps at Dobsiná. A sketch of vegetation of Slovak Paradise was published by J. SMARDA (1970). Occurrence of oakwoods in the western part of the Hnilec Valley was reported by VOLOSCUK (1964).

Northern Slovakia

Communities of the *Polygonion avicularis* alliance in N. W. Slovakia were studied by JURKO (1967), pastures of the Kysucká hornatina Mts. by URBANOVÁ (1971), acidophilous beechwoods by HANCINSKY (1969). SOMSÁK (1963) described oakwoods in the southern part of the Malá Fatra Mts. and BOSÁCKOVÁ (1967) gave an account of the well-known fen near Stankovany. Considerable attention was bestowed on the Orava region where an interesting xerothermous association was reported by VICHEREK (1967a), pastures were examined by JURKO (1971b), peat-bogs by RAUCINA (1964) and BOSÁCKOVÁ (1968), riverside plant communities by KOPECKY (1969a, 1971a, 1972a) who also published on nitrophilous communities of wood margins in the foothills of the Western Tatra (KOPECKY, 1971b). Forests along the Slovak-Polish borderline north of the Western Tatra were examined by PANZER-KOTEJOWA (1965). In Liptov Basin, there were studied oakwoods (KONTRIS, 1965) and scrub (KONTRIS, 1966). KONTRISOVÁ (1971) recorded fen meadows

on alluvia of the Biely Váh. J. HORÁK (1971) published on timberline geobiocoenoses in the Western Tatra; a vegetation sketch of those mountains was provided by KNAZOVICKY (1970). For a review of higher units of the phytosociological system in the Tatra, see E. HADAC (1962), who, with a group of collaborators, also published a detailed account of plant communities of the valley Dolina Siedmich Pramenov in the Belanské Tatry Mts. (HADAC, E. et al., 1969, concerning chiefly alpine and subalpine vegetation) and of the vicinity of the mountain lake Trojrohé Pleso in the High Tatra (HADAC, E., JEZEK & BREZINA, 1969). Secondary plant communities of higher montane zones have been described by J. SMARDA (1963), who described also succession on devastated slopes near the timberline (SMARDA, J., 1964d) and, in collaboration with Rauser, also published a vegetation survey of the valley Dolina Siedmich Pramenov (SMARDA, J. et RAUSER, 1966). Grass vegetation of Spis Basin has been discussed by J. SMARDA (1961), plant communities of the Poprad riverside by ZALIBEROVÁ (1970, 1971). For information on the vegetation of Presov area, see the section on Eastern Slovakia.

Eastern Slovakia

A report on oakwoods of the *Potentillo albae-Quercetum* ass. in the vicinity of Presov was published by JURKO (1965); he also gave an account of pastures in that areas (JURKO, 1971a). In the lowlands of Kosice, meadows were examined by SPÁNIKOVÁ (1969, 1971), and a *Sagino-Bryetum argentei* by KRIPPELOVÁ (1967a). Much attention was given to the Tisa lowlands where studies were made on swamps (SOMSAK, 1964), riverside woodlands (BERTA, 1970), and meadows and fens (RUZICKOVÁ, 1971). FRANO (1971), in his soil microbiological study, also describes different vegetation types excepting woods. Woods of the Zemplínské vrchy Hills have been dealt with by NEUHÄUSL & NEUHÄUSLOVÁ-NOVOTNÁ (1967a) and FRANO, JURKO & SOMSAK (1971). PETRÁNOVÁ (1967) studied fens on the southern foot of the Vihorlat Mts. A vegetation sketch of the outstanding locality of Rabia skala in the Nízké Poloniny Mts. was provided by KUCEROVÁ & JENÍK (1963).

Larger areas

Some publications cover larger areas then those adopted for the purpose of the present account. A new vegetation survey of

Slovakia is given by COLL. (1972). A classification survey of woody vegetation of Slovakia may be found in ZLATNÍK (1961) and HANCINSKY (1972). A survey of alder woods in Slovakia is provided by V. KÁRPÁTI, I. KÁRPÁTI & JURKO (1963). As far as the Slovak Carpathians are concerned, shrub vegetation was reviewed by JURKO (1964a), pastures of the *Cynosurion* alliance by JURKO (1969b) and Silver Fir forests by E. HADAC (1965). Subhalophilous meadows of the *Agrostion albae* alliance in the Pannonian region of Southern Moravia and Southern Slovakia were studied by VICHEREK (1965) who also published a review of halophilous vegetation of Czechoslovakia (VICHEREK, 1961). Woody vegetation of Western Czechoslovakia is included in the synthesis by HARTMANN & JAHN (1967), vegetation of hillslopes with *Quercus pubescens* in the summarizing work by JÁKUCS (1961).

The following survey is arranged by the types of phytocoenoses concerned.

