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The genus *Astragalus* L. (Fabaceae) in Europe with exclusion of the former Soviet Union*

Summary

A modern treatment of the European species of the genus *Astragalus* with complete descriptions of all species and a key is given. Excluded are the species which occur only in the former Soviet Union (Baltic states, White Russia, Ukraine, Moldavia and Russia itself) and those of Turkey in Europe, because these will be treated by ANDREJ SYTIN (St. Petersburg) in a special paper and due to the fact, that I could not investigate enough material of all the species concerned. 112 species will be treated here.

Zusammenfassung

Die Gattung *Astragalus* L. (Fabaceae) in Europa unter Ausschluss der früheren Sowjetunion

Eine moderne Bearbeitung der europäischen Arten der Gattung *Astragalus* mit vollständigen Beschreibungen aller Arten und einem Bestimmungsschlüssel wird vorgelegt. Ausgeschlossen sind diejenigen Arten, welche nur in der ehemaligen Sowjetunion (Baltische Staaten, Belarus/Weißrussland, Ukraine, Moldavien und Russland selbst) sowie der Europäischen Türkei vorkommen, weil sie von ANDREJ SYTIN (St. Petersburg) in einer eigenen Arbeit behandelt werden und ich selbst zuwenig Material derselben untersuchen konnte. 112 Arten werden hier behandelt.

Introduction

The last treatment of all European species of the genus *Astragalus* is dated 1968 by CHATER. Since this time a lot of taxonomic work has been done on the genus. Therefore the species concept was several times changed, some of the species are now put into synonymy, other names are valid now. The descriptions in Flora Europaea are too short and are missing essential characters to recognize species in such a difficult genus. Therefore we present here a treatment with complete descriptions of the species

with new, I hope working keys. The species from Turkey in Europe, and from the former Soviet Union (Baltic states, White Russia, Ukraine, Moldavia and Russia itself) are omitted here, because these will be treated by ANDREJ SYTIN (St. Petersburg) in a special paper and due to the fact, that I could not investigate enough material of all the species concerned.

The attribution of the species to sections is according to the classical, morphological circumscription of sections and does not reflect the at moment still insufficient molecular data.

*Der Autor widmet diese Arbeit dem Gedenken an den deutschen Botaniker Werner Rothmaler (1908–1962).

- 1 Annual, mostly branched from the base, without sterile shoots at time of flowering 2
- Perennial, often unbranched, often with sterile shoots at time of flowering 17
- 2 Most hairs medifixed or asymmetrically bifurcate, usually appressed 3
- All hairs simple, basifixed 8
- 3 Stamens 5; legumes ovate-triangular, acute, with strongly dilated dorsal groove at base 9. *A. epiglottis* L.
- Stamens 10; legumes oblong to linear 4
- 4 Stems and leaflets underside very sparsely hairy; racemes long pedunculated, densely many-flowered, at fruiting time elongated up to 15 cm; legumes obliquely ellipsoid to semicircular, 7–10 mm long and 4–5 mm high, glabrous 2. *A. algarbiensis* BUNGE
- Stems and leaflets underside more densely hairy; racemes few-flowered (at most up to 22-flowered), much shorter; legumes distinctly longer, mostly hairy 5
- 5 Plants with subbasifixed to strongly or extremely asymmetrically bifurcate hairs; stems with appressed to ascending hairs; legumes widely rounded ventrally, widely grooved dorsally with shape edges passing in the sides, therefore square in cross-section 6. *A. solandri* LOWE
- Plants with medifixed to \pm asymmetrically bifurcate hairs; stems appressed hairy; legumes rounded ventrally and therefore orbicular in cross-section or sharply keeled and triangular in cross-section 6
- 6 Stems sparsely covered with hairs 0.2–0.5 mm long; racemes mostly sessile, rarely with a peduncle up to 8 cm long, (1–)2–5-flowered; legumes erect, with a rigid beak 8–13 mm long and thickly coriaceous, wrinkled valves 3. *A. cymbicarpus* BROT.
- Stems more densely covered with hairs 0.4–1.2 mm long; racemes with a distinct peduncle, 3–18-flowered; legumes always pendulous, with a short beak 7
- 7 Ovary and legumes glabrous; legumes obliquely oblong, 10–18 mm long, 5–6 mm wide, sharply keeled ventrally, widely flat dorsally, with sharp edges passing into the sides, therefore triangular in cross-section 4. *A. edulis* BUNGE
- Ovary and legumes hairy; legumes linear, \pm upcurved, 15–55 mm long and 1.5–3.5 mm high, rounded ventrally, grooved dorsally, \pm orbicular in cross-section 5. *A. hamosus* L.
- 8 Calyx teeth very unequal in length; keel always longer than wings; legumes sickle-shaped to contorted 8. *A. contortuplicatus* L.
- Calyx teeth \pm of same length; keel shorter than wings; legumes of other form 9
- 9 Stipules 5–8 mm long, greenish, free from petiole and from each other; legumes obliquely ovoid, with scale-like hairs and with short, basifixed, appressed hairs 11. *A. echinatus* MURRAY
- Stipules of other kind, distinctly adnate to the petiole; legumes never with scale-like hairs. 10
- 10 Plants annual to short-living perennial; calyx tubular, 8–12 mm long; standard blade rhombic-elliptic, tongue-like narrowed toward the tip; fruit with coriaceous and net-like wrinkled and minutely warty valves, hardly opening when ripe 20. *A. peregrinus* VAHL
- Plants always annual; calyx campanulate to shortly tubular, less than 8 mm long; standard blade elliptic to obovate; legumes of other kind 11
- 11 Stipules large, 7–15 mm long, greenish; calyx 6–8 mm long; legumes large, 20–45(–60) mm long, 7–8 mm high and 5–7 mm wide, acutely keeled ventrally, with coriaceous, bulging-wrinkled valves and a stout, hooked beak 7. *A. boeticus* L.
- Stipules distinctly smaller; calyx mostly distinctly shorter; legumes of other form 12
- 12 Standard without distinct claw; legumes as high as wide, sharply keeled ventrally and at the sides, obtusely vaulted dorsally, with shallow grooves beside the midnerve, therefore quadrangular (obtrullate) in cross-section 10. *A. oxyglottis* M.BIEB.
- Standard with a distinct claw; legumes of other form, never with sharp keels at the sides 13
- 13 Inflorescences a \pm long; loose raceme 1. *A. longidentatus* CHATER

