NEPETA FISSA AND THE SPECIES ALLIED TO IT

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INTRODUCTION

This consideration of *Nepeta fissa* C. A. Meyer and the species allied to it arose from the difficulty of classifying the Turkish material of this group and relating the taxa involved to the many currently used names. *Nepeta* is, of course, at all levels—generic, sectional and specific—taxonomically one of the most difficult groups of the Labiatae. For example, the limits between *Nepeta*, *Dracocephalum*, *Lallemantia* and *Glechoma* are so arbitrary and indistinct that the generic names can only be considered as convenient marker buoys in a sea of taxonomic turbulence. Attempts to sub-divide *Nepeta* into satisfactory sections have also resulted in artificial and, in many cases, very misleading sections. Bentham (Labiatarum, 464: 1834) gave one of the first comprehensive accounts of the genus and recognised eight sections which he admitted were elusive of definition. His introductory remarks are worth repeating as they are as pertinent today as when they were first written: "The appearance of the *Nepetae* alters very much according to their age and station; I have, therefore, had great difficulty in drawing up the following analysis, upon which I fear less reliance must be placed than on that of many other genera". Subsequent authors have rarely agreed with Bentham or each other about sectional divisions, largely, it must be stressed, because of the absence of suitable characters. The species under consideration here were treated by Bentham in section *Macronepeta* Benth. together with *N. macrantha* Fisch., *N. erecta* Benth. and *N. govaniana* Benth. The first named of these species is not infrequently treated as a *Dracocephalum* (*D. sibiricum* L. in Bot. Mag. **164,** t. 9646: 1943). Boissier (Fl. Orient. **4,** 638: 1884) created the group *Longiflorae* to accommodate only the species dealt with here with one or two exceptions. Pojarkova (Fl. U.R.S.S. **20,** 522: 1954) adopting the new sectional name *Schizocalyx* recognised in it, again with one or two exceptions, the same species as did Boissier under *Longiflorae*.

Although it is almost superfluous to say that a comprehensive monograph of *Nepeta* is much needed, until that appears conservatism and restraint in describing new taxa must be the basis of the approach to its taxonomy.

DEFINITION OF THE GROUP

The group of species allied to *N. fissa* C. A. Meyer is characterised by the deeply split, two-lipped and oblique calyx (cf. fig. 1). The inflorescence is composed either of distinct or compacted cymes or the uppermost form capitate heads. The nutlets are more or less smooth or clearly tuberculate. This definition corresponds with that given by Pojarkova in her original description of sect. *Schizocalyx*. It is also more or less the same as Boissier's definition of his group *Longiflorae*. This latter group was based on *N. longiflora* Ventenat. I have seen an original specimen of

this species and there is no doubt that it does not belong to the *N. fissa* complex at all but rather is a close ally of *N. mussinii* Spreng. in an entirely different species complex. The specimens which Boissier cited in the Flora Orientalis (**4,** 646: 1884) as *N. longiflora* Vent. were in fact wrongly determined and he presumably had not seen a valid specimen of that species. His cited specimens of *N. longiflora* all fall within my concept of *N. fissa*. Although there are justifiable reasons for rejecting the name *Longiflorae* and using the more recent name *Schizocalyx* as the sectional designation, I prefer not to use any sectional name to cover this alliance of species. The brief definition given above does indeed hold true for the species under discussion here, but it is very difficult to exclude from it several other species which on the basis of general facies and other characters are not allied to the *N. fissa* complex. In other words, the disadvantages of recognising a separate section for this species group outweigh the advantages. Where the line should be drawn in recognising allies of *N. fissa* is therefore very much a matter of personal choice. In this paper I have considered the following species which, for convenience of reference, are listed alphabetically:-

N. amani Post in Bull. Herb. Boiss. **1**(1), 29 (1893).
N. andrica Boiss. & Heldr. ex Benth. in DC. Prodr. **22,** 389 (1848).
N. brevifolia C. A. Mey. Verz. Pfl. Cauc. 93 (1831).
N. calvertii Boiss. Diag. Sér. II, **4,** 25 (1859).
N. carmanica Bornm. in Bull. Herb. Boiss. **7,** 239 (1899).
N. cilicia Boiss. ex Benth. in DC. Prodr. **12,** 368 (1848).
N. daghestanica Pojark. in Notul. Syst. Leningrad, **15,** 312 (1953).
N. fissa C. A. Mey. Verz. Pfl. Cauc. 93 (1831).
N. galatica Bornm. in Bull. Herb. Boiss. **7,** 241 (1899).
N. glandulosa Blakelock in Kew Bull. 542 (1949).
N. gracilescens Boiss. Fl. Orient. **4,** 647 (1884).
N. iberica Pojark. in Notul. Syst. Leningrad, **15,** 312 (1953).
N. iodantha Náb. in Publ. Fac. Sc. Univ. Masaryk, Brno, No. 70, 53 (1926).
N. lamiifolia Willd. Enum. Hort. Berol. 602 (1809).
N. laxa Benth. Lab. Gen. et Sp. 483 (1834).
N. leptantha Boiss. & Hausskn. ex Boiss. Fl. Orient, **4,** 648 (1884).
N. leptoclada Trautv. in Act. Hort. Petrop. **2,** 480 (1873).
N. longituba Pojark. in Notul. Syst. Leningrad, **15,** 318 (1953).
N. macrosiphon Boiss. Diagn. Sér. I, **7,** 51 (1845).
N. microphylla Stapf in Denkschr. Acad. Wien, **1,** 44 (1885).
N. obtusicrena Hedge in Notes Roy. Bot. Gard. Edinb., **24,** 70 (1962).
N. pisidica Boiss. & Heldr. in Boiss. Diag. Sér. I, **12,** 65 (1853).
N. pycnantha Benth. in DC. Prodr. **12,** 388 (1848).
N. rarifolia C. Koch in Linnaea, **21,** 676 (1848).
N. sosnovskyi Asker. in Notul. Syst. Leningrad, **16,** 286 (1954).
N. teucriifolia Willd. Enum. Hort. Berol. 602 (1809).
N. trautvetteri Boiss. & Buhse in Nouv. Mém. Soc. Nat. Mosc. **12,** 175 (1860).
N. velutina Pojark. in Notul. Syst. Leningrad, **15,** 312 (1953).
N. virgata C. Koch in Linnaea, **21,** 676 (1848).

Assessment of Characters

Throughout the group under discussion there is great uniformity in the basic type of habit, branching, inflorescence, leaf shape, indumentum and corolla. Consequently, and this is particularly true of calyx and corolla, botanists have been forced to the use of quantitative, rather than qualitative, distinguishing features for specific separation. This in turn has led to the description of quite a large number of species, difficult to define and recognise. It was this difficulty in naming recently collected material that emphasised the need for a wider approach to the taxonomy of these species taking into consideration *all* the available material and *all* the currently used names. At an early stage in the investigation, it became clear that an assessment of the characters used for specific separation was needed before any decision could be reached about specific values. Accordingly, a fairly large and comprehensive range of material was examined from Turkey, Lebanon, Syria, Iraq, Iran and the Caucasus region. A total of about 150 specimens were examined.

Calyx

a) *Indumentum.* The most frequent indumentum consists of short antrorse hairs, especially on the ribs, and sessile yellow oil globules. The latter vary appreciably in quantity even on the same plant. They are often more frequent on immature flowers. Multicellular glandular hairs are very rare or absent, but short stalked glandular papillae are not infrequent. Combinations of these types in varying density make up the entire range of calyx indumentum. Calyx indumentum as a taxonomic character is undoubtedly of very little value—in the same species there may be a range from an almost completely eglandular calyx to a densely papillose glandular one.

The presence or absence of a pilose indumentum towards the apex of the inside of the calyx was used by Boissier as a means of sectional distinction in *Nepeta*; for example, the group '*Longiflorae* Boiss.' was defined as being glabrous at the throat of the calyx. Although there is never the dense annulus of hairs which is characteristic of other sections (e.g. sect. *Psilonepeta*, Benth.) there is usually a pilose indumentum of very small inconspicuous hairs which vary in density from population to population. Thus, in some plants the throat of the calyx is quite glabrous whereas in others it is clearly pilose.

b) *Shape.* The shape of the calyx teeth which initially seemed a promising character proved on more detailed examination to be of little value. As fig. 1 shows there is a wide range of shape among the species in this group. This varies from calyces with acutely pointed teeth with small mucros to calyces where the calyx teeth are almost obtuse. However, within one species, *N. fissa*, there is almost as much range of shape as there is illustrated in the figure for all the other species—i.e. the drawings of the calyces cannot be thought of as generally representative of a particular species. Generally, there was a close correlation between the shape of the calyx teeth and the length of the calyx—acutely pointed teeth were more frequent on longer calyces and obtuse teeth on shorter calyces. The calyx lengths throughout this group were of as little value as the corolla lengths.