Special attention has been paid to woods, as indicators of original environmental conditions. The following papers deal with different aspects of wood vegetation: BLAZKOVÁ (1962, Roblín, C. Bohemia); DZATKO (1972, Danube Lowlands); FIEDLER (1965, Jaroměr area, E. Bohemia); FRANO, JURKO & SOMSAK (1971, Zemplínské vrchy Hills); HANCINSKY (1972, forest types of Slovakia); HORÁK, J. (1961, Drahanská vrchovina Mts.); HORNÍK (1967, S. W. Moravia); HUSOVÁ (1968a, S. W. Bohemia); KRONTORÁD & MÁLEK (1961, Jihlavské vrchy Mts.); MAGIC (1968b, Slovenské Rudohorie Mts.); MÁLEK (1961, 1970a, S. W. Moravia); RICHALKO & DZATKO (1965, Lower Váh valley); MIKYSKA (1963, 1964a, 1967a, b, 1968, 1972, E. Bohemia); MORAVCOVÁ-HUSOVÁ (1963, S. Bohemia); MRÁZ (1963, lower Sázava valley; 1965, Bohemian-Moravian Highlands); MUSIL (1963, forest types); NEUHÄUSL (1963b, E. Silesia); NEUHÄUSL & NEUHÄUSLOVÁ-NOVOTNÁ (1964b, Stiavnické pohorie Mts.; 1966a, East surroundings of Prague; 1967a, Zemplínské vrchy Hills, 1971a, Silesian hillcountry; 1971b, southern surroundings of Prague); NEUHÄUSLOVÁ-NOVOTNÁ (1965b, Krupina area; 1970a, 1971, Malé Karpaty Mts.); PISTA (1970, S. Bohemia; 1972, Sumava Mts.); PLÍVA & PRUSA (1969, forest types); PRUDIC (1963, Hostynské vrchy Mts.; 1967, Chřiby Hills); PRUSA (1972, forest types); RABSTEINEK (1969, Jizerské hory Mts.); RANDUSKA (1963, forest

types); SAMEK (1961b, Boubín Primaeval Forest in the Sumava Mts.; 1962a, 1964a, C. Bohemia); SAMEK & JAVUREK (1964, Mionsí Primaeval Forest in the Beskydy Mts.); SMARDA, F. (1961, S. E. Moravia, sands); SOFRON (1967a, Central Berounka valley); SYKORA, T. (1970, N. Bohemia); TICHY (1968, Ostrava area; 1970, promontories of Hrúby Jeseník Mts.); VOREL (1961, Sumava Mts.); ZLATNÍK (1961, typological classification of Slovak forests).

Deciduous more or less mesophilous forests: MORAVCOVÁ-HUSOVÁ (1964a, S. Bohemia; 1964b, S. W. Bohemia); NEUHÄUSL & NEUHÄUSLOVÁ-NOVOTNÁ (1968b, C. Bohemia; 1968c, S. Moravia; 1969a, E. Bohemia).

Hornbeam-oakwoods (*Carpinion*): MORAVEC (1964a, S. W. Bohemia); NEUHÄUSL & NEUHÄUSLOVÁ-NOVOTNÁ (1968d, Czechoslovakia; 1972b, C. and N. Moravia); NEUHÄUSLOVÁ-NOVOTNÁ (1963, classification; 1964, Czechoslovakia); NEUHÄUSLOVÁ-NOVOTNÁ & NEUHÄUSL (1971, subcontinental Europe).

Riverside forests: BEDNÁR (1964a, b, Upper Morava river Basin); BERTA (1970, Tisa Lowlands); DOVOLILOVÁ-NOVOTNÁ (1961); JURKO (1961a, C. Slovakia, *Alnetum incanae*; 1964, riverside thickets); KÁRPÁTI, V., I. KÁRPÁTI & JURKO (1963, Slovakia); NEUHÄUSLOVÁ (1965, Elbe Lowlands); NEUHÄUSLOVÁ-NOVOTNÁ (1965a, Elbe and Ohre Lowlands; 1972, *Stellario-Alnetum glutinosae*, the Czech lands); SOMSÁK (1961, Spissko-Gemerské Rudohorie Mts.).

Oakwoods: HUSOVÁ (1967, Tribecské pohorie Mts., acidophilous oakwoods); JURKO (1965, Presov area, *Potentillo albae-Quercetum*); KONTRIS (1965, Liptov Basin); NEUHÄUSL & NEUHÄUSLOVÁ-NOVOTNÁ (1967b, acidophilous oakwoods); SOMSÁK (1963, N. W. Slovakia); VICHEREK (1962a, Silesia); VOLOSCUK (1964, C. Slovakia).

Beechwoods: FAJMONOVÁ (1971a, 1972, Central Váh river valley, calciphilous beech forests; 1972a, Vrsatec Mts.); HANCINSKY (1969, N. W. Slovakia, acidophilous beech forests); MIADOK (1971a, Klenovsky Vepor Mts.); MORAVCOVÁ-HUSOVÁ (1966, Písek area); NEUHÄUSL (1969a, Czechoslovakia); SYKORA, T. (1967b, Krkonose Mts., mountain beech forests).