- Inflorescence dense, capitate 14
- 14 Leaflets glabrous on upper side; calyx 6–8 mm long; legumes linear, 30–50 mm long
 12. *A. scorpioides* WILLD.
- Leaflets hairy on upper side, calyx distinctly shorter; legumes of quite other form 15
- 15 All inflorescences with a peduncle 2–11.5 cm long, 4–15-flowered 15. *A. stella* L.
- At least the lower inflorescences of a stem in part sessile or with a very short peduncle,
 at most with up to 10 flowers 16
- 16 Stipules behind the stem shortly but distinctly vaginate-connate; legumes ± stellately
 spreading. 14. *A. sinicus* BOISS.
- Stipules free from each other; legumes strictly erect 13. *A. sesameus* L.
- 17 Leaves with the rachis ending in a spine, paripinnate or the terminal leaflets soon falling
 18
- Leaves with rachis not ending in a spine, imparipinnate 40
- 18 Hairs at stem and leaves medifixed, partly black 19
- Hairs all simple, basifixed, all white 27
- 19 Leaflets in 3–5 pairs, glabrous on upper side; calyx 4–5 mm long
 105. *A. balearicus* CHATER
- Leaflets in more than 5 pairs, hairy on upper side; calyx longer 20
- 20 Plants up to 80 cm tall; stipules densely hairy allover; petiole and rachis with scattered
 hairs in the youth to glabrous with age; peduncles 0.2–1 cm long
 107. *A. gennarii* BACCHETTA & BRULLO
- Plants mostly up to 30 cm, rarely up to 50 cm tall; stipules up to loosely hairy or mostly
 only ciliate at the margins; petiole and rachis sparsely to densely hairy; peduncles longer
 21
- 21 Standard 20–23 mm long; calyx 9–10 mm long, densely covered with appressed white
 and black hairs 0.3–1.2 mm long, its teeth 2.5–4 mm long
 108. *A. greuteri* BACCHETTA & BRULLO
- Standard shorter, at most up to 20 mm long; calyx shorter, at most up to 9 mm with
 shorter teeth, if 9–10 mm long (*A. genargenteus*), then the black hairs of calyx distinctly
 shorter than the white ones, 0.2–0.5 mm long 22
- 22 Plants 30–50 cm tall; leaves at first 2–3 cm long, imparipinnate, elongating during the
 vegetation period to 3–6 cm, becoming paripinnate and spiny; leaves of brachyblasts
 imparipinnate with small leaflets often only up to 1 mm long; leaflets on both sides with
 ascending hairs 111. *A. thermensis* VALSECCHI
- Plants 6–30 cm tall; leaves from the beginning paripinnate; no brachyblast leaves with
 such small leaflets; leaflets with appressed hairs 23
- 23 Racemes 8–15-flowered; bracts 4–6 mm long, black ciliate at the margins; legumes
 covered with spreading, curled white hairs up to 1.5 mm long and with appressed black
 hairs 109. *A. sirinicus* TEN.
- Racemes up to 8-flowered, if 3–14-flowered (in *A. angustifolius*), then bracts 2–4 mm
 long, white hairy; legumes with mostly appressed hairs 24
- 24 Peduncles covered with strongly to extremely asymmetrically bifurcate hairs; standard
 11–13 mm long 110. *A. terraciano* VALSECCHI
- Peduncles covered with medifixed hairs; standard 15–20 mm long 25
- 25 Calyx 9–10 mm long, its teeth 2–2.8 mm long; rachis with partly ascending hairs; leg-
 umes very sparsely hairy to subglabrous 106. *A. genargenteus* MORIS
- Calyx 6–9 mm long, its teeth 0.5–2 mm long; rachis with appressed hairs; legumes
 densely hairy 26
- 26 Leaflets in 7–12 pairs, narrowly elliptic, 2–7 × 0.5–2 mm; calyx partly with ascending
 hairs; petals whitish to pale yellowish or pink-purple; standard 15–16 mm long; legumes
 with appressed to ascending, symmetrically to strongly asymmetrically bifurcate hairs
 104. *A. angustifolius* LAM.

