Taxonomy and cytology of the genus Hyacinthella (Liliaceae-Scilloideae) with special reference to the species in S.W. Asia : Part I

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Taxonomy and cytology of the genus Hyacinthella (Liliaceae-Scilloideae) with special reference to the species in S.W. Asia. Part I

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RÉSUMÉ

PERSSON, K. & P. WENDELBO (1981). Taxonomie et cytologie du genre Hyacinthella (Liliacées-Scilloidées) avec traitement détaillé des espèces du S.W. de l'Asie. Partie I. *Candollea* 36: 513-541. En anglais, résumé français.

Seize espèces sont attribuées au genre *Hyacinthella*, quatre dans le S.E. de l'Europe et douze en Asie du S.W. Ces dernières sont traitées plus en détail avec des descriptions complètes et des cartes de distribution. Une clé pour toutes les espèces est ajoutée. Les espèces nouvelles sont: *H. acutiloba* K. persson & Wendelbo, *H. campanulata* K. Persson & Wendelbo et *H. glabrescens* (Boiss.) K. Persson & Wendelbo. *Scilla atropatana* Grossh. est inclus sous le nom *H. atropatana* (Grossh.) Mordak & Zakharyeva comb. nova. L'épithète *H. dalmatica* (Baker) Chouard est illégitime et le nom correct de l'espèce est *H. pallens* Schur. Le genre se reconnaît bien sur la base d'une série de caractères morphologiques et cytologiques. Les nombres chromosomiques $2n = 16$, 18, 20, 22 et 24 ont été dénombrés. On considère que $x = 9$ est le nombre de base primitif. La morphologie du caryotype est caractéristique et nettement distincte de celle des genres voisins *Muscari, Bellevalia, Alrawia* et *Hyacinthus*. Certains groupes d'espèces affines sont suggérés sur la base de la morphologie, de la cytologie et de la distribution. L'évolution et la migration du genre à partir d'un centre de dissémination hypothétique situé au sud de l'Anatolie centrale sont discutées.

ABSTRACT

PERSSON, K. & P. WENDELBO (1981). Taxonomy and cytology of the genus Hyacinthella (Liliaceae-Scilloideae) with special reference to the species in S.W. Asia. Part I. *Candollea* 36: 513-541. In English, French abstract.

Sixteen species have been recognized in the genus *Hyacinthella*, four of which are found in S.E. Europe and twelve in S.W. Asia. The latter have been treated more in detail with full descriptions and maps of distribution. A key to all species is

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provided. New species are: *H. acutiloba* K. Persson & Wendelbo, *H. campanulata* K. Persson & Wendelbo, and *H. glabrescens* (Boiss.) K. Persson & Wendelbo. *Scilla atropatana* Grossh. has been included as *H. atropatana* (Grossh.) Mordak & Zakharyeva, comb. nova. The epithet *H. dalmatica* (Baker) Chouard is illegitimate and the species must now be called *H. pallens* Schur. The genus is well characterized by a combination of morphological and cytological characters. The chromosome numbers $2n = 16$, 18, 20, 22 and 24 have been recorded. $x = 9$ is considered to be the original basic number. The morphology of the karyotype is characteristic, clearly distinguished from the related genera *Muscari, Bellevalia, Alrawia* and *Hyacinthus.* Certain species affinity groups are suggested on the evidence of morphology, cytology and distribution. Evolution and migration of the genus from a hypothetical centre in South Central Anatolia are discussed.

The genus *Hyacinthella* Schur (1856) was originally described with *H. leucophaea* (C. Koch) Schur as the only species. In the present work 16 species are accepted.

BAKER (1871) in his revision of a number of liliaceous genera included present day species of *Hyacinthella* in *Hyacinthus.* They were partly referred to his section *Hyacinthella* and partly to section *Bellevalia.* But both of these sections were heterogeneous. Thus the former included species that are now referred to *Brimeura, Muscari* and *Drimia.* Baker's circumscriptions of the genera are not well founded, and he does not seem to have had any clear view on the real relationship of the species, as so often in his works. BOISSIER (1882), on the other hand, treated his *Bellevalia* sect. *Hyacinthella* as comprising 9 species, seven of which are true *Hyacinthella* species and two are now referred to *Muscari* subgen. *Pseudomuscari.* KRAUSE (1930) again referred *Hyacinthella* to *Hyacinthus* as a section. CHOUARD (1930/31, 1931b) made an important study especially of bulb characters in *Scilla* and related genera. He accepted *Hyacinthella* as a genus and made a series of new combinations, but probably due to lack of living material and good herbarium material for more detailed studies many species were wrongly included. Thus of his 16 *Hyacinthella* species 3 now belong to *Bellevalia,* 2 to *Hyacinthus* s.str. and 3 to *Muscari.*

FEINBRUN (1961) monographed the genus and gave it a final circumscription based on a clear understanding of the important morphological and anatomical characters distinguishing it from *Bellevalia, Muscari* and *Hyacinthus.* Due to lack of fruiting material she was somewhat uncertain whether the species *H. micrantha* and *H. persica* were true members of the genus. BARANOVA (1965) did not accept this circumscription and followed Chouard in keeping *Hyacinthus litwinowii* Czerniak. and *H. transcaspicus* Litw. as members of *Hyacinthella.* BENTZER & al. (1974) and PERSSON & WENDELBO (1979d) could, however, show by means of cytological studies and crossing experiments that the two species really belonged in *Hyacinthus.* BELJANINA & PROSKURJAKOVA (1978) again treated *Hyacinthella* as a section of *Hyacinthus.*

WENDELBO (1973) with considerable doubt transferred *Scilla bellii* Baker (= *Bellevalia dichroa* Bornm.) to *Hyacinthella* and described a new related

species *H. nutans* Wendelbo. A new section *Alrawia* was erected for the two species. PERSSON & WENDELBO (1979c) studied living material of both species and found that they for morphological and cytological reasons were better accomodated in a separate new genus, *Alrawia* (Wendelbo) Persson & Wendelbo. Thus Feinbrun's more restricted circumscription of *Hyacinthella* was accepted.

Since the study of FEINBRUN (1961) much more herbarium material has accumulated especially from Turkey, which so definitely is the centre of the genus. Thus more data on variation and distribution of especially the different extra-European taxa have become available. We have not studied the 4 European species in detail. The present study is closely connected with a revision of *Hyacinthella* for "Flora of Turkey", and also with a study of generic delimitations and phylogeny within the *Bellevalia-Hyacinthus-Muscari*-group of the *Scilloideae*. For these studies a collection of living bulbs was built up in the Botanical Garden of Göteborg. This collection gradually came to include all the species of *Hyacinthella* as well as most of the species of *Bellevalia, Hyacinthus* and *Muscari* that through the years have caused so much trouble for the taxonomists. Cytological work on this material has contributed much to and has in fact been indispensable for an understanding of the phylogeny and generic delimitations within the group.

Prior to the present study, only a few data on *Hyacinthella* chromosomes have been published. Thus, BUVAT (1945) recorded $2n = 18$ for *H. leucophaea,* probably not correct (most of his countings of chromosome numbers were based on material of horticultural origin, undoubtedly often falsely determined). ÖSTERGREN & al. (1958) made a study on chromosome size and breakability by x-rays in *Hyacinthus orientalis* and *Hyacinthella pallens* (sub *Hyacinthus dalmaticus*) in which the number $2n = 20$ for the latter species was given and the small size of its chromosomes was pointed out. The author of the *Hyacinthella* monograph, FEINBRUN (1961), counted the chromosome number in three species collected in Turkey by P. H. Davis, viz., *H. glabrescens* (sub *H. lineata* var. *glabrescens*) $2n = 18$, *H. heldreichii* $2n = 18$, and *H. nervosa* $2n = 24$. No data were given on chromosome morphology. Finally, POPOVA (1972) reported $2n = 20$ for *H. leucophaea* from Bulgaria, and BARANOVA (1979) the same number for *H. leucophaea* and *H. pallasiana*. GREILHUBER & SPETA (1976) gave the number $2n = 22$ for *H. atropatana* (sub *Scilla a.*) with no indication of locality. The species examined was perhaps actually *H. persica* (see under *H. atropatana* in taxonomic chapter).

Hyacinthella Schur

Schur, Österr. Bot. Wochenbl. 6: 227 (1856).

Hyacinthus sect. *Hyacinthella* (Schur) Baker, Journ. Linn. Soc. 11: 424 (1871) pro p.

Bellevalia sect. *Hyacinthella* Boiss., Fl. Or. 5: 301 (1882) pro max.p.

TYPE SPECIES: *H. leucophaea* (C. Koch) Schur.

Small bulbose, scapose, racemose to spicate herbs. Bulb perennial, small, ovoid, with imbricate, free scales; outer tunics entire, papery, dark brown to grey. Leaves 2-3 when one scape present, up to 4(-5) when more than one scape, glabrous to hispid, margin smooth or scabrid to ciliate, often ± twisted, usually glaucous; in the dried state usually with distinctly elevated nerves. Scape up to 20 cm long including rhachis, in fruit sometimes elongating to as much as 30 cm. Bracts minute, often appearing as a mere rim, entire to bilobed. Perianth pale to dark blue or blue-violet, rarely white or pinkish, ascending to patent, somewhat zygomorphic to nearly regular, campanulate to tubular or more rarely urceolate, persistent in fruit; divided for about ¼ to ½ of its length into somewhat unequal, ± obliquely elliptic to ovate, obtuse to acute lobes, in one species perianth split to the base; at least upper outer lobes with ± distinct oblique crest-like protuberances. Filaments adnate to perianth up to middle or upper part of tube and forming distinct ribs or ridges, free part terete, often shorter than or as long as anthers, more rarely longer, points of attachment often at slightly different levels; anthers small, reddish violet to dark violet, dorsifixed, introrse. Ovary 3-loculed, with 2(-4) ovules in each locule. Style slender to rather thick with ± punctiform stigma reaching the level of the anthers. Capsule 3.5-5 mm in diameter, somewhat depressed globose to broadly pyriform, with a short beak; valves rounded on back, coriaceous. Seeds black, ± wrinkled; testa reticulate or with a pattern of low intertwined ridges.

CHROMOSOME NUMBER $2n = 16, 18, 20, 22$ or 24.