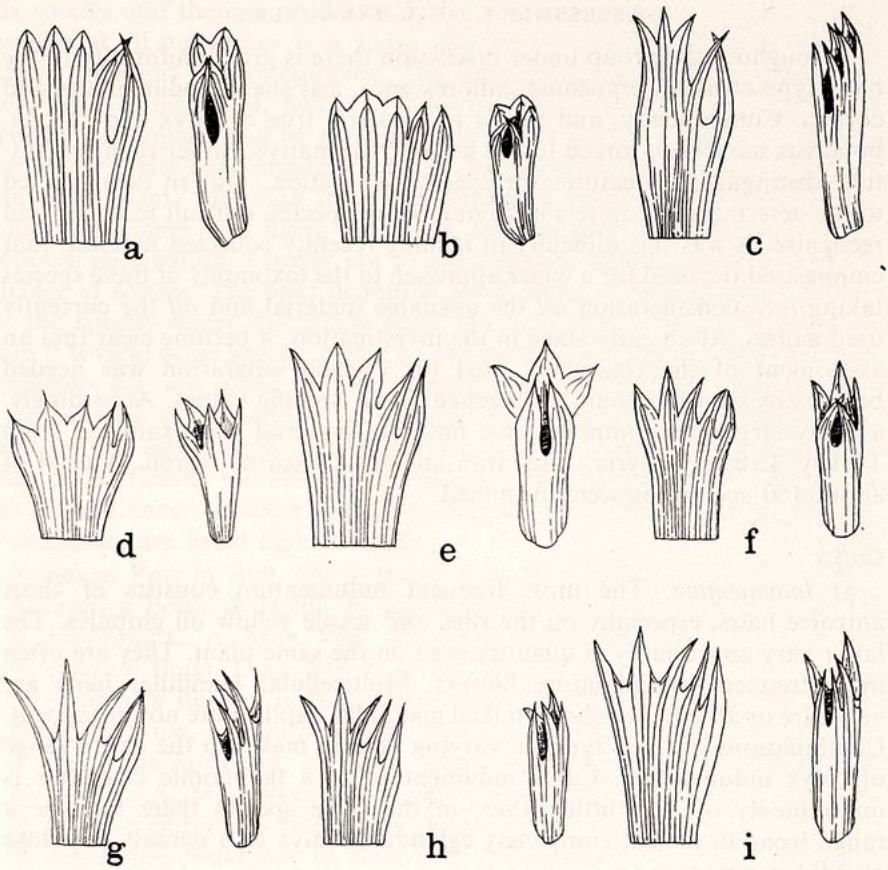

FIG. 1. Calyx dissections of the species allied to *N. fissa* C.A.Mey.:—a) *N. fissa* C.A. Mey.–*Huber-Morath* 11332. b) *N. fissa* C.A.Mey.–*Davis* 31940. c) *N. macrosiphon* Boiss.–*Koelz* 18504. d) *N. lamiifolia* Willd.–*Davis* 24131. e) *N. brevifolia* C.A.Mey.– Alexeenko 217. f) *N. obtusicrena* Hedge–*Davis* 24609. g) *N. leptantha* Boiss.– *Davis* 31166. h) *N. leptantha* Boiss.–*Davis* 20284. i) *N. cilicia* Benth.–*Balls* 1261. All x 2.

Detailed examinations were made of the proportions of calyx teeth to total length and the depth of the split of the anterior calyx lip relative to total length. This too proved very clearly that it was not a worthwhile character (cf. under *N. fissa* fig. 7).

Fig. 1 also illustrates the difference in the shape of the entire calyx. In *N. fissa* and *N. macrosiphon* the calyx is slightly oblique and the teeth are somewhat turned in towards each other, whereas in *N. cilicia* Benth. the calyx is a little straighter and the teeth spread out from each other.

The various calyx characters (indumentum, length, proportions of parts) were plotted on a map. No significant correlation emerged.

Corolla

Fig. 2 gives a representation of the corolla lengths of the species discussed here. As in the case of the calyx lengths, there is no clear difference between the individual specific names i.e. there is a gradual transition between one species and the next. For instance, even between *N. fissa* and *N. macrosiphon*—two species which otherwise are not likely

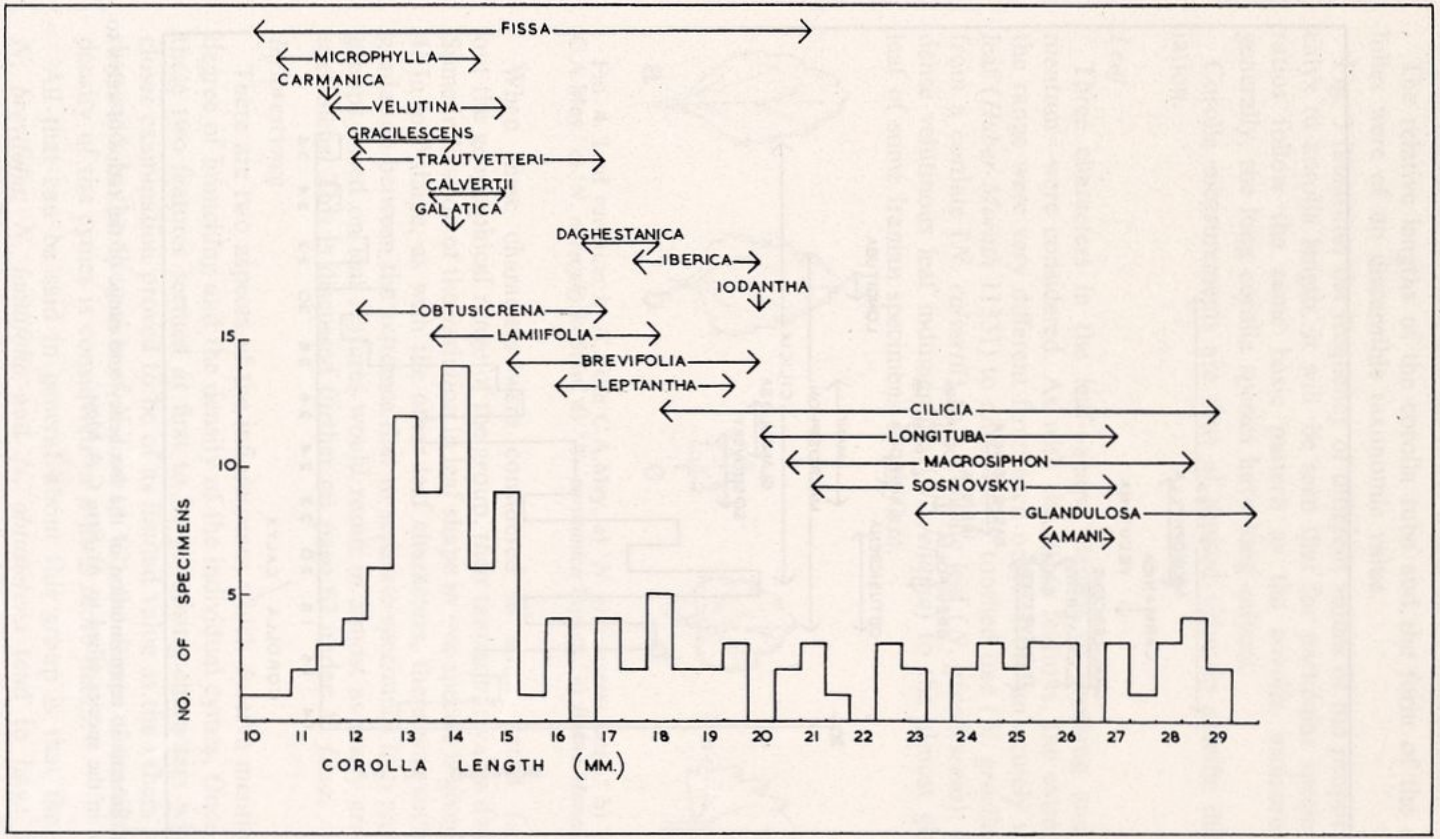

FIG. 2. Schematic representation of corolla lengths and frequency in the species allied to *N. fissa* C.A.Mey. The horizontal arrows cover the range of corolla length within a particular taxon i.e. the corolla length of material determined as *N. microphylla* varies from 10·5–14·5 mm. The vertical arrows indicate the corolla length of species based on and only known from one gathering.