Silver Fir forests: FAJMONOVÁ (1971b, Javorníky Mts., *Vaccinio-Abietion*); HADAC, E. (1965, Carpathians); HUSOVÁ (1968b, S. Bohemia).

Norway Spruce forests: MÁLEK (1972b, Bohemian-Moravian Highlands, sphagnicolous spruce forests); MIADOK (1969, C. Slovakia); STÖCKER (1969, Krkonose Mts.; 1971, Jeseník Mts.).

Scree woodlands: BLAZKOVÁ (1961, Central Vltava river valley); HUSOVÁ (1968b, S. Bohemia).

Alderwoods: KRIPPEL (1967, Zahorie Lowlands); SOMSÁK (1967, Upper Hron river valley) — see also riverside forests.

Pine-woods: MIKYSKA (1964c, Sumava Mts.; 1970, Bohemia and Klodzko region in Poland); MORAVEC (1972, woods with *Goodyera repens*); NEUHÄUSL & NEUHÄUSLOVÁ-Novotná (1972a, E. Bohemia); Ruzicka, M. (1961, 1964b, Zahorie Lowlands).

Quercus cerris woodlands: JÁKUCS (1961); NEUHÄUSLOVÁ-Novotná & NEUHÄUSL (1965).

Quercus pubescens forest steppe (*Quercion pubescentis*): FAJMONOVÁ (1969, fragments in northern part of the Biele Karpaty Mts.); JÁKUCS (1961a, b, Czechoslovakia); MAGIC (1968a, Central Hron river valley).

Robinia pseudoacacia woods: BLAZKOVÁ (1961, Central Vltava river valley); JURKO (1963, Slovakia).

Special types of forests: FAJMONOVÁ & SIMEKOVÁ (1972, forests with *Sesleria albicans*); KÁRPÁTIOVÁ, V. et al. (1961, Pannonian forest of *Populus alba* and *Juniperus communis*, Stúrovo area); NEUHÄUSL (1969b, sphagnicolous forests in Europe).

Specialized papers on forests: AMBROS (1971, ecological character of the herbaceous layer on «Flysch» sandstones); HANCINSKY (1971, characteristics of the vegetational belts); MIKYSKA (1971, diagnostic groups of the undergrowth species); PLASILOVÁ (1970, root systems of species of the herbaceous layer).

Scrub and fruticuli vegetation: JURKO (1964a, Slovak Carpathians; 1964b, E. Slovakia); KONTRIS (1966, Liptov Basin); SOFRON (1967a, Central Berounka river valley); VICHEREK (1962a, *Sarothamnion, Calluno-Genistion*).

Rock communities: JURKO & PECLAR (1963, shady rocks in Slovak Carpathians); VICHEREK (1970, serpentine rocks).

Xerothermous communities of grasses and herbs: BEDNÁR & VELÍSEK (1967, Grygov, C. Moravia); KOSINOVÁ-KUCEROVÁ (1964, Central Vltava river valley, acidophilous communities); MAGIC (1968a, Central Hron river valley); MAGLOCKY (1970, *Carici humili-Seslerietum calciaeae*, W. Slovakia); MARTINOVSKY, 1967d, vegetational sketch of the Oblík Hill in the Ceské Stredohorí Mts.); MORAVEC (1967b, *Sedo-Scleranthetea*, S. W. Bohemia); TOMAN, M. (1969c, proposal of a new classification of steppe vegetation); VICHEREK (1967a, Orava region; 1970, serpentines of C. Europe).

Psammophilous communities: KRIPPEL (1969, Czechoslovakia); SMARDA, F. (1961b, c, S. Moravia); VICHEREK (1962a, *Corynephorion*, Silesia).

Grassland: SMARDA, J. (1961a, Spis Basin).

Pasture communities: JURKO (1969a, *Cynosurion*, Strázovská hornatina Mts.; 1969b, *Cynosurion*, Carpathians; 1970, Kremnické pohorie Mts.; 1971a, district Presov; 1971b, Orava region; 1971c, Slovakia); KRIPPELOVÁ (1967a, S. Slovakia); KROPÁCOVÁ & SYKOROVÁ-HRUBCOVÁ (1972, Krkonose Mts.); SOMSÁK (1971, *Nardo-Agrostidion*, Slovenské Rudohorie Mts.); URBANOVÁ (1971, *Anthoxantho-Agrostidetum*, N. W. Slovakia).