1. Flowers sessile or subsessile; pedicels less than 1 mm 2
1a. Flowers pedicelled; pedicels more than 1 mm 6
2. Perianth very dark blue-violet ..... **2. H. heldreichii**
2a. Perianth rather pale blue to nearly white 3
3. Leaves ± filiform or narrowly linear to linear-oblanceolate, 1.5-4.5(-7) mm broad, canaliculate, recurved. Perianth 3.5-5 mm long 4
3a. Leaves linear to oblong-lanceolate, first one 5-20 mm broad, flat, often twisted. Perianth 5-9 mm long 5
4. Perianth ± urceolate, lobes 1-1.5 mm long. Leaves with scabrid to puberulent margin and usually also nerves ..... **14. H. micrantha**
4a. Perianth tubular-campanulate, lobes 1.7-2.5 mm long. Leaves glabrous with margin scabrid to scabridulose .... **11. H. millingenii**
5. (3) Anthers nearly reaching apex of perianth lobes . **13. H. nervosa**
5a. Anthers only reaching base of perianth lobes ..... **12. H. siirtensis**
6. (1) Perianth (8-)9-12 mm long ..... **9. H. pallasiana**
6a. Perianth less than 6.5 mm 7

7. Leaf margin smooth, rarely minutely and indistinctly scabrid but perianth then very dark blue-violet 8

7a. Leaf margin ciliate to ciliolate or scabrid 10

8. Perianth pale blue, campanulate with lobes nearly as long as tube **4. H. campanulata**

8a. Perianth ± dark blue-violet, tubular to tubular-campanulate with lobes half as long as tube 9

9. Second leaf less than half as broad as the first one. Flowering pedicels usually not more than 2 mm long ..... **2. H. heldreichii**

9a. Second leaf at least half as broad as the first one. Flowering pedicels 2-7 mm long ..... **3. H. glabrescens**

10. (7) Perianth split to the base ..... **16. H. atropatana**

10a. Perianth not split more than halfway 11

11. Filaments more than twice as long as anthers. Bracts 1-2.5 mm long with acute lobes ..... **15. H. persica**

11a. Filaments about as long as anthers. Bracts a mere rim or very short with indistinct lobes 12

12. Leaves ± linear with scabrid margin. European species 13

12a. Leaves oblong-lanceolate to elliptic or elliptic-obovate with ciliate to ciliolate or very rarely scabrid margin. Asian species 15

13. Leaves recurved with rather indistinct nerves in the dried state **10. H. pallens**

13a. Leaves erect with distinctly elevated nerves in the dried state 14

14. Perianth intensely blue, campanulate ..... **8. H. atchleyi**

14a. Perianth pale blue to nearly white, tubular-campanulate **7. H. leucophaea**

15. (12) Second leaf less than half as broad as the first one; leaf surfaces rather densely hispid ..... **1. H. hispida**

15a. Second leaf more than half as broad as the first one; leaf surfaces glabrous or more rarely somewhat hispid 16

16. Perianth deep blue to violet-blue; lobes mostly broadly ovate, rather obtuse, often incurved. Leaves usually 2 when 1 scape **6. H. lineata**

16a. Perianth rather pale blue; lobes oblong-ovate to elliptic-ovate, subacute to acute, ± straight. Leaves usually 3 when one scape **5. H. acutiloba**

Sect. **Hyacinthella**

Leaves linear to elliptic with fibre strands along vascular bundles, in *H. micrantha* narrow without fibre strands. Bracts except in *H. siirtensis* less than 1 mm, often appearing as a mere rim, entire to faintly bilobed. Free part of filaments shorter than to slightly longer than anthers. Seed testa reticulate (Fig. 11c).

1. **H. hispida** (J. Gay) Chouard

Chouard, Bull. Mus. Hist. Nat. Paris, Sér. 2, 3: 178 (1931). — *Bellevalia hispida* J. Gay, Bull. Soc. Bot. France 3: 240 (1856). — TYPE: [Turkey. Içel:] Hab. in Cilicia littorali circa Mersinam, ann. 1855, *B. Balansa 815,* iso- G!, GOET!, JE!, K!

ICON. Fig. 1A.

Leaves 2 or rarely 3 when 2 scapes, first one 4-12(-17) mm broad, ± narrowly oblong-lanceolate, second less than half as broad, ± densely hispid on both sides, undulate-twisted, glaucous, base of leaves usually with purplish spots. Scape 5-12(-16) cm long, with purplish spots, in fruit up to 23 cm. Raceme (4-)10-20(-30)-flowered, rather lax. Pedicels 2-4 mm long, slender, ascending, blue-violet, slightly elongated and arcuate in fruit. Perianth dark blue-violet, (4-)5-6 mm long, tubular to tubular-campanulate; lobes about half as long as tube, broadly elliptic, subobtuse to obtuse, submucronate, apex thick, somewhat incurved. Filaments attached just below lobes.

CHROMOSOMES $2n = 18$; second chromosome metacentric and about as long as long arm of chromosome No. 1, chromosomes No. 3-9 distinctly smaller (Figs. 1C, 12A).

FL. 2-4. In *Quercus coccifera*-scrub, stony slopes, limestone scree, limestone rocks; 100-1100 m.

DISTR. Turkey: Içel, Adana, Nigde (Fig. 13).

With its dense cover of long, patent and rather stiff hairs *H. hispida* is easy to recognize among the species of the genus. It is only in *H. lineata* one may otherwise find, now and then, hairs on the lower part of the leaf lamina and then always much more sparse.

From cytological evidence, i.e. chromosome number and morphology, it seems clear that *H. hispida* is most closely related to *H. heldreichii, H. glabrescens* and *H. campanulata.* These are also the species that are found in the adjacent geographical areas.

H. hispida and *H. glabrescens* are apparently the only Asian species of the genus that overlap in their distribution. Both species seem to have been collected in the Ulukishla-Pozanti area on the border of the provinces of Nigde and Adana. Generally *H. hispida* occurs at lower altitudes than *H. glabrescens.* There is no certain record of the two species growing in

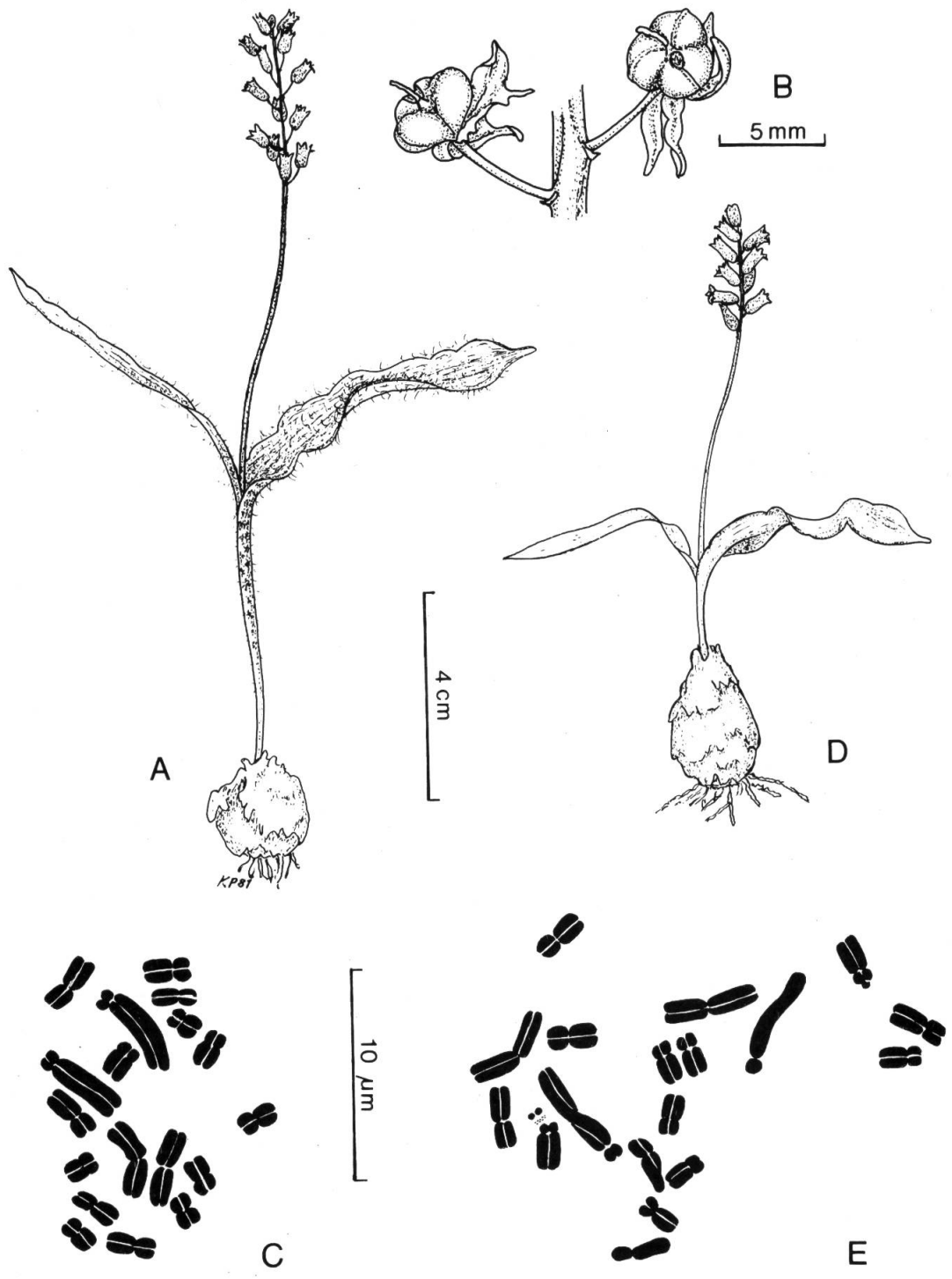

Fig. 1. — *Hyacinthella hispida.* **A** *(Balls 168):* habit. **B** (ibid.): fruits. **C** (*Renz & Taubenheim* s.n.): mitotic metaphase.
H. heldreichii. **D** *(Tengwall 83):* habit. **E** *(Runemark & Wendelbo 350):* mitotic metaphase.

mixed populations. Thus they may normally show different ecological preferences when they grow at the same altitude, according to Davis (in FEINBRUN, 1961). *H. hispida* should grow in drier places.

2. H. heldreichii (Boiss.) Chouard

Chouard, Bull. Mus. Hist. Nat. Paris, Sér. 2, 3: 178 (1931). — *Bellevalia heldreichii* Boiss., Diagn. 2, 4: 111 (1859). — TYPE: [Turkey. Antalya:] Hab. inter Adalia et Yenidge Khan in herbidis inter frutices, — *Heldr.,* G., iso- K!, E!

ICON. Fig. 1D.

Leaves 2, or 3 when 2 scapes, first one (3-)5-12(-16) mm broad, narrowly oblong-lanceolate, second often less than half as broad, glabrous with smooth or rarely minutely scabrid margin, somewhat undulate-twisted, glaucous, ± tinged purplish. Scape 4.5-15 cm long, tinged purplish, in fruit elongating up to 25 cm. Raceme (3-)10-15(-25)-flowered, lax to rather dense. Flowers ± sessile, or pedicels up to 2 mm long, ascending, blue-violet, somewhat elongating in fruit. Perianth very dark blue-violet, ascending, (4-)5-6(-6.5) mm long, tubular to tubular-campanulate; lobes about half as long as tube, broadly elliptic, subobtuse, submucronate, apex thick, somewhat incurved. Filaments attached somewhat below lobes.

CHROMOSOMES $2n = 18$; second chromosome metacentric and about as long as long arm of chromosome No. 1, chromosomes No. 3-9 distinctly smaller; usually a small satellite on short arm of chromosome No. 6 (Figs. 1E, 12B).

FL. 2-5 according to altitude. Limestone gravel, hills with white marly soil, open patches in pine forest or among *Quercus* spp.; 150-1500 m.

DISTR. Turkey: Antalya, Burdur, Isparta, Içel, Konya (Fig. 13).

Specimens from E. Içel, Nigde and Adana which look very like *H. heldreichii* or intermediary between *H. heldreichii* and *H. micrantha* have at least in one case *(Mathew & Tomlinson 4078)* been shown to have the chromosome number $2n = 22$. They have been treated as hybrids with *H. micrantha* (see under that species).