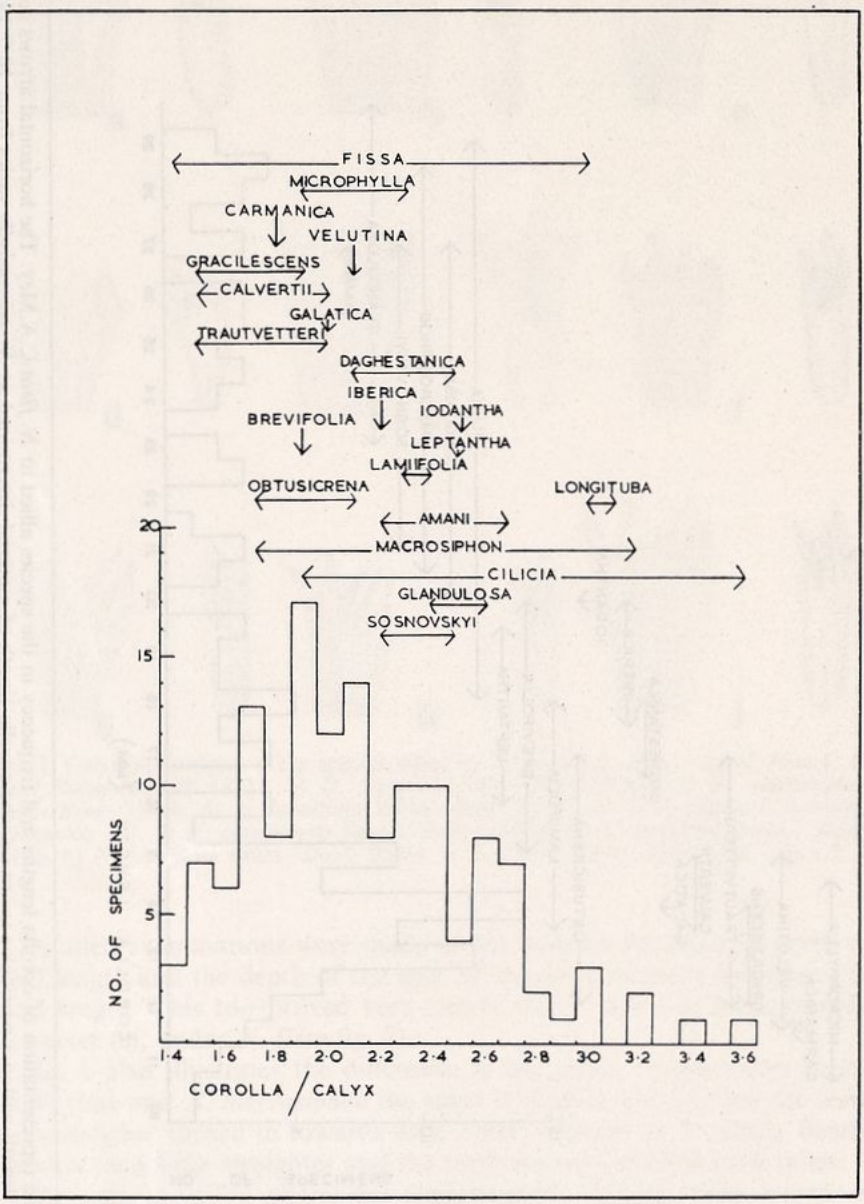

FIG. 3. Schematic representation of the frequency and range of the ratios of calyx to corolla in the species allied to *N. fissa* C.A.Mey.

to be confused—there is an overlap between the upper limits of the corolla length of *N. fissa* and the lower limits of *N. macrosiphon.*

The relative lengths of the corolla tube and the form of the corolla lobes were of no discernible taxonomic value.

Fig. 3 illustrates the frequency of different values of the proportion of calyx to corolla length. It will be seen that for particular species these ratios follow the same basic pattern as the corolla measurements: generally, the long corolla species have long calyces.

Corolla measurements are thus of limited value in specific differentiation.

Leaf

Three characters in the leaf—shape, degree of toothing and indumentum—were considered. As with the other features, the extremes of the range were very different from each other: from an acutely toothed leaf (*Huber-Morath* 11331) to an obtusely toothed one (*N. gracilescens*); from a cordate (*N. calvertii*) to a cuneate leaf (*N. gracilescens*); from a dense velutinous leaf indumentum (*N. velutina*) to the almost glabrous leaf of some Iranian specimens of *N. fissa.*

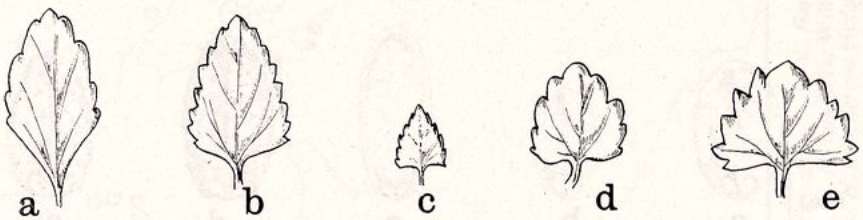

FIG. 4. Leaf variation in *N. fissa* C.A.Mey. a) '*N. gracilescens* Boiss.' b) '*N. fissa* C.A.Mey.' c) '*N. microphylla* Stapf d) '*N. carmanica* Bornm.' e) *Huber Morath* 11331.

When these characters were considered in some detail throughout the geographical range of the group, their taxonomic value dwindled. Some indication of the variation in leaf shape in one species is given in fig. 4. In leaf shape, as with the other leaf characters, there was such intergradation between the extremes that to separate specimens into particular groups based on leaf features would result in almost as many groups as specimens. This is discussed further on page 62 under *N. fissa.*

Inflorescence

There are two aspects of the inflorescence which deserve mention: the degree of branching and the density of the individual cymes. Once again, these two features seemed at first to be promising characters which on closer examination proved to be of as limited value as the others already discussed. In the discussion of *N. fissa* (p. 62), the degree of branching and density of the cymes is considered in a little more detail.

All that can be said in general about this group is that the species *N. brevifolia*, *N. lamiifolia* and *N. obtusicrena* tend to have densely compacted inflorescence heads which are never, or very rarely, found in the other allied species. There is, however, no apparent fundamental difference between the two types.

Nutlets

Fig. 5 gives some indication of the range of size, shape and the texture of the nutlets. There are apparently three basic types of nutlet texture: 1) smooth without tubercles, 2) 'flatly' tuberculate, 3) clearly tuberculate especially towards the apex. Although there is a certain amount of intergradation between these groups, *mature* nutlets of a particular species are generally uniform—e.g. *N. cilicia* almost always has clearly tuberculate nutlets and *N. fissa* has 'flatly' tuberculate nutlets. This latter type of texture results from a more or less transparent pitting of the outer seed coat which gives the impression of tubercles immersed in the outer wall of the seed coat. Only a few nutlets of the smooth type were seen, for example, in *N. lamiifolia*, but these nutlets were apparently not fully mature and it is possible that the smooth texture is partly due to the undeveloped outer seed coat which would later develop into the 'flatly' tuberculate type.

As is discussed under *N. macrosiphon* and also in *N. cilicia*, some nutlets become mucilaginous or oily when soaked in water; the majority do not. There was no apparent connection between the type of nutlet texture and the presence or absence of mucilage.

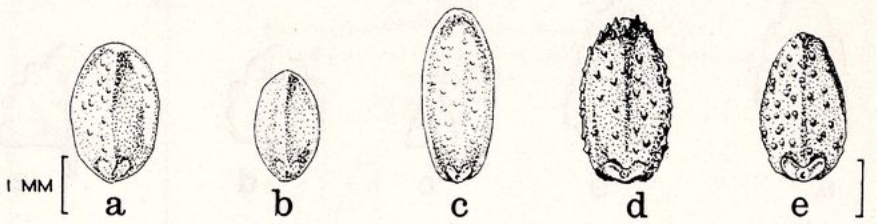

FIG. 5. Nutlets of a) *N. fissa* C.A.Mey.–*Wendelbo* 1649. b) *N. fissa* C.A.Mey.–*Kotschy* 473. c) *N. macrosiphon* Boiss.–*Davis* 23892b. d) *N. cilicia* Benth.–*Davis* 16380. e) *N. leptantha* Boiss.–*Davis* 31136.

Sex forms

It was of considerable interest that out of about 150 corollas dissected, only two (*Sabeti* 1088—*N. microphylla* and *Davis* 24490—*N. macrosiphon*) were male-sterile sex forms. Such a low proportion is unexpected in the Labiatae where gynodioecism is of frequent occurrence, particularly so in very polymorphic groups or species.

Hybridisation

There is no evidence of hybridisation in this group. In the field, individual populations were very uniform in respect of all the characters considered above.

Distribution and Habit

As the map (fig. 6) shows, this is an Irano-Turanian and Mediterranean group which is restricted to steppe, montane or alpine habitats.