More or less mesophilous meadow communities: BALÁTOVÁ-TULÁCKOVÁ (1965a, *Cnidion venosi*; 1965b, Hlucín area; 1966, S. Moravia; 1969a, *Cnidion venosi*; 1969b, Odra river valley; 1970); GRÜLL (1961, C. Moravia); KROPÁCOVÁ (1961, *Festucetum rubrae*); KROPÁCOVÁ & SYKOROVÁ-HRUBCOVÁ (1972, Krkonose Mts., mountain meadows); MIADOK (1971b, valley meadows, C. Slovakia); MORAVEC (1965a, central part of Sumava Mts.); RUZICKOVÁ (1971, Tisa Lowlands); REHOREK (1971a, valley meadows along the Slaná river); SPÁNIKOVÁ (1969, *Alopecuretum pratensis*, Kosice Basin; 1971, Kosice Basin); VALLOVÁ-STOLCOVÁ (1965, Turnov area); VICHEREK (1962c, Lower Dyje river valley; 1965, subhalophilous meadows of *Agrostion albae*, Pannonian region of Czechoslovakia); VICHEREK & KORÁB (1969, Svitavy area) — see also the fen communities.

Fen communities (incl. fen meadow communities): BALÁTOVÁ (1968, *Molinietalia*); BALÁTOVÁ-TULÁCKOVÁ (1963b, *Molinietalia*; 1965a, *Cnidion venosi*; 1965b, Hlucín area; 1966, S. Moravia; 1968, *Molinietalia*; 1969a, *Cnidion venosi*; 1969c, *Serratulo-Plantaginetum altissimae*; 1972a, Opava river valley); BEDNÁR, JÍLEK & VELÍSEK (1964, Upper Morava river Basin); BEDNÁR & VELÍSEK (1963, Upper Morava river Basin); BOSÁCKOVÁ (1967, locality Stankovany in Upper Váh river valley); DOHNAL et al. (1965); GAZDA (1967, *Caricetum davalliana*, promontories of the Sumava Mts.); HÁBEROVÁ (1968, *Caricetum davalliana*, Upper Hron river valley); HOLUBICKOVÁ (1970, Elbe Lowlands); HOSTICKA (1967, locality Soos in W. Bohemia); JÍLEK, B. & VELÍSEK (1963, Upper Morava river Basin); KONTRISOVÁ (1971, alluvial fens on the stream Biely Váh); KOPECKÝ (1962, fen meadows, N. E. Bohemia); MORAVEC (1966, classification of *Caricetum davalliana*); MORAVEC & RYBNÍČKOVÁ (1964, *Caricetum davalliana*, Sumava Mts.); PETRANOVÁ (1967, fens, E. Slovakia);

RUZICKOVÁ (1971, E. Slovakia); RYBNÍČEK & RYBNÍČKOVÁ (1970, *Caricetum davallianae*, Trebon Basin); VELÍSEK (1968, basiphilous reedswamps, Upper Morava river Basin); VICHEREK (1967b, *Caricetum davallianae*, S. Moravia); VICHEREK & KORÁB (1969, Svitavy area); ZAHRADNÍKOVÁ-ROSETZKÁ (1965, *Molinion*, Danube Lowlands).

Peat-bogs: BOSÁČKOVÁ (1968, Orava region); BREZINA et al. (1963, Trebon Basin); DOHNAL & MEJSTRÍK (1963, Slavkovsky les Mts.); DOHNAL et al. (1965); DUDA & SULA (1964, N. Moravia); FERDA & MEJSTRÍK (1964, Krkonose Mts.); HADAC, E., JEZEK & BREZINA (1969, Vysoké Tatry Mts.); HADAC, E. & VÁNA (1967, 1969, Krkonose Mts.); HOLUBICKOVÁ (1961a, Sumava Mts. 1961b, Zdárske vrchy Mts.; 1961c, Trebon Basin); MEJSTRÍK (1967, Krusné hory Mts.); NEUHÄUSL (1969b, forest peat-bogs in Europe; 1972b, Zdárske vrchy Mts.); NEVRLY (1963, Jizerské hory Mts.); RAUCINA (1962, W. Slovakia; 1964, N. Slovakia); RYBNÍČEK (1964, Bohemian-Moravian Highlands); RYBNÍČEK & RYBNÍČKOVÁ (1961, Jihlavské vrchy Mts.); SOFRON & SANDOVÁ (1972, Sumava Mts.); SYKORA, T. (1969b, Jizerské hory Mts.); VÁNA (1963-64, 1969, Krusné hory Mts.).

Swamp communities: BALATOVA-TULÁCKOVÁ (1963a, *Phragmitetea*; 1963b, *Magnocaricetalia*); BLAZKOVÁ (1971a, *Caricetum gracilis*; 1971b, *Junco inflexae-Menthetum longifoliae*); NEUHÄUSL (1965, reedswamps and *Magnocaricetea*, Trebon Basin); NEUHÄUSL & NEUHÄUSLOVÁ-NOVOTNÁ (1965b, N. Bohemia); NEUHÄUSLOVÁ-NOVOTNÁ & NEUHÄUSL (1972, *Scirpetum silvatici* in W. Czechoslovakia); SOMSÁK (1964, Tisa Lowlands); SPÁNIKOVÁ (1968, *Scirpetum silvatici* in Slovakia); VELÍSEK (1968, basiphilous reedswamps, Upper Morava river Basin).