3. H. glabrescens (Boiss.) K. Persson & Wendelbo, **stat. nov.**

Bellevalia hispida J. Gay var. *glabrescens* Boiss., Fl. Or. 5: 306 (1882). — *Hyacinthella lineata* (Steud.) Chouard var. *glabrescens* (Boiss.) Feinbr., Bull. Res. Counc. Israel 10D: 333 (1961). — TYPE: [Turkey.] Tarsous, *Aucher-Eloy 2116,* lecto- G!, iso- E!, K! (lectotype selected by FEINBRUN, 1961).

ICON. Fig. 2A.

Folia 2(-3), primum (6-)8-20 mm latum, secundum dimidiam latitudinem folii primi aequans vel latius; folia glabra, margine laevia, glauca, saepe dilute purpureo-suffusa. Scapus 5-15 cm longus, fructifer vix elongatus. Racemus (8-)15-30-florus, laxiusculus. Pedicelli 2-7 mm longi, ascendentes, fructiferi vix elongati. Perianthium atro-coeruleo-violaceum, (4-)4.5-6 mm longum, tubulosum usque ad tubuloso-campanulatum; lobi circiter dimidiam partem tubi aequantes, late ovati, subobtusi, submucronati. Filamenta aliquantum infra loborum basin perianthii affixa. Ovula in quoque loculo bini vel quaterni. Capsula ca. 5 mm lata.

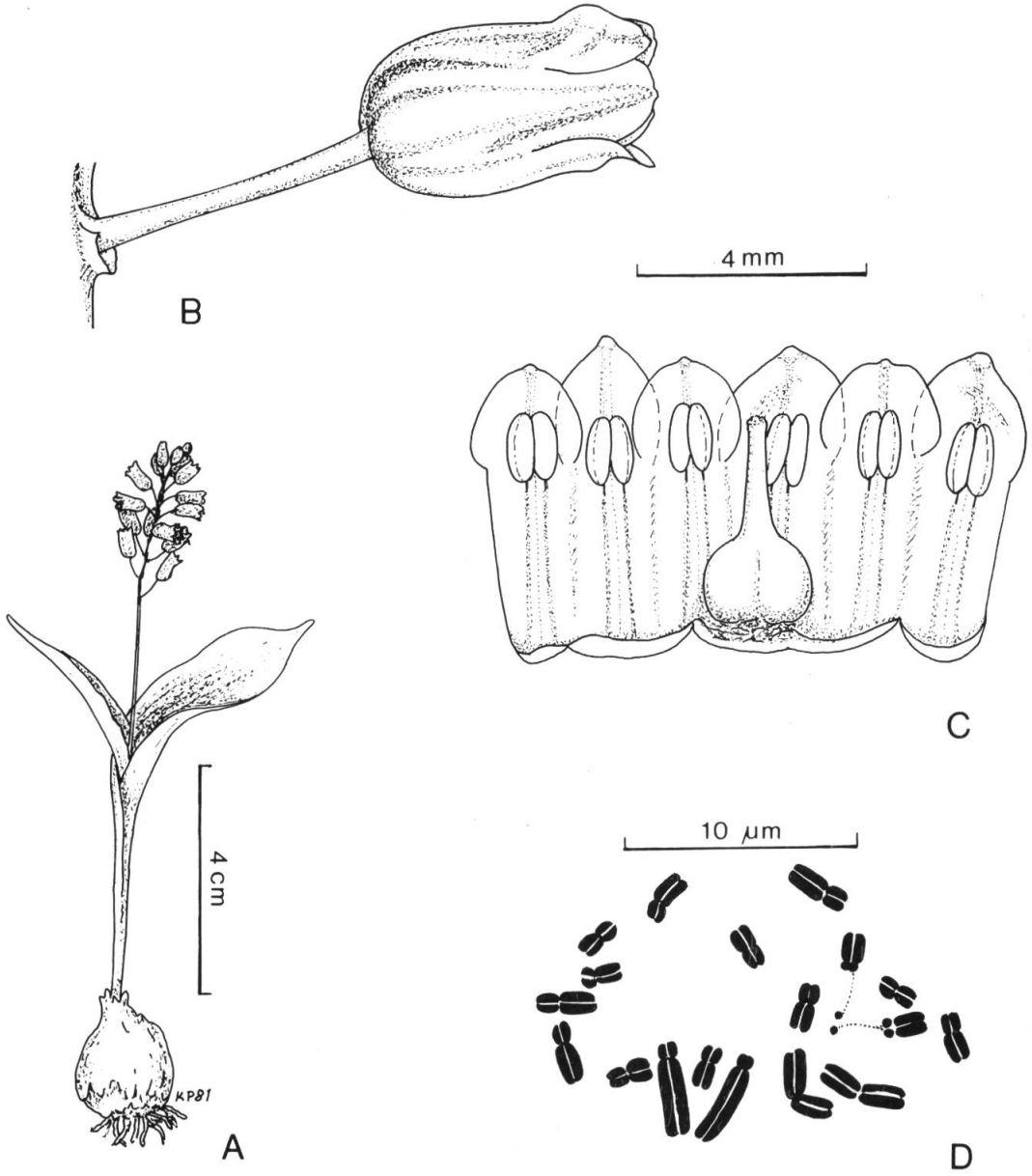

Fig. 2. — *Hyacinthella glabrescens*. **A:** habit. **B:** perianth with pedicel and bract. **C:** perianth split open. **D:** mitotic metaphase (all *Mathew & Tomlinson 4463*).

Leaves 2, or 3 when 2 scapes, first one (6-)8-20 mm broad, narrowly oblong-lanceolate to narrowly oblong-ovate or elliptic, second about half as broad or broader, glabrous with smooth margin, glaucous, often faintly tinged purplish. Scape 5-15 cm long, only slightly elongating in fruit. Raceme (8-)15-30-flowered, rather lax. Pedicels 2-7 mm long, ascending, hardly elongating in fruit. Perianth deep blue-violet, (4-)4.5-6 mm long, tubular to tubular-campanulate; lobes about half as long as tube, broadly ovate, subobtuse, submucronate, slightly thickened at apex. Filaments attached somewhat below lobes.

CHROMOSOMES $2n = 18$; second chromosome metacentric and about as long as or longer than long arm of chromosome No. 1, chromosomes No. 3-9 distinctly smaller; usually a small satellite on short arm of chromosome No. 6 (Figs. 2D, 12C).

FL. 3-4. Dry slopes under pines, rocky slopes, scree and clay soil, lime screes, open slopes wet from snow in spring; 600-1300 m.

DISTR. Turkey: Içel, Adana, Nigde (Fig. 13).

H. glabrescens has partly been treated as a variety of *Bellevalia hispida (= H. hispida)* and partly of *H. lineata*. We cannot find that it is more closely related to the one than the other of these species; judged from several characters otherwise used in the taxonomy of the genus it rather deserves the rank of a species. *H. glabrescens* differs from both *H. lineata* and *H. hispida* in being glabrous and in having a completely smooth leaf margin, the two leaves are more erect and tightly enclosing the scape like a cornet (Fig. 2A), leaves and scape also lack the purple spots. The second leaf is about half as broad as the first one in *H. glabrescens,* more than half as broad in *H. lineata* and less than half as broad in *H. hispida*. In the lack of pubescence and scabridity *H. glabrescens* is more akin to *H. heldreichii* and *H. campanulata,* but it differs from the former in the broader second leaf and the distinctly pedicelled and less dark flowers, and from the latter in the much darker and more tubular flowers. Cytological characters indicate a closer relationship with *H. hispida, H. heldreichii* and *H. campanulata* than with other species of the genus.

4. H. campanulata K. Persson & Wendelbo, **sp. nova**

TYPE: Turkey. Konya: W. of Konya by the river, limestone cliffs above dam site, 1300 m, *Runemark & Wendelbo 416,* holo- GB!, iso- E!

ICON. Fig. 3A.

Folia 2, primum 6-15 mm latum, secundum dimidiam circiter latitudinem folii primi aequans; folia glabra, margine laevia, plus minusve undulata, glauca, basin versus dilute purpureo- vel violaceo-suffusa. Scapus ca. 7 cm longus, fructifer usque ad 16 cm elongatus. Racemus 4-12-florus, laxiusculus.

Pedicelli 1.5-3 mm longi, ascendentes, fructiferi usque ad 8 mm longi. Perianthium pallide coeruleum, 4.5-5.5 mm longum, campanulatum; lobi tubum fere aequantes, ovati, subobtusi usque ad obtusi, emucronati. Filamenta proxime infra loborum basin perianthii affixa. Ovula in quoque loculo bini. Capsula ca. 5 mm lata.

Leaves 2, first one 6-15 mm broad, linear-elliptic to linear-oblanceolate, second about half as broad, glabrous, margin smooth, somewhat undulate,

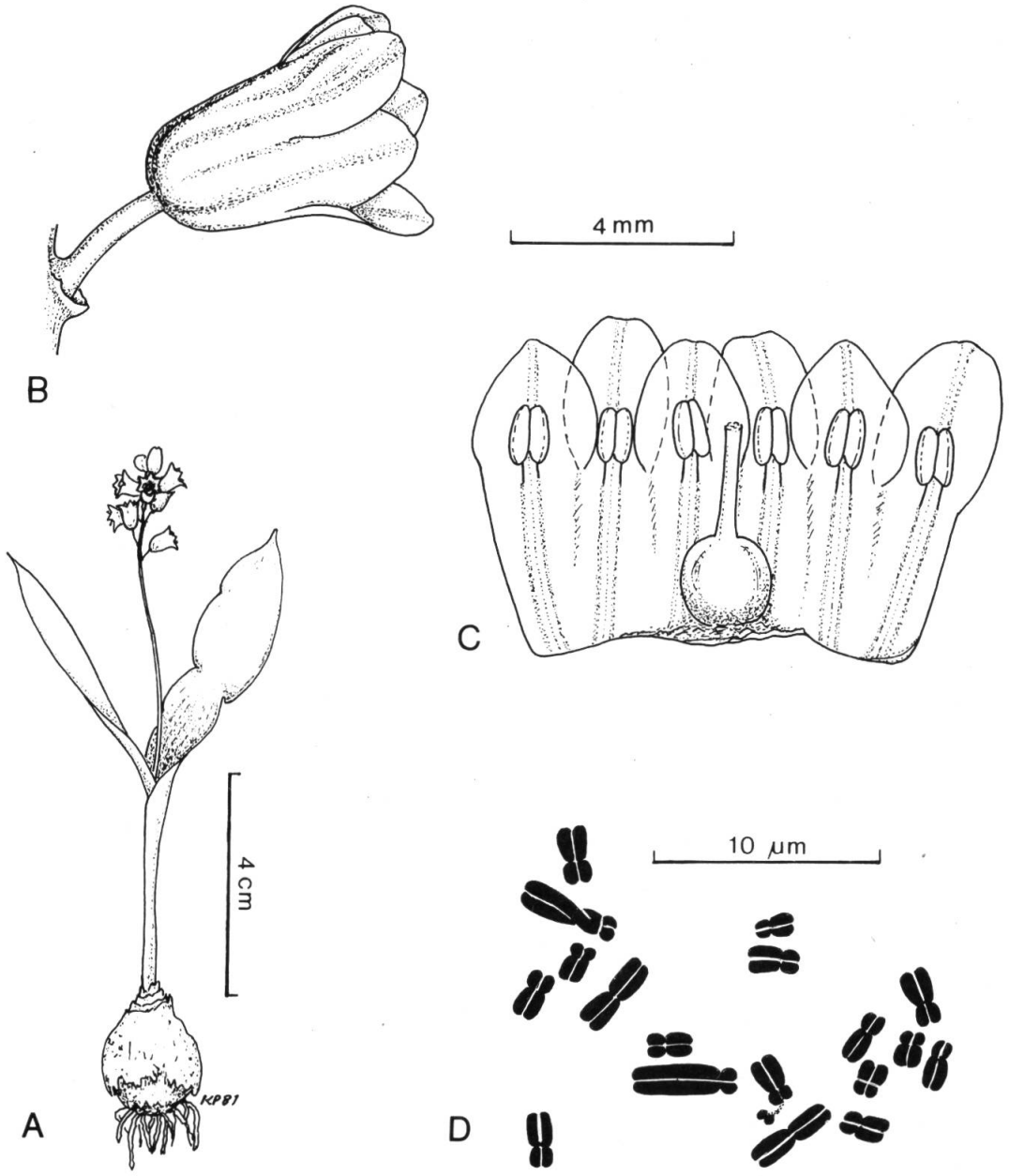

Fig. 3. — *Hyacinthella campanulata*. **A:** habit. **B:** perianth with pedicel and bract. **C:** perianth split open. **D:** mitotic metaphase (all *Runemark & Wendelbo 416*).