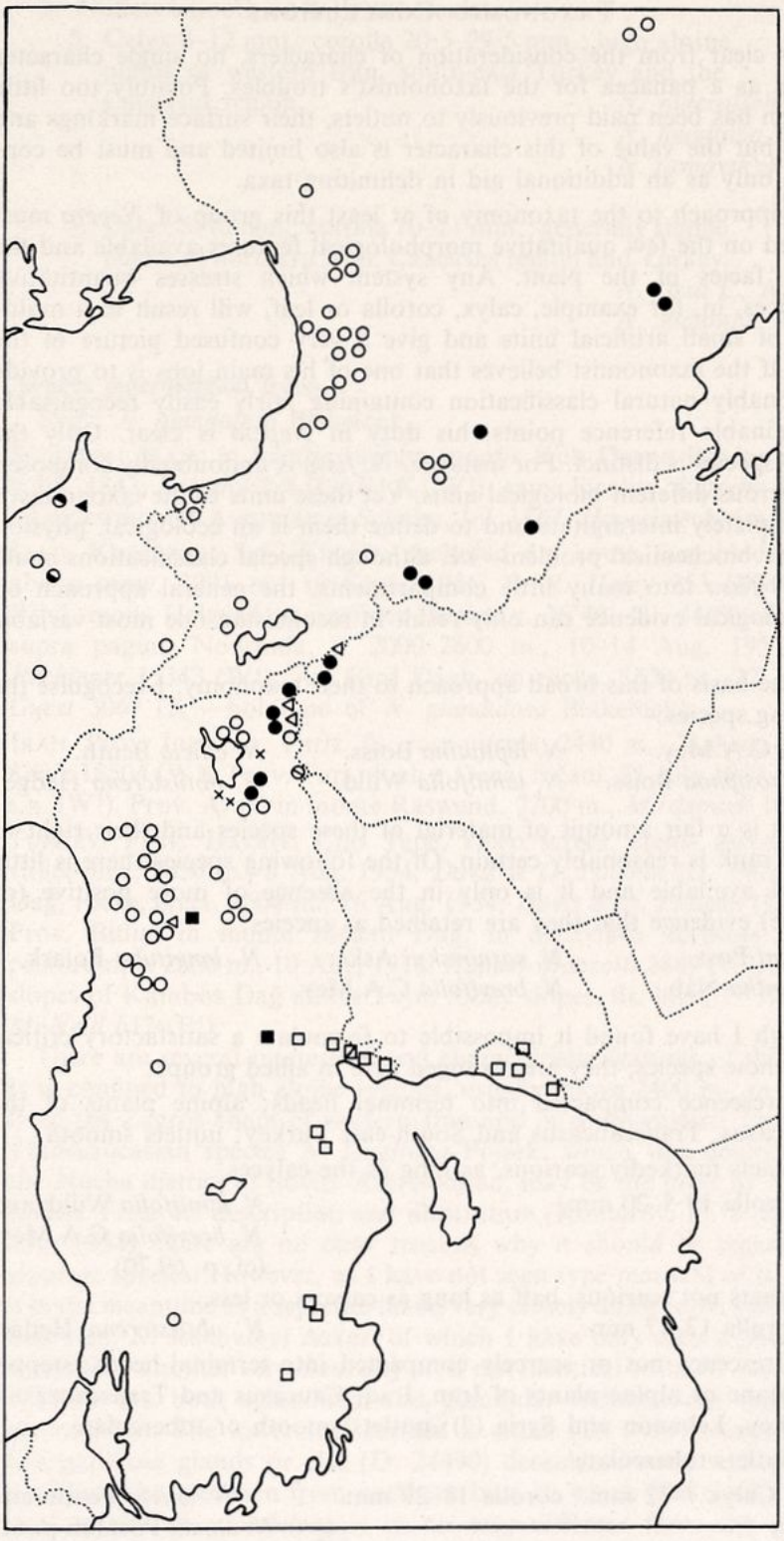

FIG. 6. Map showing the distribution of *N. fissa* C.A.Mey. and its allies. ○ *N. fissa* C.A.Mey. ● *N. macrosiphon* Boiss. ◐ *N. longituba* Pojark. ◑ *N. sosnovskyi* Pojark. □ *N. cilicia* Benth. ■ *N. leptantha* Boiss. △ *N. lamiifolia* Willd. ▲ *N. brevifolia* C.A. Mey. ⊘ *N. iodantha* Náb. ⊠ *N. amani* Post × *N. obtusicrena* Hedge.

Taxonomic Conclusions

As is clear from the consideration of characters, no single character emerges as a panacea for the taxonomist's troubles. Possibly too little attention has been paid previously to nutlets, their surface markings and texture but the value of this character is also limited and must be considered only as an additional aid in delimiting taxa.

The approach to the taxonomy of at least this group of *Nepeta* must be based on the few qualitative morphological features available and the general facies of the plant. Any system which stresses quantitative differences, in, for example, calyx, corolla or leaf, will result in a multiplicity of small artificial units and give a very confused picture of the group. If the taxonomist believes that one of his main jobs is to provide a reasonably natural classification containing fairly easily recognisable and definable reference points, his duty in *Nepeta* is clear. Only the 'broad' species is distinct. For instance, *N. fissa* is undoubtedly composed of numerous different biological units. Yet these units to the taxonomist's eye completely interdigitate and to define them is an ecological, physiological or biochemical problem—i.e. although special classifications could split *N. fissa* into many little compartments, the general approach on morphological evidence can only result in recognising one most variable species.

On the basis of this broad approach to their taxonomy, I recognise the following species:-

N. fissa C.A.Mey.	*N. leptantha* Boiss.	*N. cilicia* Benth.
N. macrosiphon Boiss.	*N. lamiifolia* Willd.	*N. obtusicrena* Hedge

There is a fair amount of material of these species and their right to specific rank is reasonably certain. Of the following species there is little material available and it is only in the absence of more positive (or negative) evidence that they are retained as species:

N. amani Post	*N. sosnovskyi* Asker.	*N. longituba* Pojark.
N. iodantha Náb.	*N. brevifolia* C.A.Mey.	

Although I have found it impossible to formulate a satisfactory critical key to these species, they are arranged here in allied groups:

1. Inflorescence compacted into terminal heads; alpine plants of the Caucasus, Transcaucasus and South-east Turkey; nutlets smooth
   2. Bracts markedly scarious, as long as the calyces, corolla 13·5–20 mm. . . . . *N. lamiifolia* Willd. and *N. brevifolia* C.A.Mey. (cf. p. 69,70)
   2. Bracts not scarious, half as long as calyces or less, corolla 12–17 mm. . . . . *N. obtusicrena* Hedge.
1. Inflorescence not or scarcely compacted into terminal heads; steppe, montane or alpine plants of Iran, Iraq, Caucasus and Transcaucasus, Turkey, Lebanon and Syria (?); nutlets smooth or tuberculate
   3. Nutlets tuberculate
      4. Calyx 7–12 mm., corolla 18–29 mm. . *N. cilicia* Benth. and *N. amani* Post (cf. p. 62)
      4. Calyx 7·5–9 mm., corolla 16–19·5 mm. *N. leptantha* Boiss.

3. Nutlets smooth or flatly tuberculate
   5. Calxy 8–12 mm., corolla 20·5–29·5 mm.; high alpine plants of western Iran, south-east Turkey and the Caucasus region . . . . . *N. macrosiphon* Boiss.
      N. longituba Pojark.
      N. sosnovskyi Asker.
      (cf. p. 61)
   5. Calyx 5–10 mm., corolla 10–21 mm.; generally steppe plants of northern Iran, Caucasus region and Turkey
      N. fissa C. A. Mey.
      N. iodantha Náb. (cf. p. 62)

Nepeta macrosiphon Boiss.

Syn.: *N. glandulosa* Blakelock.

Syntypes: IRAN: in fissuris rupium montis Kuh Daena Persiae australis, 9 Jul. 1842, *Kotschy* 588 (G! E! K! W!); same locality, *Kotschy* 986 (G!); ad nives montes Avroman et Schahu, Jul. 1867, *Haussknecht* s.n. (G! W!).

IRAQ. Kurdistan: Ser-i-Khazin, sheltered dry south face in deep shale, above snow, 3291 m., 10 Sept., 1956, *B. R. Haley* 253 (BM!); distr. Erbil, mons Helgurd ad confines Persiae c. 36°40′ N., 44°50′ E. in valle supra pagum Nowanda, c. 2000–2600 m., 10–14 Aug. 1957, *K. H. Rechinger* 11343 (W!); Arl Gird Dagh, on rocks, 3350 m., 22 Jul. 1932, *Guest* 3067 (K!—holotype of *N. glandulosa* Blakelock).

IRAN. Prov. Luristan: Pariz, fls. rose-purple, 2440 m., 28 Aug. 1941, *W. Koelz* 18504 (W!). Prov. Fars: Kuh e Dena, Sičani, 31 July 1949, *Behboudi* s.n. (W!). Prov. Arak, in monte Raswend, 2200 m., *Mirdamadi* 1087 (W!).

TURKEY. Prov. Hakâri: Cilo Tepe, steep screes, stems ascending, fls. violet-blue, 3050 m., 8 Aug. 1954, *Davis & O. Polunin* (D. 24097); Kara Dağ, rocks, erect, 3504 m., 16 Aug. 1954, *Davis & O. Polunin* (D. 24490). Prov. Bitlis: in monte Meleto Dağ, in declivibus herbosis ad casas pastorum, c. 2600 m., 10 Aug. 1910, *Handel-Mazzetti* 2849 (W!); southern slopes of Kambos Dağ above Tutu, rocky slopes, fls. lilac, 17 Aug. 1956, *McNeill* 612 (E!).

There are several interesting and characteristic features of this species. It is confined to high alpine regions, usually above 2400 m., in northern Iraq, the Zagros chain of western Iran and in south-eastern Turkey. The Transcaucasian species *N. longituba* Pojark. which was described from the Nucha district of Soviet Azerbaidjian, may be the same as *N. macrosiphon*. From its description and illustration (Komarov, Fl. U.R.S.S., **20**, 351: 1954), there are no clear reasons why it should be regarded as a separate species. However, as I have not seen type material of it, I regard it in the meantime as a separate taxon very closely allied to *N. macrosiphon*. Likewise, *N. sosnovskyi* Asker. of which I have only seen a photograph, is certainly another very close ally of, if not identical with, *N. macrosiphon*.