Aquatic communities and communities of bottoms: HEJNY (1968, classification of aquatic communities); HRODOVÁ (1972, fish-ponds, S. Bohemia); KOPECKÝ (1963, bottom of fish-ponds, N. E. Bohemia); SLAVÍK (1969a, *Sparganieturn minimi*, N. Bohemia); SEDA (1967, litoral of Moravian dams).

Riverside communities: JENÍK (1964b, water dams); JURKO (1964a, riverside thickets); KOPECKÝ (1961a, *Phalaridion*, Berounka river; 1965, ecology of macrophytes; 1966, reedswamps; 1967a, neophytic communities of C. Moravia; 1967b, c, riverside *Phalaridion* communities; 1968, riverside reedswamps; 1969a, communities with *Carex buekii*, Orava region; 1969d, change of the specific composition of the communities caused by floods, Orlice river; 1972a, *Glycerie-*

tum nemoralis-plicatae, Orava region; 1972b, communities with *Carex bukii* in N. E. Bohemia); KOPECKY & HEJNY (1965a, b, riverside *Phalaridion*); SOFRON & STEPÁN (1971a, Upper Otava river); SOMSÁK (1972, Lower Hron river); ZALIBEROVÁ (1970, *Rorippa sylvestris* — *Agrostietum stoloniferi*, Poprad river; 1971, *Bidention*, Poprad river).

Vegetation of springs: HADAC, E. & VÁNA (1971, Krkonose Mts.).

Halophytic vegetation: KŘIPPELOVÁ (1965, Danube Lowlands); VICHEREK (1961, Czechoslovakia; 1962b, S. Moravia).

Alpine and subalpine vegetation: HADAC, E. et al. (1969, Belanské Tatry Mts.); JENÍK (1961a, Vysoké Sudety Mts.); REJMÁNEK, SYKORA & STURSA (1971, Hrúby Jeseník Mts., communities of subalpine scrub); SMARDA, J. (1964d, succession on disturbed slopes); SMARDA, J. et al. (1963, anthropophilous communities); VÁLEK (1961, Krkonose Mts., *Molinietum*); VOLOSCUK (1966, *Pinus mugo* vegetational belt); WAGNEROVÁ & SÍROVÁ (1971, Krkonose Mts.).

Vegetation of secondary habitats and those modified by human activity: GRÜLL (1971, ruderal communities, Brno); HEJNY (1971c, ruderal flora and vegetation of a city, Praha); JEHLÍK (1971a, vegetation of ruins, N. Bohemia); JURKO (1964c, segetal communities of vineyards; 1967, *Polygonion avicularis*, N. W. Slovakia); KOPECKY (1969e, nitrophilous communities of wood margins, *Galio-Urticetea*; 1971a, b, nitrophilius communities of wood margins in promontories of the Západné Tatry Mts.); KOPECKY & HEJNY (1971, nitrophilous communities of perennial herbs of wood margins, theory of secondary communities, N. E. and C. Bohemia); KROPÁC, HADAC & HEJNY (1971, problems of segetal communities); KÜHN (1963, segetal communities in halophytic ecotops; 1965; 1971, segetal communities, N. Moravia); MARVANOVÁ (1969, segetal communities); NEUHÄUSLOVÁ-NOVOTNÁ, NEUHÄUSL & HEJNY (1969, *Aegopodium podagrariae*, Czechoslovakia); NEUHÄUSLOVÁ-NOVOTNÁ & NEUHÄUSL (1970, *Agropyro repenti-Aegopodietum podagrariae*, Bohemia); PYSEK (1972, ruderal vegetation of a town, S. W. Bohemia); SYKORA, T. (1971, communities of forest roads, N. Bohemia); SMARDA, J. (1964c, dumps in Ostrava region); SMARDA, J. et al. (1963, anthropophilous communities in the mountains); TOBERNÁ (1969, colonization in dumps, W. Bohemia); VOLF (1965, segetal communities, W. Bohemia).

Special communities: GAZDA (1967b, *Trifolio hybridii-Juncetum bufonii*, S. Bohemia); KRIPELOVÁ (1967b, *Sagino-Bryetum argentei*, E. Slovakia); SYKORA, T. (1971, communities of forest roads); VICHEREK (1968, communities with *Myosurus minimus*; 1969, *Cyperus fuscus* — *Chenopodium glaucum* ass.).