glaucous, tinged purplish or violet towards base. Scape about 7 cm long, elongating to about 16 cm in fruit. Raceme 4-12-flowered, rather lax. Pedicels 1.5-3 mm long, ascending, in fruit becoming up to 8 mm long. Perianth pale blue, 4.5-5.5 mm long, campanulate; lobes nearly as long as tube, ovate, subobtuse to obtuse, emucronate, hardly thickened at apex. Filaments attached just below base of lobes.

CHROMOSOMES $2n = 18$; second chromosome metacentric and about as long as or longer than long arm of chromosome No. 1, chromosomes No. 3-9 distinctly smaller; usually a small satellite on short arm of chromosome No. 6 (Figs. 3D, 12D).

FL. 4. Stony hillsides, limestone cliffs; 1100-1300 m.

DISTR. Turkey: Konya (Fig. 13).

H. campanulata is similar to *H. heldreichii* and *H. glabrescens* in the glabrous leaves with a smooth leaf margin. From both it differs in having perianth lobes nearly as long as tube, from the former in the somewhat broader second leaf and the much paler perianth; from the latter it differs also in the much paler, more open perianth which has hardly any thickened nerve or sign of mucro at the apex of the lobes. The new species approaches *H. acutiloba* in the pale colour of the perianth but differs in most other characters.

5. H. acutiloba K. Persson & Wendelbo, **sp. nova**

TYPE: Turkey. Kayseri: 5 km N. of Sariz, 1900-2000 m, rocky limestone slopes, 24.5.1965, *Coode & Jones 1383,* holo- E!

ICON. Fig. 4A, B.

Folia (2-)3, primum (5-)10-25(-35) mm latum, ± anguste ellipticum usque ad ellipticum vel obovato-ellipticum, secundum plus quam dimidium latitudinis primi attingens; folia glabra, margine ciliata vel ciliolata, glauca, basin versus plerumque purpureo-suffusa et maculata. Scapus 7-17.5 cm longus, basin versus purpureo-maculatus, fructifer usque ad 20(-30) cm elongatus. Racemus 9-30(-40)-florus, laxiusculus. Pedicelli 2-6 mm longi, ascendentes, fructiferi vix elongati. Perianthium ± pallide coeruleum raro coeruleum, (5-)5.5-6.5 mm longum, tubuloso-campanulatum usque ad campanulatum; lobi tubum subaequantes vel dimidium tubi circiter aequantes, ± elliptico-ovati, subacuti usque ad acuti raro subobtusi vel fere acuminati, vix mucronati, plerumque recti. Filamenta saepe manifeste infra loborum basin perianthii affixa. Ovula in quoque loculo bini. Capsula ca. 5 mm lata.

Leaves (2-)3, or 4 when more than one scape present, first one (5-)10-25(-35) mm broad, narrowly oblong-elliptic to ± elliptic or obovate-elliptic, second more than half as broad, glabrous, margin ciliate to ciliolate,

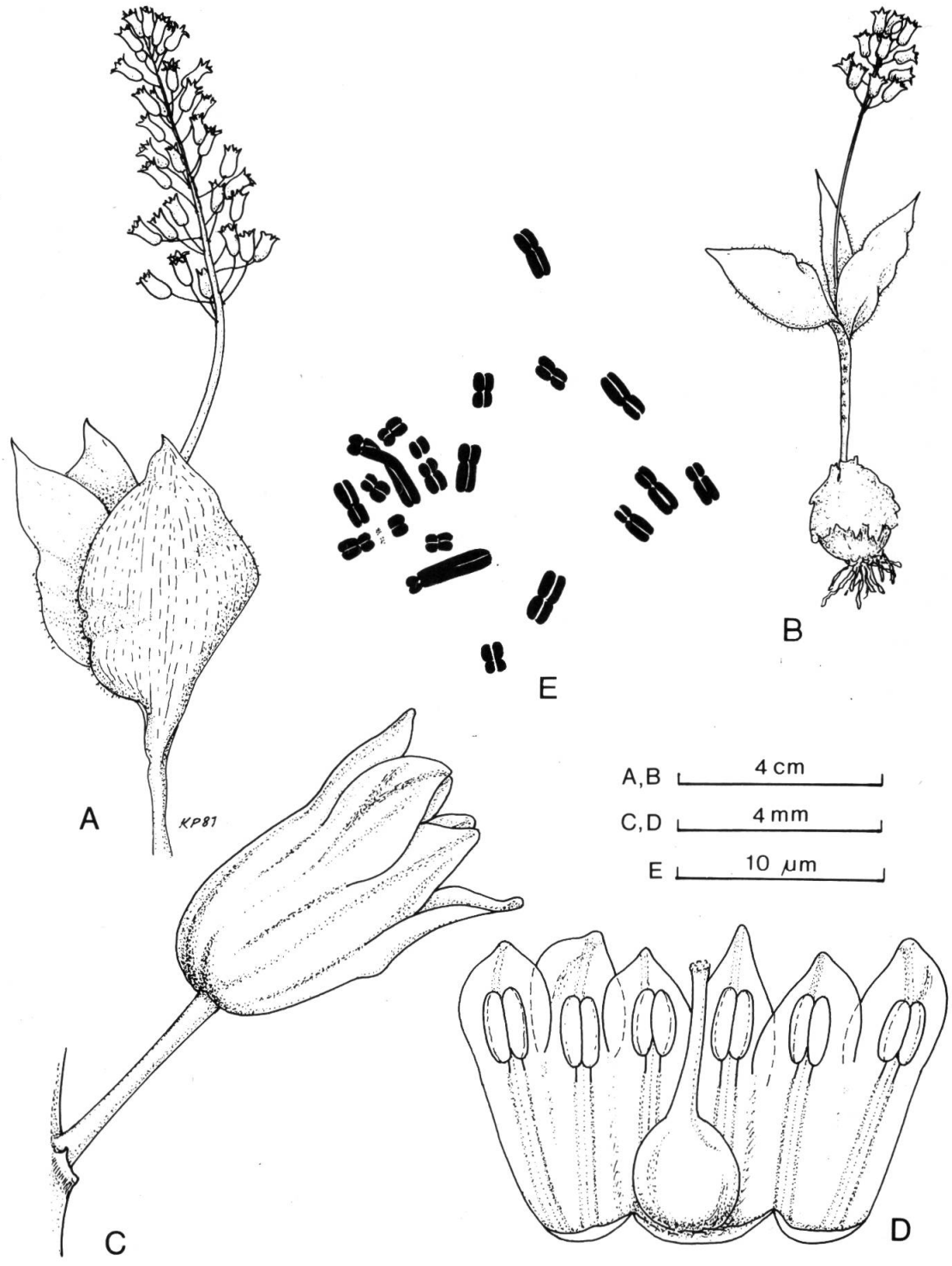

Fig. 4. — *Hyacinthella acutiloba.* **A** *(Baytop 44 272):* habit. **B** *(Stainton & Henderson 5176):* habit. **C** *(Coode 1344):* perianth with pedicel and bract. **D** (ibid.): perianth split open. **E** (ibid.): mitotic metaphase.

glaucous, often tinged purplish and red-mottled towards base. Scape 7-17.5 cm long, often red-mottled towards base, in fruit elongating up to 20(-30) cm. Raceme 9-30(-40)-flowered, rather lax. Pedicels 2-6 mm long, ascending, somewhat elongating in fruit. Perianth ± pale blue or rarely rather deep blue, (5-)5.5-6.5 mm long, tubular-campanulate to campanulate; lobes about half as long to nearly as long as tube, oblong-ovate to elliptic-ovate, subacute to acute, rarely subobtuse to nearly acuminate, hardly mucronate, slightly thickened at apex, usually straight. Filaments attached in tube often distinctly below base of perianth lobes.

CHROMOSOMES $2n = 18$; second chromosome asymmetric and (like the rest of the set) definitely shorter than the long arm of chromosome No. 1, also with a very distinct secondary constriction (Figs. 4E, 12E).

FL. 4-5. In *Quercus* scrub, rocky limestone slopes, gypsaceous hills; 1550-2100 m.

DISTR. Turkey: Sivas, Kayseri, Malatya, Erzincan (Fig. 13).

In habit the new species is rather similar to *H. lineata*. The differences are found in the paler perianth, by different collectors described as china blue, azure, sky-blue, pale blue and blue; the more elongated, straighter, not incurved, perianth lobes; the filaments attached well below base of perianth lobes; the generally broader, more shortly ciliate leaves with the lamina never hispid. *H. acutiloba* has usually 3 leaves when one scape, whereas *H. lineata* more often has 2 leaves. The chromosome number is $2n = 16$ in *H. lineata*, whereas *H. acutiloba* has $2n = 18$.

6. H. lineata (Steud.) Chouard

Chouard, Bull. Mus. Hist. Nat. Paris, Sér. 2, 3: 178 (1931). — *Hyacinthus lineatus* Steud. in Roem. & Schult., Syst. 7: 584 (1830). — *Bellevalia lineata* (Steud.) Kth., Enum. 4: 309 (1843). — *Hyacinthella lineata* var. *lineata;* Feinbrun, Bull. Res. Counc. Israel 10D: 333 (1961). — TYPE: [Turkey. Izmir:] In fruticetis collinis Smyrnae, Febr. 1827, *Fleischer,* iso-E!, K!, M!

Hyacinthus hispidus Baker, Journ. Linn. Soc. Bot. 11: 429 (1871). — TYPE: [Turkey. Uşak:] Phrygia, prope Ouchak [vers 910 m d'alt.], Mai 1857, *Balansa* [*95*], lecto- K! (here selected).

Hyacinthus hispidus var. *platyphyllus* Gay ex Baker, l.c. — TYPE: [Turkey.] Ad montem Mourad-Dagh, [28 Juillet 1857], *Balansa,* lecto- K! (here selected).

ICON. Fig. 5A, B.