There are both eglandular and glandular indumentum types in *N. macrosiphon*. The lower leaf surface is either (D. 24097) hirsute with a few papillose glands or else (D. 24490) densely covered with glandular papillae. The specimen from northern Iraq on which Blakelock based his new species *N. glandulosa* is in no way different from the glandular forms of *N. macrosiphon*.

There is considerable variation in the dimensions of the flower. The calyx length varies between 8 mm. and 12 mm. and the corolla from 20·5 to 29·5 mm. Such an appreciable range of size is rather unexpected in a species which of any in this very variable group is most uniform in its general facies and not readily confused with any other.

A further interesting characteristic of *N. macrosiphon* is provided by the nutlets. When soaked or boiled in water some of the nutlets became decidedly mucilaginous (e.g. D. 24490). In other cases the nutlets were either not at all mucilaginous, only very slightly so or else became surrounded by an oily aura when immersed. Unfortunately there was insufficient material of completely mature nutlets to make any more detailed experiments on this interesting feature.

Nepeta cilicia Benth.

The orthography, nomenclature and taxonomy of this species have already been discussed by Davis (Kew Bull. 402: 1949 and 79–80: 1951). He recognised three varieties of *N. cilicia* based on the shape of the calyx teeth, density of inflorescence and the indumentum:- var. *cilicia*, var. *pycnantha* (Benth.) Davis, and var. *brevidens* Davis. The large number of intermediates between the varieties and the occurrence of different varieties in the same locality throw considerable doubt on the value of recognising them at varietal or any other infra-specific rank. I prefer to regard them as local races of *N. cilicia* without designating them in any formal manner. As can be clearly seen on the map, *N. cilicia* is restricted to the Mediterranean phyto-geographical zone of southern Turkey, Syria and the Lebanon.

I have not seen any authentic material of *N. amani* Post but from its description and distribution it is probably within the limits of *N. cilicia*.

Nepeta iodantha Náb.

TURKEY. Kurdistaniae Turcicae distr. Ramoran, Halakur-Dar (Dağ) ad septentriones ab oppido Ğezîret-ibn-Ômar, ad rupes calcar. aridas alt. c. 2300 m., 25 Jul. 1910, *Nábêlek* 1468 (probably at Slovenska Akademia Vied, Biologichy Ustav, Bratislava.)

Unfortunately, it has not been possible to borrow Nábêlek's material and thus assess the value of the species. However, from the photograph and the description of the type specimen, it is apparently similar to the small leaved forms of *N. fissa* C.A.Mey which have a dense indumentum and compressed cymes. In the diagnosis, the new species was said to differ from '*N. teucriifolia* Willd.' in the much denser indumentum, the contracted panicles and the longer and broader calyces. Judged solely on these characters, there are no basic differences between *N. fissa* C.A.Mey (and *N. teucriifolia* Willd.) and *N. iodantha* Náb.

Nepeta fissa C. A. Mey.

Before discussing the characters and variation of this species, it is necessary to explain its nomenclature. The name previously used for this species was *N. teucriifolia* Willd. This was described by Willdenow in 1809, before *N. fissa*. However, I have been able to examine a photograph of Willdenow's original specimen and there are several reasons for

not using the name *N. teucriifolia*. The photograph of *Willdenow* 10740 is clearly labelled by Willdenow as *Melissa teucrifolia* (sic!). Unfortunately, the specimen now only consists of one shoot with two pairs of lower leaves and two pairs of upper leaves. No inflorescence parts are represented and no exact information is given about the provenance of the plant other than that it was collected by Tournefort in 'Armenia'. Although with the very scant material available, Tournefort's plant probably is a *Nepeta* and it is not impossible that it is the same as *N. fissa*, there are no convincing reasons for accepting it as such. Because it is impossible to correlate Tournefort's plant with recently collected material or to consider the inadequate original description as the type, I propose rejecting the name *N. teucriifolia* Willd. and using in its place the subsequently published name *N. fissa* C.A.Mey. The former is the name which Boissier used in the Flora Orientalis and under which this species is to be found in most herbaria. *N. fissa*, however, was used by Bentham* (Labiatarum 737: 1834)** and later by Pojarkova (Flora U.R.S.S. **20**, 305: 1954).

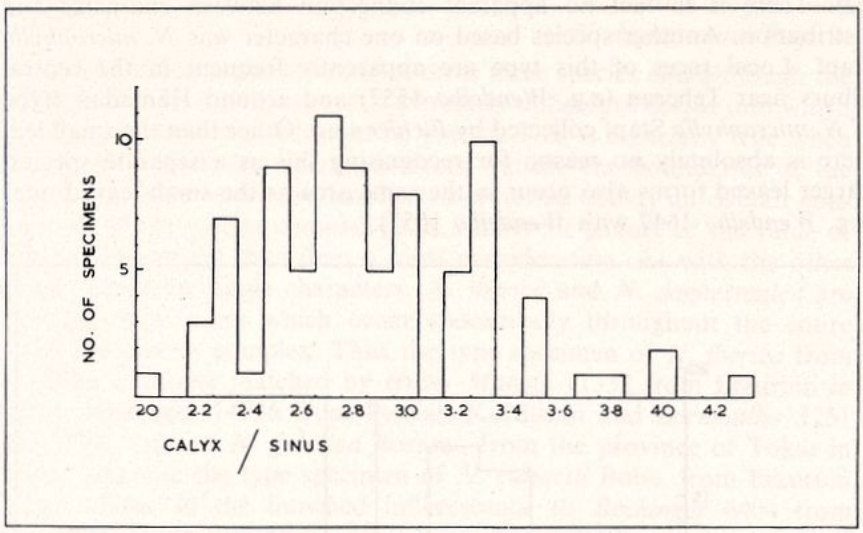

FIG. 7. Frequency of proportion of total calyx length to the depth of the split of the anterior calyx lip in *N. fissa* C.A.Mey.

The specific names which I consider synonymous with *N. fissa* are:-

N. calvertii Boiss. p.p.
N. carmanica Bornm.
N. daghestanica Pojark.
N. galatica Bornm.
N. gracilescens Boiss.
N. iberica Pojark.
N. laxa Benth.
N. leptoclada Trautv.
N. microphylla Stapf
N. rarifolia C. Koch
N. trautvetteri Boiss. & Buhse
N. velutina Pojark.
N. virgata C. Koch

The corolla dimensions of the 'species' within *N. fissa* are given in fig. 2. Fig. 7 gives the frequency of proportion of calyx length to depth of split of the anterior calyx lip and Fig. 8 illustrates the range of calyx size.

* He treated *N. teucriifolia* Willd. under his species '*non satis notae*'.

** The species referred to as *N. fissa* by Bentham on page 471 is *N. supina* Stev.

As briefly outlined in the general consideration of characters given above, several of the species which I regard as synonyms of *N. fissa* were based essentially on single characters. Both the main character on which the species was based and the supporting characters were in no case outwith the orbit of variation of *N. fissa* in the sense that I recognise it. Thus, *N. gracilescens* Boiss. was based on a form in which the leaf base was clearly cuneate and where the leaf length was longer than the breadth. The leaf shape is illustrated in fig. 4a. As discussed above under the heading 'leaf shape' there is, however, a complete intergradation between forms with cuneate leaf bases and those with a cordate leaf base. It is quite understandable that in Boissier's time such a plant was described as a new species but today with a fairly representative range of variation at hand the cuneate leaf base type is seen merely as one end of a long line of leaf shape variants. Although the type specimen came from Ispir in Turkey and there is a *Reese* specimen from Elâziğ—in the same area—there are some Iranian specimens (e.g. *Bornmüller* 4322 named as *N. carmanica* Bornm. var. *cuneifolia* Bornm.) which also have this type of leaf. There is in fact no apparent connection between character and distribution. Another species based on one character was *N. microphylla* Stapf. Local races of this type are apparently frequent in the central Elburs near Teheran (e.g. *Wendelbo* 1557) and around Hamadan (type of *N. microphylla* Stapf collected by *Pichler* s.n.). Other than the small leaf there is absolutely no reason for recognising this as a separate species. Larger leaved forms also occur in the same area as the small leaved ones (e.g. *Wendelbo* 1649 with *Wendelbo* 1557).