Much emphasis was laid on vegetation mapping. In the period covered by this review, mapping of the Czech lands was completed and the publication of the maps is now being finished (MIKYSKA et al., 1968). Mapping of Slovakia also draws to a close and a synthetical map is now being prepared. The primary aim was reconstruction of archetypal vegetation. A meeting was devoted to problems of vegetation mapping and the results have been edited by M. RUZICKA (1961b). A number of other publications on vegetation mapping have appeared. Progress in mapping of Moravia has been reviewed by NEUHÄUSL (1963a) who also reported on the vegetation map of Bohemia and Moravia (NEUHÄUSL, 1963d). SAMEK (1961a) published on typological mapping, MRÁZ & SAMEK (1963) on vegetation mapping, MAGIC, MICHALKO & JURKO (1966) on the vegetation map of the Carpathians, MICHALKO (1971) on the mapping of Slovakia. Vegetation maps of the Zálabí area in Eastern Bohemia have been prepared by MIKYSKA (1967b). Problems of the reconstructional vegetation mapping have been discussed by NEUHÄUSL (1964a) and MICHALKO (1965). In some cases there was a considerable difference of opinions on mapping of particular areas such as Intra-Carpathian basins; see for instance the discussion on the mapping of Spis Basin (MAGIC, 1969, 1971, NEUHÄUSL & NEUHÄUSLOVÁ-NOVOTNÁ, 1969c).

Problems of timberline in the mountains have also been subject to discussion. Alpine timberline has been dealt with by JENÍK & LOKVENC (1962), LOKVENC (1965), and SOMORA (1969), and is thoroughly discussed in a recent monograph on the problem in the High Tatra and Belanské Tatry Mts. by PLESNÍK (1971). Timberline in the Hraby Jeseník Mts. was studied by BEDNÁR et al. (1966) and ALBLOVÁ (1970); on the Mt. Choc by PLESNÍK (1966). Timberline geobiocoenoses in the Western Tatra have been described by J. HORÁK (1971) and KNAZOVICKÝ (1970). The so-called summit phenomenon, which is in relation to the alpine timberline, has been observed by KADLUS (1967) in the Orlické hory Mts.

Of geobotanical publications, the following should also be mentioned here: A survey of the higher coenotaxa with their

ecological and phytocoenological characteristics (as defined by indicator species groups) was compiled by HOLUB et al. (1967). Delimitation of vegetation zones (belts) and their indication by forest plant species was proposed by ZLATNÍK (1963). A proposal for designation of the highest units of the phytocoenological system and a survey of these was published by E. HADAC (1967a). The work of KOPECKÝ & HEJNY (1971) is a detailed review of theoretical problems concerning the coenology of anthropogenic vegetation. MORAVEC (1965b, 1968a, 1969b, c) and NEUHÄUSL (1968) took a close look at nomenclatural problems of phytocoenology; an attempt has been made to produce a Code of phytocoenological nomenclature based on similar principles as the ICBN. Problems of phytocoenological terminology have been considered by NEUHÄUSL (1963c) and FUKAREK, JASNOWSKI & NEUHÄUSL (1964), resulting in a vocabulary prepared by NEUHÄUSLOVÁ-NOVOTNÁ & NEUHÄUSL (1969a). Definitions of certain terms were subject to animated discussions (see *Zprávy Cs. Bot. Spolec., Praha*, 5: 119-127, 1970; 6: 232-234, 1971). A bibliography of geobotanical publications for 1945-1960 was compiled by JENÍK (1961b) and DOVOLILOVÁ et al. (1962) and a review of the progress in systematic phytocoenology in Czechoslovakia since 1960 was published by NEUHÄUSL (1972a).

A meeting of the Czechoslovak Botanical Society was held to discuss problems of the existence of steppes in this country in the post-glacial era and opinions, some controversial, were given by JENÍK (1969), MORAVEC (1970), LOZEK (1971), JENÍK & LOZEK (1970) and recently most thoroughly by MARTINOVSKÝ (1971a).

HADAC, E. & SMOLA (1962a, b) placed under review the relationships between snow cover and distribution in the mountains of certain plant communities. The impact of wind erosion on alpine vegetation was discussed by J. SMARDA (1964b). Fluctuation of water level in relation to aquatic communities of macrophytes and their characteristics has been dealt with by HEJNY (1962). A classification of riverside habitats based on hydrological principles was propounded by KOPECKÝ (1969c). An attempt at phyto-indication of landslip areas was made by L. SYKORA (1961). KÜHN (1967b) attempted to employ weeds in indicating the various soil types. A volume edited by JENÍK (1964) is concerned with vegetation problems of dams. Ecological indications in meadows plants was studied by REGÁL (1967a), the vegetation of spilites in the Lower Vltava valley by PIVNICKOVÁ (1970), microclimatic conditions of rock