Leaves 2-3, somewhat more often 2, or when 2 scapes 4, first one (3-)5-15(-28) mm broad, ± narrowly oblong-lanceolate to elliptic-ovate, second more

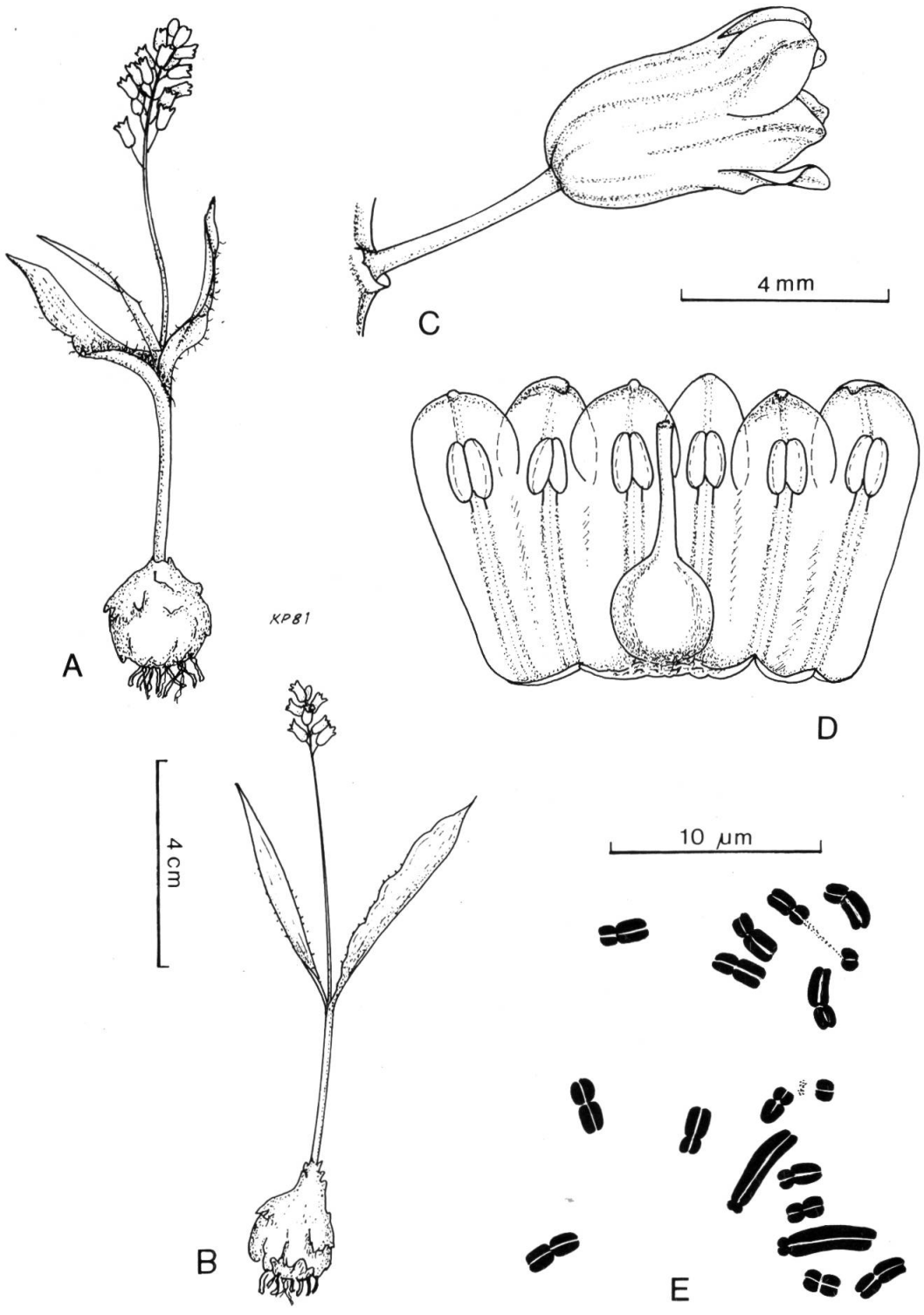

Fig. 5. — *Hyacinthella lineata*. **A** *(Baytop 31 349):* habit. **B** *(Baytop 34 757):* habit. **C** *(Baytop 34 518):* perianth with pedicel and bract. **D** (ibid.): perianth split open. **E** *(Baytop 44 530):* mitotic metaphase.

than half as broad, glabrous or sometimes hairs on lower part of lamina, margin long-ciliate to ciliolate-scabrid, often twisted, glaucous, base of leaves often tinted or spotted purplish. Scape 6.5-14 cm long, often tinted and spotted purplish near base, in fruit up to 20(-29) cm. Raceme 6-25-flowered, rather lax. Pedicels 2-6 mm long, ascending, in fruit (2-)4-12 mm long. Perianth rather deep blue to violet blue, (4-)4.5-5.5(-6) mm long, tubular-campanulate; lobes about half as long as tube, elliptic-ovate to broadly ovate, subobtuse to subacute, submucronate, slightly thickened at apex, often somewhat incurved. Filaments usually attached just below base of perianth lobes.

CHROMOSOMES $2n = 16$; second chromosome asymmetric and (like the rest of the set) definitely shorter than the long arm of chromosome No. 1, also with a very distinct secondary constriction (Figs. 5E, 12F).

FL. 3-5. In *Quercus coccifera* scrub, bare overgrazed slopes with sandy loam and stones, under *Pinus nigra,* (200-)400-1500 m.

DISTR. Turkey: Manisa, Izmir, Denizli, Uşak, Kütahya, Eskişehir, Afyon, Bolu (Fig. 13).

7. H. leucophaea (C. Koch) Schur

Schur, Öst. Bot. Wochenbl. 6: 228 (1856). — *Muscari leucophaeum* C. Koch, Linnaea 22: 254 (1849). — *Hyacinthus leucophaeus* Steven in sched., nomen nudum; Steven ex Ledeb., Fl. Ross. 4: 156 (1853). — *Bellevalia leucophaea* (Stev.) Boiss., Fl. Or. 5: 305 (1882). — TYPE: Aus Südrussland von Wilhelms erhalten, B (probably lost).

ICON. Fl. Europ. URSS 4 (1979), Pl. 31, Fig. 2; Polunin, Flowers of Greece and the Balcans (1980), Pl. 59, Fig. 1643d.

CHROMOSOMES $2n = 20$; second chromosome asymmetric and (like the rest of the set) definitely shorter than the long arm of chromosome No. 1; usually a small satellite on the long arm of chromosomes No. 3 and 8 (Figs. 6A, 12G).

DISTR. S. European USSR, S.E. Poland, Roumania, Bulgaria, Yugoslavia.

C. Koch got the specific name from Steven, who had written *Hyacinthus leucophaeus* on the label of the sheet he used as a type. Koch did not make a formal description, but he compared his *Muscari leucophaeum* with *M. pallens, M. botryoides* and *M. racemosum* in such a way that the discussion must be accepted as a valid description.

Most of Koch's herbarium in Berlin was destroyed by fire after bombing in 1943 (EDMONDSON & LACK, 1977) and most probably the type sheet has been lost. There may be an isotype in Leningrad or possibly Geneva as is the case with several of Koch's types. If not, a neotype must be selected. BARANOVA (1979) quoted the type wrongly.

Fig. 6. — Mitotic metaphases.
A: *Hyacinthella leucophaea* (*Prasil* s.n.). **B:** *H. atchleyi (Horton 1402).* **C:** *H. pallasiana (Mordak & al. 1368).* **D:** *H. pallens* (*van Tubergen* s.n.).

8. H. atchleyi (A. K. Jackson & Turrill) Feinbrun

Feinbrun, Bull. Res. Counc. Israel 10D: 339 (1961). — *Bellevalia atchleyi* A. K. Jackson & Turrill in Hooker, Ic. Plant. 34: tab. 3329 (1937). — TYPE: Greece. Mt. Kithaeron, 620 m, dry hillsides, April 1934, *S. C. Atchley 1852,* K, and April 1936, s.n., K.

ICON. Hooker l.c.

CHROMOSOMES $2n = 20$; second chromosome asymmetric and (like the rest of the set) definitely shorter than the long arm of chromosome No. 1; usually a small satellite on the long arm of chromosome No. 3 (Figs. 6B, 12H).

DISTR. Greece.

9. H. pallasiana (Stev.) A. Loz.

Lozina-Lozinskaya, Fl. USSR 4: 408 (1935). — *Hyacinthus pallasianus* Stev., Bull. Soc. Nat. Mosc. 30, 2: 85 (1857). — TYPE: [USSR:] "e campis elatis ad rivum Kaltschik in Maeotidem influentem", *D. Graff,* lecto- H! (here selected).

ICON. Fl. Europ. URSS 4 (1979), Pl. 31, Fig. 3.

CHROMOSOMES $2n = 20$; second chromosome asymmetric and (like the rest of the set) definitely shorter than the long arm of chromosome No. 1; secondary constrictions on chromosomes No. 2-4, most distinct on No. 4 (Figs. 6C, 12I).

DISTR. S. European USSR.

The typification of *H. pallasiana* has caused certain problems. LOZINA-LOZINSKAYA (1935) and FEINBRUN (1961) stated that this species was described from Crimea, but according to RUBTSOVA (1972) it is not occurring there at all. BARANOVA (1979) quoted the type locality as above under type and this is, in fact, the only locality mentioned directly by STEVEN (1857) in his original description. But indirectly Steven (l.c.) quoted what must be considered a syntype as he referred to a note made by MARSHALL VON BIEBERSTEIN (1819: 273) under *Hyacinthus pallens* on a plant collected "in collibus ad riuum Belajam inter fluuios Donez et Don (Tanain minorem et majorem) occurit". Both of these syntypes are found in the private herbarium of Steven, now in the Botanical Museum of the University of Helsinki (H). We have selected the former of these as the lectotype.

10. H. pallens Schur

Schur, Österr. Bot. Wochenbl. 6(30): 235 (1856). — TYPE: [Yugoslavia] Habitat in Dalmatia Gallicia in fissuris saxorum, Vis.

Hyacinthus dalmaticus Lallem., Ind. Sem. Hort. Petrop. 11: 71 (1846). — TYPE: [Yugoslavia] Hab. in Dalmatia.

Hyacinthus dalmaticus Baker, Journ. Linn. Soc. Bot. 11: 428 (1871), nom. illeg. — *Hyacinthella dalmatica* (Baker) Chouard, Bull. Mus. Hist. Nat. Paris, Sér. 2, 3: 178 (1931), comb. illeg. — TYPE: [Yugoslavia] Dalmatia in subalpinis, *Petter Exsicc. 338,* K.

ICON. Polunin, Flowers of Greece and the Balcans (1980), Pl. 59, Fig. 1643e (sub *H. dalmatica*).

CHROMOSOMES $2n = 20$; second chromosome asymmetric and (like the rest of the set) definitely shorter than the long arm of chromosome No. 1; distinct secondary constrictions on chromosomes No. 4 and 6 (Figs. 6D, 12J).

DISTR. Yugoslavia.

The oldest valid description of this species seems to be that of AVÉ-LALLEMANT (1846) under *Hyacinthus dalmaticus,* a name that was neglected and not taken up in Index Kewensis. BAKER (1871) unknowingly described it again, curiously enough under the same name, but later (1874) discovered and published his mistake. Baker's illegitimate name, however, became the one generally used and unfortunately was the source of the combination *Hyacinthella dalmatica* (Baker) Chouard. This combination having been founded on an illegitimate basionym is of course likewise illegitimate (Art. 72 of the Code).