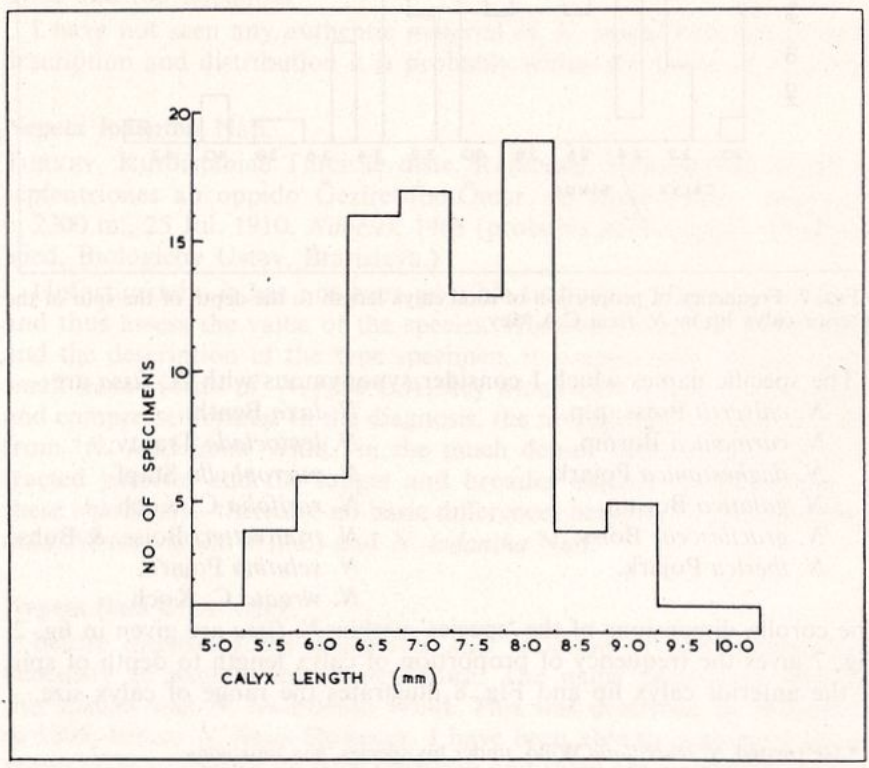

FIG. 8. Frequency of calyx lengths in *N. fissa* C.A.Mey.

Turning from species based on leaf shape characters to those based on leaf indumentum, *N. velutina* Pojark. was described on the basis of a very dense leaf indumentum together with the supporting character of a long corolla. In this instance, the dense leaf indumentum types are the extremes of the density range which at the other end is represented by the almost glabrous forms from parts of Iran.

The species which were based on the degree of inflorescence branching were keyed out thus in the Flora U.R.S.S.:-

Stem developing long axillary flowering branches throughout almost its whole extent from the base; cymes distant, almost all (except upper ones) barely dichotomously branched; usually inflorescence has the appearance of a large very lax panicle . . . . . *N. fissa* C. A. Mey.

Plant less branched, stem usually with few axillary branches; upper cymes approximating, the lower ones distant, obviously dichotomous only below; usually inflorescence has appearance of a more or less condensed raceme, rarely panicle . . . . . *N. iberica* Pojark. and *N. daghestanica* Pojark.

I have seen type material of all of these three species and although the type specimens fit into the key, it is extremely difficult to decide into which category many specimens should be placed. This is especially true when it comes to considering specimens from outside the boundaries of the U.S.S.R. In other words, as has been mentioned above, an overall consideration of the species complex gives a different picture of the value of particular characters than does a local consideration. As with the other 'species' based on single characters, *N. iberica* and *N. daghestanica* are apparently local races which occur sporadically throughout the entire area of the species complex. Thus the type specimen of *N. iberica* from near Tiflis is closely matched by *Huber-Morath* 11332 from Erzurum in Turkey, *Rechinger* 14736 from Persian Kurdistan and *Bornmüller* 1251 (ann. 1889), type of *N. galatica* Bornm., from the province of Tokat in Turkey. Likewise the type specimen of *N. calvertii* Boiss. from Erzurum is very similar in the bunched inflorescence to *Rechinger* 6404 from Mazanderan in Persia. Many other examples could be cited.

These 'species' which I propose treating as locally differentiated races could be recognised at the rank of form, or some (e.g. *N. gracilescens* Boiss.) at varietal rank. But until very much more material is available for study there seems little advantage to be gained in recognising or creating new taxa even at the lower levels of infra-specific rank.

The main trends of variation within *N. fissa* can be summarised thus:-

1) small-leaved forms often with cuneate leaf bases; previously used epithets: *N. gracilescens* Boiss., *N. carmanica* Bornm., *N. microphylla* Stapf.
2) widely and loosely branching forms often with large (17 mm.) corollas; previously used epithets: *N. fissa* C.A.Mey. sensu Pojarkova, *N. laxa* Benth., *N. virgata* C. Koch, *N. rarifolia* Benth.
3) forms with little-branched inflorescences and/or compacted cymes; previously used epithets: *N. iberica* Pojark., *N. daghestanica* Pojark., *N. galatica* Bornm., *N. calvertii* Boiss. p.p.

4) forms with a very dense leaf indumentum; previously used epithets: *N. trautvetteri* Boiss. & Buhse, *N. velutina* Pojark., *N. leptoclada* Trautv.

TURKEY. Prov. Eskişehir: 12 km. südwestlich von Eskişehir, am Weg nach Kütahya, Felsen, 20 Juni 1950, *H. Reese* s.n. (H-M!). Prov. Tokat: Pontus Galaticus, inter Amasia et Kaiseri in apricis aridis montium ad Soulou-serai, 1200 m., 4 August 1889, *Bornmüller* 1251 (type of *N. galatica* Bornm-W! JE!). Prov. Sivas: Zara-Suşehri, 20 miles from Suşehri, on serpentine screes, stems 2–3 ft., corolla blue, 1300 m., 23 June 1960, *Stainton & Henderson* 5765 (E!); distr. Suşehri, Eruptivschutt 23km. südwestlich ob Suşehri, 1440 m., 30 Juni 1955, *A. Huber-Morath* 14201 (H-M!). Prov. Giresun: Şebinkarahisar, coarse volcanic screes and eroded slopes, perennial, erect, flower violet-blue, 5 August 1952, *Davis, Dodds & Çetik* (D. 20463); distr. Şebinkarahisar, Eruptivschutt 4 km. nördlich Ş.K., 1260–1300 m., 30 Juni 1955, *A. Huber-Morath* 14203 (H-M!). Prov. Gümüşane: Kovans, between Bayburt and Gümüşane, dry banks, perennial, erect, flowers lavender, 1800 m., 2 August 1957, *Davis & Hedge* (D. 31940); Tekke to Baiburt, non-lime screes and hot dry rocks, stems 12″–24″, round-cornered triangular leaves, dark green and glossy, flowers red-purple, 1096 m., 19 July 1934, *E. K. Balls* 1753 (E!K!); Jamurdere, in herbidis, 4 July 1894, *P. Sintenis* 6096 (G!W!). Prov. Erzincan: Erzincan-Kelkit, c. 12 km. from Erzincan, dry shaley hillsides, perennial, erect, flowers pale lavender blue, 1500 m., 1 August 1957, *Davis & Hedge* (D. 31910); Erzincan-Refahiye, Kalkgeröll 27 km. westlich Erzincan, 1540 m., 3 Juli 1953, *A. Huber-Morath* 12762 (H-M!); Erzincan-Refahiye, Eruptivschutt 23 km. nordwestlich Erzincan, 1470 m., 6 July 1955, *A. Huber-Morath* 14200 (H-M!); Erzincan-Refahiye, Bachgeröll 29 km. nordwestlich Erzincan, 1560 m., 6 Juli 1955, *A. Huber-Morath* 14202 (H-M!). Prov. Erzurum: Tortum Göl, dry sun-baked slopes, corolla mauve, 1250 m., 9 July 1960, *Stainton & Henderson* 6117 (E!); gorge between Tercan and Selepur, dry gravelly banks, perennial, erect, flowers lavender blue, 1400 m., 11 July 1957, *Davis & Hedge* (D. 30972); distr. Tortum, Tortum-Artvin, Steppenhügel, Kalkschiefer, 8 km. Nö. Tortum, 1450 m., 16 Juli 1958, *A. Huber-Morath* 15582 (H-M!); Steppenhügel 1 km. westlich Tercan, 1340 m., 26 Juni 1951, *A. Huber-Morath* 11332 (H-M!); Aşkale-Bayburt, Schotterhänge 11 km. nordwestl. Aşkale, Urgestein, 1680 m., 27 Juni 1951, *A. Huber-Morath* 11329 (H-M!); Erzurum, 1853, *Calvert* 279 (type of *N. calvertii* Boiss.-G!). Lasistan: 1885, *N. Kusnetzow* s.n. (G!K!). Prov. Bingöl: Fluss-Schotter 1 km. westlich ob Çapakcur, 1280 m., 15 Juli 1951, *A. Huber-Morath* 11330 (H-M!). Prov. Elâziğ: Elâziğ-Gölcük, Eruptivgestein ca. 18 km. südöstlich Elâziğ, 1290 m., 2 Juli 1951, *A. Huber-Morath* 11331 (H-M!); c. 35 km. östlich von Elâziğ am Weg nach Palu felsige Hänge, 2 Juli 1950, *H. Reese* s.n. (H-M!); Taurus Armenius, prope Göldschik ad lacum subsalum eodem nomine (fontes Tigridis occid.), in declivibus siccis lapidosis, substrato calcifero, 1350 m., 28 July 1910, *Handel-Mazzetti* 2568 (W!). Prov. Diyarbakir: entre Khankézzine et Arghani, 27 juillet 1906, *G. & B. Post* 321 (G!). Prov. Bitlis: environs de Chémarun non loin de Bitlis, 10 août 1906, *G. & B. Post* 659 (G!). Prov. Siirt: in schistosis Schirwan, 1096 m., 28 September 1859, *Kotschy* 473 (G!W!K!JE!). Prov. Van: distr. Çatak,

2 km. north of Micingersuyu river (Çatak road), eroded shale hills, stems ascending erect, flowers lilac blue, 1900 m., 25 July 1954, *Davis & O. Polunin* (D. 23235); Erek dağ, dry volcanic slope, stems ascending erect, flowers lavender, 1981 m., 18 July 1954, *Davis & O. Polunin* (D. 22907); Van-Hoşap, Artemisia-steppe 10 km. östlich Hasbaşa, 1870 m., 8 Juli 1951, *A. Huber-Morath* 11320 (H-M!); Şuşanis Dagh ob Van, Alpweide, Fellschutt, 2200 m., 1 Juli 1949, *A. Huber-Morath* 9122 (H-M!). Prov. Hakâri: Zab gorge near Dezi, perennial, stems ascending, flowers violet blue, 1585 m., 6 August 1954, *Davis & O. Polunin* (D. 24020). Cappadocia orientale: vallées humides, 1836, *Coquebert & Montbret* 2390 (K!); Akdağ, *Aucher-Eloy* 1730 (K!); près d'un ruisseau affluent de l'Euphrate, 1834, ex. herb. Montbret. (W!).