steppe in S. Moravia by RYCHNOVSKÁ & ÚLEHLOVÁ (1966). MIKYSKA (1964a) provides a critical examination of changes in the vegetation of a locality after almost 40 years; he also discussed the facies-phases of undergrowth in forests exploited by man (MIKYSKA, 1964b). KOPECKÝ (1969d) gives an account of changes in riparian communities caused by floods. Ecological gradients in a forest steppe in the Bohemian Karst are described in a paper by KUBÍKOVÁ (1971), whereas a quantitative analysis of xerothermous grassland vegetation in that area was made by JANKO (1971). KUBÍKOVÁ (1967) took a close look at root systems of woody plants and PLASILOVÁ (1970) studied root systems of the herbaceous layer in deciduous woods. Different modes of dissemination have been examined by PIKULA (1963). A study of these modes, including also a list of appropriate terms, is given by MÜLLER-SCHNEIDER & LHOŠTÁK (1971); see also the vocabulary of phytogeographical terms by HOLUB & JIRÁSEK (1971). JEHLÍK & LHOŠTÁK (1970) provide an insight into carpobiology of anthropogenic vegetation in the S. E. vicinity of Prague. Endozoic dispersal by hares of seeds of trees and shrubs was examined by TURCEK (1964). An examination of seeds and fruits of mountain plants and their dispersal mechanisms was provided by J. SMARDA & SMARDOVÁ (1966). Altitudinal distribution of plants in the High Tatras was discussed by PACLOVÁ (1971).

Studies on floral biology of Czechoslovak plants have been published by Daumann and are listed in the section on autecology. A survey of pollination types in the Czechoslovak flora was given by DAUMANN & SYNEK (1968) and DAUMANN (1972b). DAUMANN also published on ombrogamy (1970b) and hydrogamy (1963d).

The following is a list of taxa for which important ecological data have been provided in the pertinent publications; notes are appended in most cases specifying the information supplied.

Abies alba (HAJDÚK, 1965), root system.

Acer platanoides (SVOBODOVÁ, D., 1972), floral biology.

Aldrovanda vesiculosa (BERTA, 1961), ecology.

Alisma plantago-aquatica (DAUMANN, 1965), floral biology.

Allium strictum (MARTINOVSKÝ, 1969), ecology.

Arctostaphylos uva-ursi (MORAVEC, 1967a), synecology.

Aristolochia clematitis (DAUMANN, 1971), floral biology.



- Asarum europeum* (DAUMANN, 1972a), floral biology.
Bidens (LHOTSKÁ, 1968c), carpobiology.
Carex buekii (KOPECKY, 1972b), ecology.
C. davalliana (RYBNÍČEK & RYBNÍČKOVÁ, 1970a), ecology.
C. fritschii (HOLUB & MORAVEC, 1964), synecology.
C. strigosa (HORÁK, J. & DVORÁK, 1968), ecology.
Ceterach officinarum (BLAZKOVÁ, 1971a), ecology on the edge of distribution area.
Coleanthus subtilis (HEJNY, 1969), ecology.
Cornus mas (STRNADOVÁ, 1964), ecology in C. Bohemia.
Corynephorus canescens (RYCHNOVSKÁ-SOUDKOVÁ, 1961), physiological and ecological study; (RYCHNOVSKÁ, 1963), ecology in an isolated Hungarian locality.
Cypripedium calceolus (DAUMANN, 1968b), floral biology.
Dianthus arenarius (TOMAN, M., 1970b), ecology.
Dictamnus albus (SLAVÍKOVÁ, Z. & SVEREPOVÁ, 1964), floral biology.
Digitalis (DAUMANN, 1970c), floral biology.
Drosera rotundifolia (TURCANOVÁ-CVACHOVÁ, 1972), synecology.
Dryas octopetala (KUBÍKOVÁ, 1972a), ecology.
Echinocystis lobata (SLAVÍK & LHOTSKÁ, 1967), carpobiology.
Festuca drymeia (MAGIC, 1968b), synecology.
F. tenuifolia (POSPÍSIL, V., 1969), ecology.
F. vallesiaca et *F. rupicola* (HROUDOVÁ-PUCELÍKOVÁ, 1972), ecology.
Fraxinus excelsior (JENÍK & KUBÍKOVÁ, 1962), mycorrhiza.
Hesperis slovaca (DVORÁK, F., 1964b), ecology.
Impatiens (DAUMANN, 1967a), pollination and dissemination.
I. glandulifera (LHOTSKÁ & KOPECKY, 1966), biology.
Iva xanthifolia (LHOTSKÁ & SLAVÍK, 1969), carpobiology.
Juniperus communis subsp. *communis* (VOLNY, 1963), root system; (1964), soil conditions.
Leucoium aestivum (SLAVÍK & HEJNY, 1971), ecology.
Mercurialis (DAUMANN, 1972c), floral biology.
Myosurus minimus (VICHEREK, 1968), synecology.
Myricaria germanica (KUBÍKOVÁ, 1972b), ecology and biology.
Nardus stricta (TURCEK, 1970), seed production and viability.
Phragmites communis (DYKYJOVÁ, 1971), ecomorphoses and ecotypes; (RYCHNOVSKÁ, 1967), physiological autecology, heterogeneity of leaves.
Picea abies (LOKVENC, 1962), influence of the altitude.
Pinus cembra (MYCZKOWSKI, 1969), Tatra Mts.