Accordingly, the oldest valid name for the species under *Hyacinthella* must be *Hyacinthella pallens,* given together with a description by SCHUR (1856). The specific epithet was unhappily enough taken from a misidentification in "Flora dalmatica" (VISIANI, 1842: p. 150) where "*Hyacinthus pallens* M. B." (Bieberstein's species is really a *Muscari,* viz. *M. pallens* (M. B.) Fisch.) is listed from "supra Breno prope Ragusa [Dubrovnik]." This should be considered the type locality as SCHUR (1856) refers to Visiani's material. The case is further complicated by Visiani's reference to REICHENBACH (1826, Tab. CCCXXXI) for an illustration of "*Hyacinthus pallens* M. B.". The plant illustrated is neither *Muscari pallens* (M. B.) Fisch., nor *Hyacinthella pallens* Schur; it obviously represents *Hyacinthella leucophaea* Schur.

11. H. millingenii (Post) Feinbrun

Feinbrun, Bull. Res. Counc. Israel 10D: 335 (1961). — *Bellevalia millingenii* Post, Mém. Herb. Boiss. 18: 101 (1900). — *Hyacinthus nervosus* Bertol. subsp. *millingenii* (Post) Holmboe, Studies on the vegetation of Cyprus: 52 (1914). — TYPE: Cyprus. Nicosia [Dec. 1894, *Post 920*], iso- G!

ICON. Fig. 7A.

Leaves 2, first one 2.5-4.5(-6) mm broad, narrowly linear to narrowly linear-oblanceolate, second about half as broad, canaliculate, recurved, glabrous, margin usually scabrid, glaucous. Scape 3.5-8(-13) cm long. Raceme

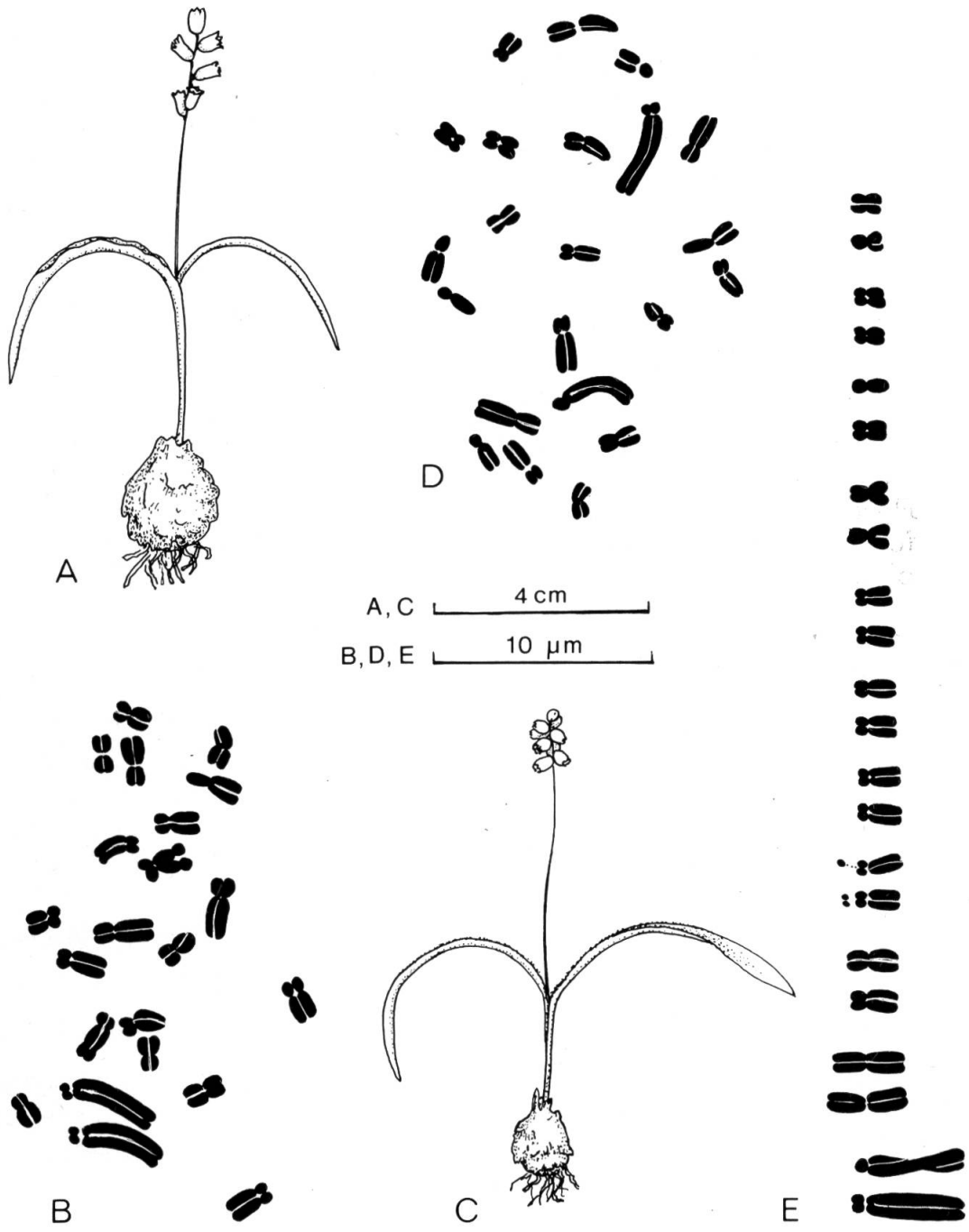

Fig. 7. — *Hyacinthella millingenii.* **A** *(Sintenis 856):* habit. **B** (*Wollin* s.n.): mitotic metaphase. *H. micrantha.* **C** *(Bornmüller 5):* habit. **D** *(Marais 1608):* mitotic metaphase. *H. micrantha* × *heldreichii.* **E** *(Mathew & Tomlinson 4078):* mitotic metaphase chromosomes.

3-7(-12)-flowered, lax, spikelike. Flowers sessile to subsessile. Perianth pale blue, ascending, 3.5-5 mm long, tubular-campanulate; lobes about as long as tube or somewhat shorter, ovate, subobtuse to subacute. Filaments attached just below perianth lobes.

CHROMOSOMES $2n = 22$; second chromosome asymmetric and (like the rest of the set) definitely shorter than the long arm of chromosome No. 1; secondary constrictions (usually rather indistinct) on chromosome No. 3 (Fig. 7B, 12K).

FL. 1-2. Limestone hills, marly soil, cliffs by the sea, hillsides; at rather low altitudes.

DISTR. Cyprus (Fig. 13).

Post (l.c.) compared his new species with *H. nervosa,* and Holmboe (l.c.) stressed the similarity by making it a subspecies. Feinbrun (l.c.) thought the relationship was rather with *H. hispida, H. lineata* and *H. heldreichii.* We are inclined to agree with Post and Holmboe. In many ways *H. millingenii* looks like a dwarf *H. nervosa.* The karyotype with $2n = 22$ and the second chromosome somewhat asymmetric and shorter than the long arm of chromosome No. 1, is closer to that of *H. nervosa* ($2n = 24$) and *H. siirtensis* ($2n = 22$) than to that of *H. heldreichii* and related species. According to HOLMBOE (1914) the phytogeographical links of the flora of Cyprus are equally strong with southern Turkey and Syria-Lebanon. It is of interest to point out that POST & AUTRAN (1899) stressed the similarity between the flora of the plain of Nikosia, from where *H. millingenii* was described, with that of the maritime plain of Syria, where *H. nervosa* occurs.

Feinbrun (l.c.) also recorded *H. millingenii* from the Turkish mainland. We refer these specimens partly to *H. heldreichii (Attila 52)* and partly to a hybrid complex *H. micrantha* × *heldreichii* (see under the former species). This hybrid has $2n = 22$, but the second chromosome is similar to that of *H. heldreichii* and related species.

12. **H. siirtensis** Mathew

Mathew, Kew Bull. 28: 517, Fig. 1 (1973). — TYPE: Turkey. Siirt: Pass between Eruh and Şirnak, 5600′, *E. M. Rix 407,* cult. in England by E. M. Rix 20.1.1973, holo- K!

ICON. Mathew (l.c.).

Leaves 2, first one 5-10 mm broad, linear-lanceolate to oblong-lanceolate, second about half as broad, glabrous, margin ciliolate, ± undulate-twisted, glaucous, often tinged purplish towards base. Scape 9-17 cm long. Raceme 5-20-flowered, spike-like, rather lax, with sessile to subsessile flowers. Bracts mostly distinctly bilobed with acute lobes, one lobe sometimes elongated and slender. Perianth ascending, rather pale blue, 5-8 mm long, tubular-campanulate; lobes about half as long as tube or longer, oblong-elliptic to

elliptic-ovate, subobtuse to subacute, slightly thickened at apex, somewhat incurved. Filaments attached distinctly below base of perianth lobes, often in middle of tube; anther apices reaching to or slightly above base of perianth lobes.

CHROMOSOMES $2n = 22$; second chromosome slightly asymmetric and (like the rest of the set) definitely shorter than the long arm of chromosome No. 1; a small satellite on the short arm of chromosome No. 1 (as the only species of the genus) and No. 3 (Figs. 8C, 12L).

FL. 3. Shaly, fairly barren soil; 1100-1700 m.

DISTR. Turkey: Siirt, Mardin, Urfa (Fig. 13).

Closely related to *H. nervosa* but differs in chromosome number and in the often smaller, paler flowers with filaments attached well down in the tube. Geographically the two species are well separated.

The first to collect *H. siirtensis* was Haussknecht: "In humidis flum. pr. Wiran Scheher, Mesopot., Apr. 1867". It was collected again at Mardin 1881, probably by Post. Both collections are represented at Geneva.

13. H. nervosa (Bertol.) Chouard

Chouard, Bull. Mus. Hist. Nat. Paris, Sér. 2, 3: 178 (1931). — *Hyacinthus nervosus* Bertol., Miscell. Bot. 1: 21 (1842). — *Bellevalia nervosa* (Bertol.) Boiss., Fl. Or. 5: 306 (1882) pro p. — TYPE: [Syria.] Col. Chesney's Exped. to Euphrates. Port William, in montibus, March 1836, *Chesney 11,* iso- G!, LD!

Bellevalia aleppica Boiss., Diagn. 2, 4: 111 (1859). — TYPE: [Syria.] Hab. in collibus calcareis prope Aleppum, *Kotschy* pl. Alepp. Kurd. *No. 15* sub *Muscari ciliato* Ker., fl. Martio, lecto- G! (here selected).

Hyacinthus exsculptus Baker, Journ. Bot. 12: 8 (1874). — TYPE: Asia Minor inter Aleppo et Mossul, *Olivier,* holo- G!

ICON. Nouv. Fl. Lib. Syr. 1 (1966), Pl. 78, Fig. 4.

Leaves 2, first one 5-20 mm broad, linear to oblong-lanceolate, second about half as broad, glabrous, margin scabrid to ciliolate, ± undulate-twisted, glaucous, towards base often tinged purplish. Scape 5-17 cm long, in fruit up to 20 cm long and markedly thickened in upper part. Raceme (5-)10-25-flowered, spike-like, rather dense, flowers ± sessile. Bracts sometimes distinctly bilobed with acute lobes. Perianth ascending, pale blue or blue sometimes with a violetish tinge, (6-)7-9 mm long, ± tubular; lobes about half as long as tube, somewhat spreading, ovate, subobtuse to subacute, slightly thickened at apex, somewhat incurved. Filaments attached just below base of perianth lobes; anthers nearly reaching apex of perianth lobes.