U.S.S.R. Transcaucasus: Tiflis, in lapidosis, 23 July 1922, *Grossheim &* Schischkin 91 (Type of *N. iberica* Pojark. LE G!K!); Daghestan, in collibus apricis pr. Achty, 1157 m., 26 July 1898, *Alexeenko* (?Type of *N. daghestanica* Pojark. LE G!W!JE!); Achty, 1880, *Beçker* 234 (G!K! E!W!); Karabagh, *Hohenacker* s.n. (K!); *Hohenacker* s.n. (G!E!), *C. A. Meyer* s.n. (W!); Nachitshevan: distr. Shachbuz, inter Karababe et Aryndzha in glareosis fl. Kjukju-tshai, 4 April 1934, *Grossheim & Gurvitsh* s.n. (W!); Azerbaijan: Talysh, in locis aridis lapidosis tract. Swant, med. sept. July, *Hohenacker* 44 (W!JE!); Talüsch, *C. A. Meyer* s.n. (K!W!); in locis lapidosis aridis pr. pag. Siwirs, Swant, 13 junie 1830, *C. A. Meyer* 123 (LE); Swant, in Armen. rossica, *W. Besser* s.n. (K!); in aridis arenosis, lapidosis prope Tatuni, rarius in arena Lenkorankae fluv. prope Lenkoran, July 1836 *Hohenacker* s.n. (W!G!K!); Lenkoran, *Bunge* s.n. (E!); Armenia: in monte Surab, June 1871, *G. Radde* 443 (type of *N. velutina* Pojark.–LE–photo. vidi).

IRAN. Azerbaijan: Atropatania, Einal-Zeinal prope Tabris, in lapidosis, 1400–1600 m., 24 June 1924, *Grossheim & Schischkin* 216 (G!); Alliar, July 1847, *Buhse* 756 (type of N. *trautvetteri* Buhse-G!). N. Persia: *Szowits* s.n. (W!G!); *Aucher-Eloy* 1751 (K!). Prov. Kurdistan: Inter Senandaj et Saqez, 41 km. N. Husseinabad, substr. conglom., 30 August 1957, *K. H. Rechinger* 14736 (W!). Prov. Hamadan: in monte Elwend (Media), 1882 *Pichler*, s.n. (?type of *N. microphylla* Stapf-K!); Hamadan, floribus minoribus, 1800 m., *Sabeti* 1088 (W!); Caman-e Abr., *Sabeti* 1091 (W!). Prov. Kazvin: in ditione oppidi Keredj, in valle fluvii Keredj prope Gacesar, 2500 m., August 1948, *K. H. Rechinger* 6729 (G!E!W! H-M!); ostan 2, Karadj, 1300–3000 m., 15 August 1956, *F. Schmid* 6472 (W!). Prov. Teheran: montes Elburs, ca. 30 km., a Teheran bor.-or. versus, 23 September 1949, *F. Starmuehlner* 216 (W!); Passghaleh, 22 September 1949, *Taghilov* 1153 (W!); Montes Elburs centr., in declivibus australibus montis Tocal ad pagum Pasgahleh, prope Darband, ca. 1500–2000 m., 25 June 1937, *K. H. Rechinger* 1096 (K!W!); Kiessteppe um Mahmudieh, 15 km nördlich Teheran, 1250 m., 24 August 1948, *P. Aellen* 774 (W!H-M! G!); in aridis faucium Passgala prope Teheran, 1843. *Kotschy* 661 (W!); in viciniis Derbent prope Teheran, 28 July 1843, *Kotschy* 592 (W!G!). Elburs: in valle Talkan, prope Dschoistan, 2100 m., 27 June 1902, *J. & A. Bornmüller* 8070 (W! K! G! E!); prope Deda et Norcon, distr. Talkan, 2400 m., 30 June 1902, *J. & A. Bornmüller* 8071 (W!) ad basin septentr. alpium Totschal, prope Schereristanek, c. 2200 m.,

7 June 1902, *J. & A. Bornmüller* 8072 (E!G!K!). Prov. Mazanderan: zentral Elburs, Flussebene des oberen Tedschen bei Kom-rud païn, 60 km. östlich von Firuzkuh, ca. 2200 m., 24 July 1948, *E. Behboudi & P. Aellen* 779 (W!); distr. Nur, Kamarband, ca. 2400–2600 m., 8 August 1948, *K. H. Rechinger* 6404 (W!K!H-M!G!); Shahkuh, gulch side, fl. purple, c. 1 m., 17 July 1940, *W. Koelz* 16314 (W!); Nezva Kuh, western top, northern side, 35°56′N. 53°15′E., corolla violet, c. 2800 m., 8 July 1959, *P. Wendelbo* 1254 (BG!); Haraz valley, above Panjab towards Darli, 36°10′N., 52°17′E., c. 1600 m., 30 July 1959, *P. Wendelbo* 1557 (BG!); Haraz valley, north of Panjab, 36°10′N., 52°17′E., c. 1000 m., 1 August 1959, *P. Wendelbo* 1649 (BG!). Prov. Shahrud-Bustam: in declivibus australibus montium Shahvar supra Nekarman (Nigarman) in glar. rivul. 2300 m., July 1948, *K. H. Rechinger* 5873 (W!G!K!H-M!). E. Casp.: *W. Besser* s.n. (W!). Prov. Kerman: in monte Kuh-i-Dschupar, c. 3000 m., 9 June 1892, *J. Bornmüller* 4320 (type of *N. carmanica* Bornm.–JE!E!); in reg. alp. montis Kuh-i-Häsar, 3600 m., 11 August 1892, *J. Bornmüller* 4322 (type of *N. carmanica* var. *cuneifolia* Bornm.-JE!); montes Djamal Bariz inter Bam et Djiroft, in declivibus borealibus, Deh Bakri, ca. 2100 m., 8–10 May 1948, *K. H. Rechinger* 3837 (W!). Prov. Fars.: Kotel Douledkuhek bei Kungischk, 5 September 1885, *O. Stapf* 287 (W!K!). Prov.?: prope Shimran in montibus vers. sept., 1700 m., 20 August 1914, *Hjalmar Pravitz* 220 (W!K!).

CULTIVATED. Hort. Berol., *Otto* 1093 (W!); July 1835, accepi Nov. 1870, *C. S. Kunth* s.n.

Nepeta leptantha Boiss. & Hausskn.

TURKEY. Prov. Maraş: distr. Çardak, Berit Dağ, nr. Arpa Cukuru yâyla, rocky places, perennial, fls. violet-blue, 2300 m., 25 July 1952, *Davis, Dodds & Çetik* (D. 20284); in rupestribus montis Berytdagh, 2130m., *Haussknecht* s.n. (holo.–G!).

These two specimens match each other very closely. Davis' collection is probably the first re-gathering of the plant on the Berit Dagh since Haussknecht originally collected it. With the limited amount of material available and bearing in mind the great variability of other species in this alliance, it is difficult to fix the specific boundary of *N. leptantha* with any certainty.

The following three specimens, also from one mountain, have been provisionally named as *N. leptantha*:

TURKEY. Prov. Tunceli: Munzur dağ above Ovacik, limestone scree near snow patch, perennial, fls. violet-blue, 2750 m., 17 July 1957, *Davis & Hedge* (D. 31256); *ibid.* rocky limestone slopes, 2400 m., 19 July 1957, *Davis & Hedge* (D. 31324); *ibid.* 1650 m., 16 July 1957, *Davis & Hedge* (D. 31166).

The Munzur Dağ plants agree with the Berit Dağ specimens in general facies, dimensions and shape of floral parts and, probably most important, in the clearly tuberculate nutlets. They differ from type material of *N. leptantha* in the petiolate leaves, petiolate lower cymes and in the less dense indumentum on the leaves and inflorescence parts.