- P. mugo* subsp. *pumilio* (STURSA, 1966; LOKVENC, 1971), Krkonose Mts.
- Poa pratensis* (REGÁL, 1967b), agroecological characteristics.
- Polygonatum odoratum* (JIRESOVÁ, 1964), biology.
- Potamogeton* (DAUMANN, 1963b), floral biology.
- Pulsatilla vulgaris* subsp. *grandis* (HILBERT, 1971), ecology and biological production.
- Quercus pubescens* (STRNADOVÁ, 1964), ecology in C. Bohemia.
- Ranunculaceae* (DAUMANN, 1969), floral biology.
- Rhynchospora alba* (RYBNÍČEK, 1970a, b), ecology.
- Salix herbacea* (JENÍK & KUBÍKOVÁ, 1963).
- Stipa* (ÚLEHLOVÁ, 1964), edaphic characteristic; (RYCHNOVSKÁ, 1965), water balance; (RYCHNOVSKÁ-SOUDKOVÁ, 1966), water economy; (ÚLEHLOVÁ & RYCHNOVSKÁ, 1967), edaphic characteristic of localities in Austria.
- Tilia europaea* (SEN, 1961, 1964), ecology of roots.
- Trichophorum alpinum* (SULA, 1972), ecology.
- Typha latifolia* (FIALA, 1971), seasonal changes in clones.
- Veratrum lobelianum* (DAUMANN, 1968a), pollination.
- Veratrum nigrum* (DAUMANN, 1963a), floral biology.
- Virga strigosa* (LHOTSKÁ, 1968b), carpobiology.

8. FLORISTICS AND PHYTOGEOGRAPHY

The past decade saw an enormous progress in floristics and phytogeography. A multitude of publications appeared, either covering particular areas or discussing particular taxa. Floristic works often contain important information on certain taxa, sometimes also distribution maps covering areas larger than described in the paper. For convenience, data of this kind have been included in the list of references to individual taxa.

This section on floristics and phytogeography is mainly concerned with the results of floristic research in different parts of Czechoslovakia. It also gives a review of the taxa examined, including the pertinent literature, either floristic or phytogeographical.

Of the publications relating to phytogeography, the following should also be considered here.

A floristic and phytogeographical survey of Slovakia was given by FUTÁK (in COLL., 1972). A biogeographical subdivision of Czechoslovakia was proposed by RAUSER (1967). Several authors

have set forth proposals for improvement and modification of the phytogeographical subdivision of Czechoslovakia by DOSTÁL (see NEUHÄUSL & NEUHÄUSLOVÁ-Novotná, 1964a; SKALICKY, 1965a; TOMAN, M., 1969a; the latter substantiated the separation of the North Bohemian steppe district). Phytogeographical elements have been listed by RAUSER (1964). A preliminary subdivision of the Czechoslovak flora into floristic elements was advanced by HOLUB (1971b). Slovak endemics have been considered by FUTÁK (1971), Carpathian ones by PAWLOWSKI (1970b). Phytogeographical relationships between the Western Carpathians and Eastern Alps have been dealt with by FUTÁK (1966c). An account of phytogeographical terminology, with proposals for its unification, will be found in HOLUB & JIRÁSEK (1967, general terminology; 1968, terminology of distribution areas). Terminology of anthropophilous plants, with examples from the Czechoslovak flora, has been reviewed by HOLUB (1971b). These efforts resulted in a vocabulary of phytogeographical (inclusive of carpobiological) terms (HOLUB & JIRÁSEK, 1971). Terminology of different dissemination mechanisms has been dealt with by MÜLLER-SCHNEIDER & LIOTSKÁ (1971). HEJNY & JEHLÍK (1972) published on types of hemerochorous dispersal of aliens, KOPECKÝ (1971a) on the linear migration (along watercourses and transportation lines). A survey of chorological studies on Czechoslovak trees and shrubs is given by JENÍK (1964a). A study on various types of chorological maps was written by HENDRYCH (1972).

Following are floristic works relating to the conventional geographical areas adopted in the section on geobotanical literature. Anyone interested in floristics of a particular region or its constituent part should also consult relevant geobotanical publications listed in the preceding chapter; the references are not repeated here.

Western Bohemia

A Phytogeographical Atlas of Western Bohemia is being compiled of which two parts have appeared (COLL., 1971-1972). Floristic information on the vicinity of Louny may be found in HOUDA (1966), on the České Středohorí Mts. in MARTINOVSKÝ (1967d, e) and KUBÁT [ed.], 1972), on halophytic biotopes on the edge of those mountains in SKALICKY (1966d). SEKERA (1971) published on the flora of the Boren Hill, OPRAVIL (1964b) on the vicinity of Teplice, HULÁN (1969) on the vicinity of Litvínov; the