CHROMOSOMES $2n = 24$ (highest number in the genus); second chromosome very slightly asymmetric and (like the rest of the set) definitely shorter than the long arm of chromosome No. 1 (Figs. 8F, 12M).

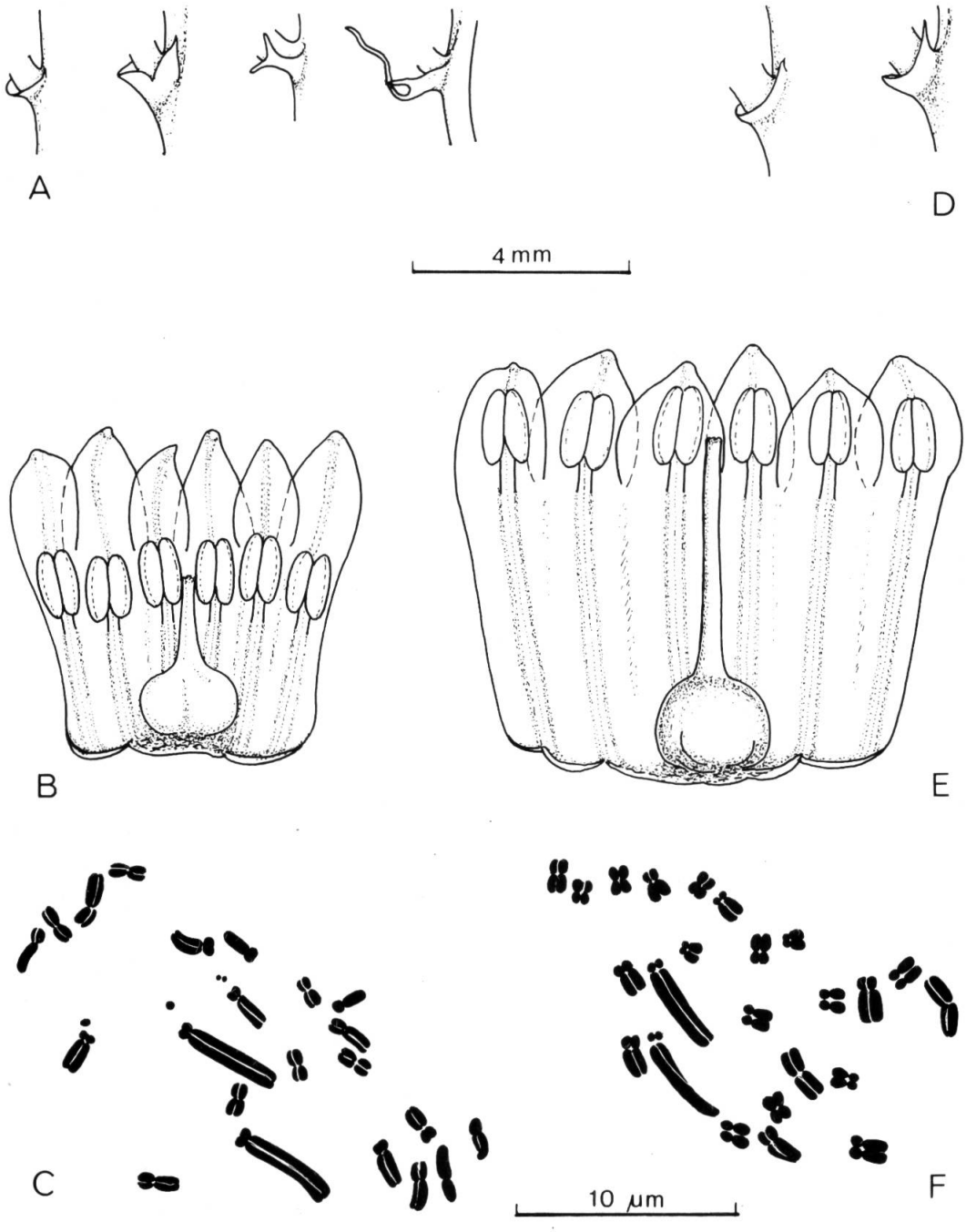

Fig. 8. — *Hyacinthella siirtensis.* **A** *(Baytop 34 439):* bracts. **B** (ibid.): perianth split open. **C** *(Rix 407):* mitotic metaphase.
H. nervosa. **D** (*Renz & Taubenheim* s.n.): bracts. **E** (ibid.): perianth split open. **F** (ibid.): mitotic metaphase.

FL. 3-4. White, chalkey soil, on steep slopes in open barren country, disturbed steppe with marly soil, rocky limestone slopes, vineyards; 200-1650 m.

DISTR. Jordan, Israel, Lebanon, Syria, Iraq, Turkey: Gaziantep, Urfa (Fig. 13).

The collections listed by BOISSIER (1882) also include material that should be referred to *H. siirtensis* and to *H. millingenii*.

14. H. micrantha (Boiss.) Chouard

Chouard, Bull. Mus. Hist. Nat. Paris, Sér. 2, 3: 178 (1931). — *Bellevalia micrantha* Boiss., Diagn. Ser. 1, 5: 63 (1844). — *Hyacinthus micranthus* (Boiss.) Baker, Journ. Linn. Soc. Bot. 11: 430 (1871). — TYPE: [Turkey.] Asia Minori. *Aucher-Eloy 2115,* lecto- G, iso- K! (lectotype selected by Feinbrun 1961).

Hyacinthella micrantha var. *puberula* Feinbrun, Bull. Res. Counc. Israel 10D: 337 (1961). — *Bellevalia micrantha* var. *puberula* Hausskn. & Bornm. in sched., nomen nudum. — TYPE: [Turkey.] Amasia, in lapidosis mts. Kirkelar 6-900 m, 3. 1889, *Bornmüller 5,* holo- (according to Feinbrun) PRC, iso- G!, JE! LD! M!

ICON. Fig. 7C.

Leaves 2, 1.5-4.5(-7) mm broad, filiform-linear to linear-oblanceolate, often distinctly broadest shortly below apex, canaliculate, glabrous to ± papillose-puberulent along margin and on nerves, nerves not elevated. Scape 5-11 cm long. Raceme 4-12(-15)-flowered, short, dense with subsessile flowers. Perianth pale blue to nearly white, patent, 3.5-4.5 mm long, ± urceolate; lobes 1-1.5 mm long, triangular-ovate, subacute, slightly thickened at apex. Filaments attached in upper half of perianth tube distinctly below base of lobes.

CHROMOSOMES $2n = 22$; second chromosome asymmetric and (like the rest of the set) definitely shorter than the long arm of chromosome No. 1 (Fig. 7D, 12N).

FL. 3-5. On limestone, open sunny stony ground, grazed ground; 600-1500 m.

DISTR. Turkey: Bolu, Kastamonu, Samsun, Çorum, Ankara (Fig. 13).

H. micrantha is the only species of sect. *Hyacinthella* in which the leaves lack fibre strands and thus have no elevated nerves. Fruit and seed characters are, however, typical and the karyotype is decisive for the generic position. There is a great variability in degree of pubescence (from glabrous to densely puberulent) even in the same population, as already indicated by FEINBRUN (1961, p. 338). We cannot see any reason for keeping var. *puberula* as a separate taxon.

H. micrantha × heldreichii

Certain specimens from Cilicia which Davis (cf. FEINBRUN, 1961) identified as *H. millingenii* with possible introgression from *H. heldreichii* or *glabrescens* should in our opinion rather be referred to *H. micrantha* with introgression from *H. heldreichii.* Typical *micrantha* characters are: leaves with a tendency to be broadest above middle, and patent flowers. Perianth lobes, pedicels and flowering time are as in the putative parent species (lobes are longer in *millingenii,* pedicels are longer in *glabrescens,* and *millingenii* flowers earlier). One specimen *(Mathew & Tomlinson 4078)* from the same area is very like *H. heldreichii* but has somewhat paler flowers and the chromosome number $2n = 22$; some features of chromosome morphology are also reminiscent of the *heldreichii* group, e.g. the symmetry (though not the size) of the second chromosome and the satellite on one of the asymmetric chromosomes (Fig. 7E).

The sheets that we have referred to this hybrid are listed below: Turkey. Içel: By Namrun, 4100′, wet clayey soil among broken rock, in full sun, 16.4.1933, *Balls 189* (E!); between Tarsus and Namrun, 4200′, in loam among coarse limestones, 15.4.1933, *Balls 177* (E!, K!). — Adana: Vorberge des Taurus bei Sis, 300 m, Nur Dagh bei Missis, 200 m, *Siehe 53* (E!); Gaensin, 1000 m, Kalk, März 1896, *Siehe 683* (G!, JE!); the sheet at G is named *H. micrantha* by Feinbrun (sic!). — Nigde: E. of Nigde, Ala Dağ W. slope, 1500 m, stony hillsides, fairly damp, 10.5.1965, *Mathew & Tomlinson 4078* (K!).

Sect. **Atropatana** (Mordak) K. Persson & Wendelbo, **comb. nova**

Scilla sect. *Atropatana* Mordak, Bot. Zhurn. 56: 1455 (1971).

Leaves linear-filiform, canaliculate, without fibre strands along vascular bundles. Bracts 1-2.5 mm long, truncate to ± distinctly bilobed with acute lobes, one lobe often elongated, slender. Free part of filaments more than twice as long as anthers. Seed testa at least in part with low intertwined ridges (Fig. 11D).

TYPE SPECIES: *H. atropatana* (Grossh.) Mordak & Zakharyeva.

15. H. persica (Boiss. & Buhse) Chouard

Chouard, Bull. Mus. Hist. Nat. Paris, Sér. 2, 3: 178 (1931). — *Hyacinthus persicus* Boiss. & Buhse, Aufzaehlung ...: 213 (1860). — *Bellevalia persica* (Boiss. & Buhse) Boiss., Fl. Or. 5: 308 (1882). — TYPE: [Iran.] Gilan: bei Mendschil in dem sandigen Ufer der Ssefidrud gesellig mit *Muscari racemosum* wachsend, 10.3.1848, *Buhse,* holo- G!, iso- LE!, LD!

ICON. Fig. 9A.