When Boissier and Haussknecht described *N. leptantha*, they stated that it was a '*species insignis*'* and placed it beside *N. macrosiphon* Boiss. and *N. leptoclada* Trautv. In this alliance it is undoubtedly unique but its closest ally lies elsewhere. *N. aristata* Boiss. & Kotschy, which in the Flora Orientalis was placed in an entirely different species group (near *N. persica* Boiss. and *N. cyanea* Stev.), is also a little known species represented only by about three gatherings. One of these is from the Berit Dağ where it was collected at the same altitude as *N. leptantha*. *N. aristata* is characterised by the very markedly aristate calyx teeth and in this respect it stands unique. However, in facies and dimensions, it is very like *N. leptantha* and, furthermore, there is a great similarity between the nutlets of the type material of *N. aristata* and the specimens of *N. leptantha* cited above. Although there are as yet no reasons for considering them conspecific, *N. leptantha* and *N. aristata* must nevertheless be regarded as close allies.

Nepeta lamiifolia Willd.

TURKEY. Prov. Hakâri: Cilo Dağ, 10 km. west of Cilo Tepe, fls. pale lilac, 3200 m., 9 Aug. 1954, *Davis & O. Polunin* (D. 24131); Cilo Tepe, rocky slopes, stems ascending, fls. light lavender-blue, 3200 m., 8 Aug. 1954, *Davis & O. Polunin* (D. 24082b); Vorfeld des Kelesin-Ostgletschers Cilo Dağlari, 24 Aug. 1956, *Deutschmann & Freh* s.n. (W!). Prov. Erzincan: Keşis Dağ above Cimin, steep igneous (dioritic?) scree, fls. lavender-blue, 2700–2900 m., 27 July 1957, *Davis & Hedge* (D. 31632).

IRAQ. Chia-i-Mandalli, 2700 m., on rocky mountainside, fls. purple, 19 July 1932, *Guest & Ludlow-Hewitt* 2726 (type of *N. iodantha* Náb. var. *parviflora* Blakelock-K!); *ibid.* fls. reddish, no. 2727.

This species is most readily distinguished from *N. fissa* C.A.Mey. by the longer bracts, often scarious or menbranous at the margins, and the compacted inflorescence, of which the terminal is most often clearly capitate. It is, unlike *N. fissa*, a high alpine species growing on rocky slopes or screes, the rootstock is thicker and the basal branches are more woody than is the case in *N. fissa*. *N. lamiifolia* is apparently restricted to the high Alps of Armenia and Kurdistan, where its range may be wider than the cited specimens suggest.

As with the other species in this group, I have taken a wide specific view of *N. lamiifolia*. There is a fair degree of variation in the specimens mentioned above. The plants from the Cilo Dağ have a clearly condensed capitate inflorescence, whereas those from Iraq are scarcely crowded at all; the specimen from Keşis Dağ also differs from the Cilo Dağ plant in having a more open inflorescence. I have seen a photograph of the type specimen in the Willdenow herbarium; the plant was collected by Tournefort in 'Armenia'. The exact locality is unknown but as Tournefort's journey in Armenia took him from Erzurum to Kars, Mount Ararat and Tiflis, the type locality presumably lies somewhere in that area. The photograph of the type is, however, most closely matched, other than in

* They described it, however, on immature fruiting material and believing the nutlets to be smooth consequently allied it to other species with smooth nutlets. Recent gatherings show that the nutlets are clearly tuberculate and that its affinities must be sought elsewhere.

the actual height of the plant, by the specimens from the Cilo Dağ in Turkish Kurdistan.

It was with some hesitation that I named the specimen from Iraq as *N. lamiifolia*. It had been named as the type of the new variety *parviflora* of *N. iodantha* Náb. by Blakelock. He also had not seen the type of *N. iodantha* and named the Iraq plant on the basis of the original description and photograph. With the available material, however, there are no obvious reasons why it should not be called *N. lamiifolia*. Whether or not *N. lamiifolia* is merely a high alpine form of *N. fissa* needs field observation. Although the great majority of the specimens cited under *N. fissa* are from much lower altitudes than *N. lamiifolia*, there are a few from higher levels that approach *N. lamiifolia* quite closely.

Other than its affinites with *N. fissa*, there is no doubt that *N. lamiifolia* is very closely allied to *N. brevifolia*. The two species were separated in the key to the Soviet species of *Nepeta* thus:-

Inflorescence consisting of a lax 8–14–flowered head and 1–2(–3) pairs of cymes; peduncles of lower cymes 12–25 mm. long; leaves up to 17 mm. long and broad . . . . *N. brevifolia* C.A.Mey.

Inflorescence consisting of a compact (20–) 30–50– flowered head and 2–4 pairs of distant cymes; lower peduncles 18–30 mm. long; leaves up to 35 mm. long and broad . . . *N. lamiifolia* Willd.

Nepeta brevifolia C.A.Mey.

U.S.S.R. Prov. Baku, distr. Schemacha, prope cacumen montis Dibrar, in detritu lapidoso decliv. meridionalis, 2200 m., 25 July 1900, Flora Caucasica exsiccata, *Busch, Marcowicz & Woronow* 217 (E!G!)

I have only seen the one specimen of this species which is given in the Flora U.S.S.R. as an endemic of the Caucasus. As pointed out under the previous species, it is very closely allied to *N. lamiifolia*. Whether there is a fundamental difference between them is a problem for the Caucasian botanist in the field. It is of interest to note, however, that a photograph of the type specimen of *N. brevifolia* (LE!) from Tufandag has recently been redetermined as *N. lamiifolia* by Askerova.

Nepeta obtusicrena [Boiss. & Kotschy ex] Hedge, **species nova**.

Perennis. *Caules* c. 50 cm. alti, basi arcuatim ascendentes, erecti, quadrangulares, angulis acutis, in parte inferiore purpurei leviter pilosi, internodiis mediis c. 5 cm. longis, simplices vel ramosi, ramulis elongatis foliatis. *Folia* petiolata late cordato-ovata, apice obtusa, margine utrinque c. 6 crenis obsoletis parvis provisa, supra viridia pilis appressis tenuissimis instructa, subtus similia, caulina 2·5×1·5 cm; folia caulina sessilia. *Inflorescentia* c. 6 cm. longa. *Cymae* in capitulum terminale densum confertae, paucis inferioribus pedunculatis. *Bracteae* anguste lineares dimidium vel duas partes calycis aequantes, extra margineque dense molliter pilosae, pilis longis albis tenuibus provisae. *Pedicelli* c. 1 mm. longi. *Calyx* c. 7 mm. longus, tubulosus, incurvus, 15 costatus, tubo pilis eglandulosis albis obsito, antice profunde c. ad duas partes suae longitudinis fissus, ore obliquo, fauce intus glaber, dentibus margine membranaceis, superioribus latioribus triangulari-ovatis vel lanceolato-ovatis, acutis inferioribus angustioribus. *Corolla* caerulea, c. 12 mm.

longa, extra puberula, tubo incurvo ad medium e calyce exserto, in faucem latum dilatato; labium superius 2–3 mm. longum in lobos duos fissum; labium inferius c. duplo longius, lobo medio concavo, margine crenato. *Nuculae* ellipticae, obtusae trigonae, brunneae, plane tuberculatae.

TURKEY. Prov. Bitlis: Tatvan-Ahlat nr. Soğurt, steep steppe slope, fls. violet-blue, 2000 m., 25 Aug. 1954, *Davis & O. Polunin* (D. 24609); Nemrut Dağ, on volcanic banks, perennial, many stemmed, leaves thick, fls. violet blue, c. 2000 m., 3 July 1954, *Davis & O. Polunin* (D. 23575). Prov. Siirt: ad pagum Müküs, 2100 m., 24 Sept. 1859, *Kotschy* 685 (holo. G! iso. W!). Cultivated: Jardin de Valeyres, seed from Armenia, June 1862, *Kotschy* s.n. (G!).

N. obtusicrena first appeared as an *exsiccata* name of Boissier and Kotschy on the widely distributed herbarium specimen *Kotschy* 685 ann. 1859. It was never described but the name appeared in the Flora Orientalis (**4,** 647: 1884) as a synonym of *N. calvertii* Boiss. With the two additional *Davis* gatherings from Bitlis, the position of the Kotschy specimen has been reassessed. The three specimens stand close together on the basis of the compacted inflorescence with a capitate head and the fairly long bracts. For these reasons, I have excluded this taxon from *N. calvertii*, which I have treated as a synonym of *N. fissa*, and recognised it as a separate species.

N. obtusicrena stands between *N. lamiifolia* and *N. fissa* in its affinities. It has the compacted terminal inflorescence of the former and the calyx form, bracts and habit of the latter.

There is a considerable and pronounced difference between the three specimens cited. In the holotype, the leaves have a very short, almost glabrescent, pilose indumentum, whereas in the *Davis* specimens the leaf indumentum is dense and pannose. Despite this marked difference between them, I have included them all under the same specific name. A similar example of indumentum variability within one species occurs in *N. mussinii* Spreng.—in some areas, especially the Elburs, a local form is frequent in which the indumentum is pannose whereas in the type plant the indumentum is quite thin.

As the map illustrates, *N. obtusicrena* is only known from a limited area of south-eastern Turkey.

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