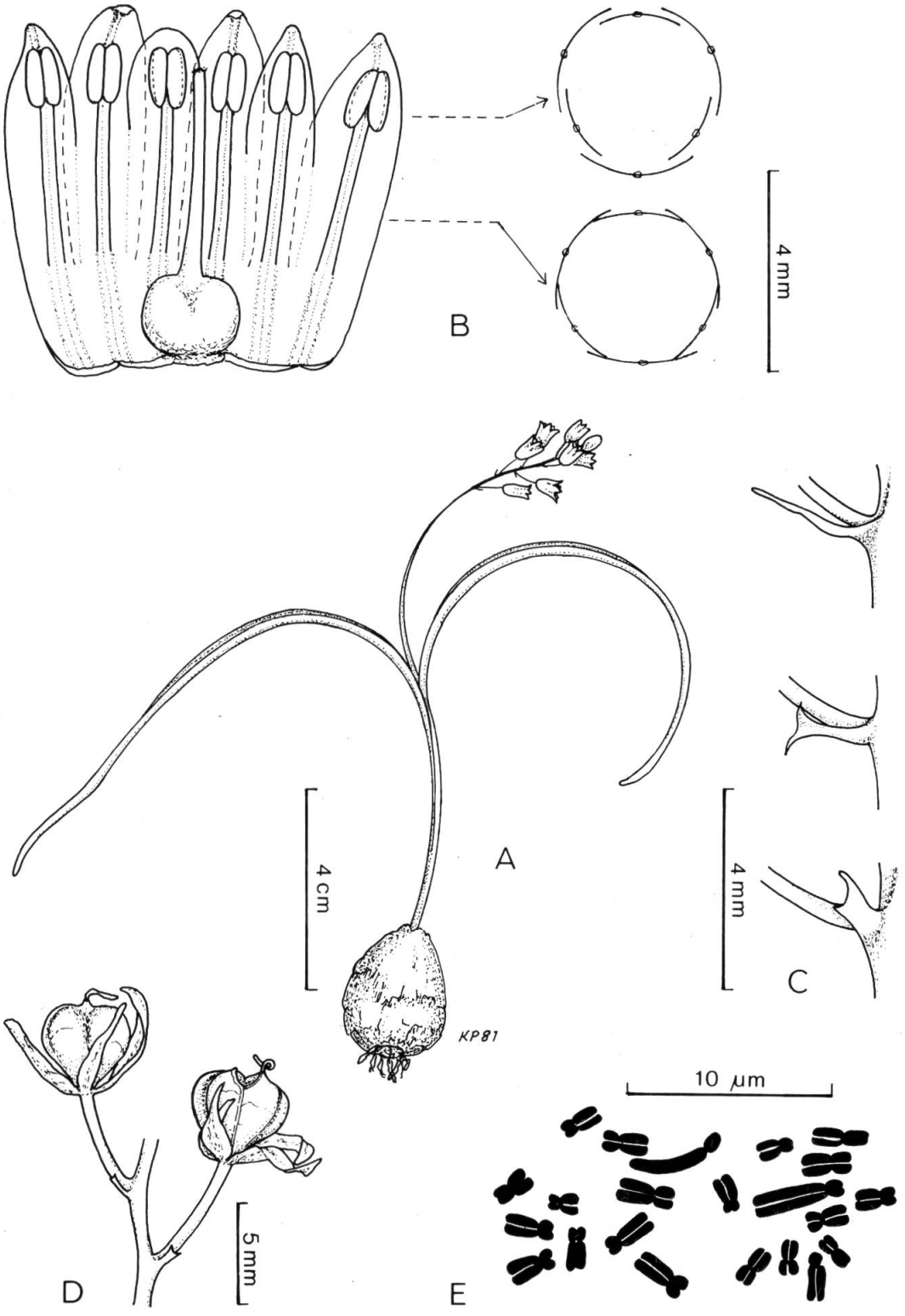

Fig. 9. — *Hyacinthella persica*. **A** *(Furse 5019):* habit. **B** *(Furse 1101):* perianth split open, with two cross sections. **C** *(Wendelbo & Masoumi 19 064):* bracts. **D** (ibid.): fruits. **E** *(Wendelbo & Masoumi 19 078):* mitotic metaphase.

Leaves 2, much exceeding scape in length, 1-4.5 mm broad, filiform-linear, canaliculate, glabrous, margin distinctly scabrid to nearly smooth, dark green. Scape 6-12 cm long, slender, curved. Raceme 4-20-flowered, rather lax. Bracts 1-2.5 mm long, truncate to ± distinctly bilobed with acute lobes, one lobe sometimes elongated, slender. Pedicels (2-)3-5 mm long, ascending to arcuate, in fruit up to 10 mm long. Perianth rather pale blue to pinkish, 5-8 mm long, tubular, tepals fully connate into a tube for about ⅓ of their length, outer 3 with free margins for about ⅔ of their length, inner 3 with free margins for about ⅓ of their length, subobtuse. Filaments attached at about ⅓ from base of perianth; anthers not quite reaching apex of lobes. Capsule broadly pyriform, shallowly 3-lobed; seeds about 4.5 × 1.7 mm, obliquely and narrowly ellipsoid; testa foveate-rugose, but at both ends with low intertwined ridges.

CHROMOSOMES $2n = 22$; second chromosome asymmetric and (like the rest of the set) definitely shorter than the long arm of chromosome No. 1; chromosomes No. 3-5 with weak secondary constrictions (Figs. 9E, 12O).

FL. 3-4. More or less sandy soil near river, dry stony slopes; 400-700 m.

DISTR. Iran: Gilan (Fig. 14).

This species is only known from a few localities within a small area near Manjil in S.E. Gilan. It is the only species where pinkish flowers have been recorded. The normal colour is however blue.

For further discussion see under *H. atropatana*.

16. H. atropatana (Grossh.) Mordak & Zakharyeva, **comb. nova**

Scilla atropatana Grossh., Fl. USSR 4: 740, Pl. 44, Fig. 3 (1935). — TYPE: USSR. Nakhitchevan: prope Dzhulfa, 25.4.1933, *T. Heideman & L. Prilipko,* holo- BAKU, iso- LE!

ICON. Fl. USSR., l.c.

Leaves 2, much exceeding scape in length, 2-3 mm broad, linear-filiform, canaliculate, in the dried state distinctly ribbed below, glabrous, margin scabrid to nearly smooth, green or somewhat glaucous. Scape 7-20 cm long, slender, curved. Raceme 5-20-flowered, rather lax. Bracts about 1 mm long, truncate to ± distinctly bilobed with one lobe often longer, slender and acuminate. Pedicels about 5 mm long, slender, ascending to arcuate, in fruit elongating to 8-10 mm. Perianth said to be pale blue, in pressed specimens tinged violet, 5-6 mm long, split nearly to the base; segments narrowly elliptic-oblong to lanceolate-oblong, subobtuse. Filaments attached somewhat above base of perianth segments; anthers nearly reaching apex of segments. Capsule broadly obovoid-cordate, deeply 3-lobed, much narrowed towards base; seeds about 2.5-3 × 1.5 mm, obliquely ovoid; testa with evenly distributed, intertwined ridges.

CHROMOSOMES $2n = 22$; second chromosome asymmetric and (like the rest of the set) definitely shorter than the long arm of chromosome No. 1; ± distinct secondary constrictions on several of the chromosomes (Figs. 10D, 12P).

DISTR. USSR. Transcaucasus: Nakhitchevan, Armenia (probably also in adjacent parts of Iran) (Fig. 14).

Drs. E. V. Mordak and O. I. Zakharyeva of Leningrad who are working on the taxonomic position of *H. atropatana* have in letter dated March 27, 1981 agreed to publish the new combination in this paper.

SPETA (1975) reported *Scilla atropatana* as new to the flora of Iran. The locality was practically identical with the "locus classicus" of *H. persica,* and SPETA later (1980) realized that the plant he had found was actually the latter species. At the same time he conveyed his opinion that the two species were conspecific.

Habitually *H. atropatana* and *H. persica* are indeed very similar to each other. Foliage and bracts are very much the same, but clear differences are found in perianth, capsule and seed characters. The perianth in *H. atropatana* is split nearly to the base (Fig. 10A). In *H. persica* the free lobes are

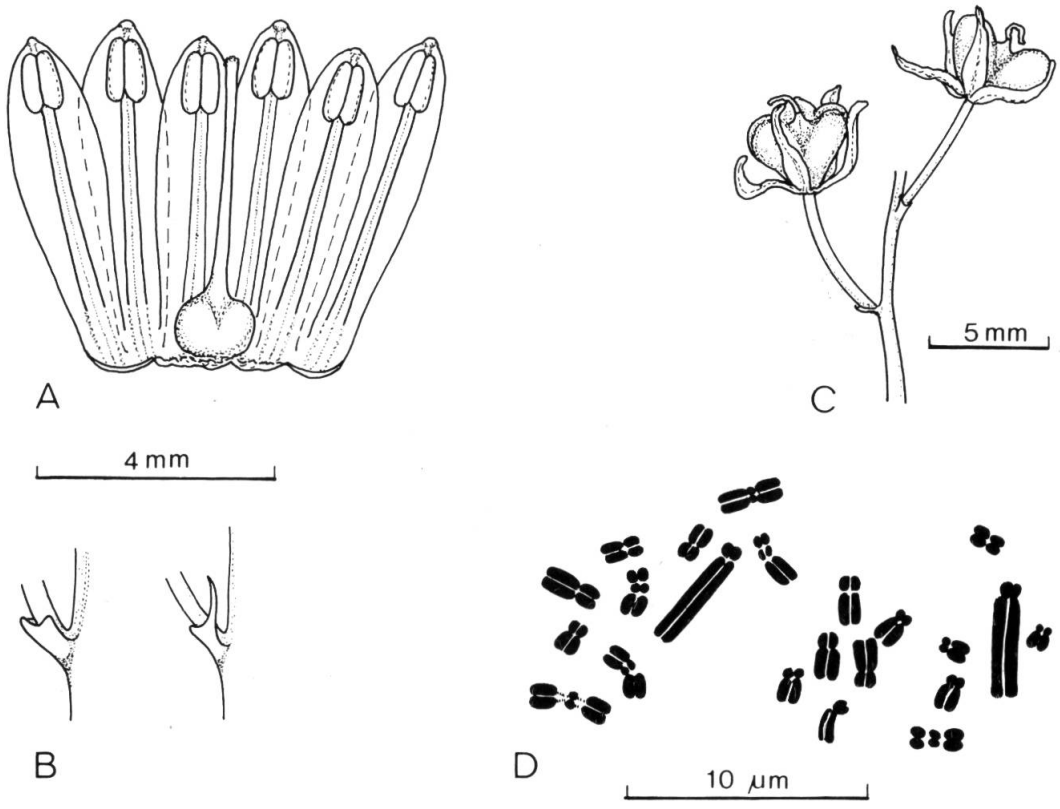

Fig. 10. — *Hyacinthella atropatana.* **A:** perianth split open. **B:** bracts. **C:** fruits. **D:** mitotic metaphase (all *Gabrielian* s.n.).

about ⅓ of the length of the perianth, but it is of great interest to note that the margins of the 3 outer tepals are free for about another ⅓ of the perianth length (Fig. 9B). Thus the perianth segments are actually elliptic-oblong as in *H. atropatana,* and the tepals are not fully connate into an entire tube for more than about ⅓ of the perianth length. The filaments are attached at the top of this tube and are longer than in any other species of the genus except *H. atropatana.* The fruit of this latter species is rather deeply lobed at the apex and distinctly narrowed towards base (Fig. 10C) but is in principle not different from the type of capsule found in other species of *Hyacinthella.* Seed characters are, however, somewhat different. The testa is not reticulate (Fig. 11C) as in most species but has a pattern of low intertwined ridges in *H. atropatana* (Fig. 11D); in *H. persica,* which has the largest seed of the genus, the surface is foveate-rugose, but around both ends of the seed there is a pattern much resembling that of *H. atropatana.*

Features of the karyotype, i.e. chromosome number and morphology, clearly point to a relationship between *H. atropatana* and *H. persica* and between these species and other members of the genus *Hyacinthella.*

Part II together with references will be published in next fascicle.

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