- Leaflets in 5–10 pairs, elliptic, 2–6 × 1–3 mm, often folded; calyx only with appressed hairs; petals whitish; standard 17–19 mm long; legumes with appressed, medifixed hairs 112. *A. tragacantha* L.
- 27 Calyx bladdery inflated at fruiting time, unruptured by the legume; racemes with a short peduncle, 2-flowered, on short lateral shoots present at the base of each leaf on the main stem 53. *A. clusianus* SOLDANO
- Calyx splitting or rupturing at least along one longitudinal line at fruiting time, never bladdery inflating; flowers many in dense, glomerate synflorescences; peduncle absent or up to 13 mm long 28
- 28 Bracteoles always in pairs at the base of each calyx, similar to the calyx teeth, hairy at the base, of equal length; bracts always differing in shape from the bracteoles, hairy only at midrib and tip, otherwise glabrous 29
- Bracteoles absent or sometimes present, mostly single, if in pairs, then distinctly different in size and glabrous at the base 30
- 29 Outer bracts narrower than 2 mm, linear to narrowly oblong; leaflets narrowly elliptic, 3–15 × 1–3 mm; synflorescences globose to rarely ovoid 67. *A. parnassi* BOISS.
 - a. Synflorescences 1.5–3 cm in diameter, composed of 2–4-flowered axillary clusters; standard 14–20 mm long 67a. subsp. *parnassi*
 - b. Synflorescences 3.5–5 cm in diameter, composed of 4–6-flowered axillary clusters; standard 18–23 mm long 67b. subsp. *calabricus* (FISCH.) ZARRE
- Outer bracts at least 2.5 mm wide, narrowly to widely ovate; leaflets wider, 2.5–17 × 1–5 mm; synflorescences globose to shortly cylindrical 68. *A. thracicus* GRISEB.
 - a. Synflorescences longer than wide, rarely globose, 2.5–3.5 cm wide; bracts densely appressed lanate in upper half; calyx 8–19 mm long; standard 15–21 mm long 68a. subsp. *thracicus*
 - b. Synflorescences wider than long or rarely globose, 3–5 cm wide; bracts glabrous or very sparsely appressed hairy along the midrib; calyx 18–22 mm long; standard 20–24 mm long 68b. subsp. *monachorum* (ŠIRJ.) STRID
- 30 Calyx firm, rupturing along a single longitudinal line at fruiting time; claws of keel and wings adnate to the stamen-tube only at the base or for up to 1.5 mm; standard not or scarcely differentiated into claw and blade; synflorescences partly with a short peduncle up to 13 mm long 31
- Calyx soon splitting or rarely firm; claws of keel and wings adnate to the stamen-tube for 1–8 mm; standard mostly differentiated into claw and blade; synflorescences always sessile 32
- 31 Calyx hairs not exceeding 2 mm; stipules of middle leaves 10–12 mm long; synflorescences composed of 4–5-flowered axillary clusters; calyx 9–12 mm long, its teeth 5–7 mm 57. *A. sempervirens* LAM.
- Calyx at least with some hairs 2–3.5 mm long; stipules of middle leaves 13–22 mm long; synflorescences composed of 4–8-flowered axillary clusters; calyx 12–18 mm long, its teeth 6.5–13 mm long 56. *A. nevadensis* BOISS.
 - a. Leaflets on upper side sparsely hairy to subglabrous, on underside sparsely to densely, appressed sericeous, sometimes subappressed hairy on both sides; with a mucro 0.1–0.7 mm long 56a. subsp. *nevadensis*
 - b. Leaflets on both sides densely appressed lanate or villous, obtuse, not mucronulate 56b. subsp. *muticus* (PAU) ZARRE & PODLECH
- 32 Leaflets on upper side glabrous or hairy only toward the margins; bracteoles mostly present 33
- Leaflets hairy on upper side all over; bracteoles always absent. 34
- 33 Stems of the current year densely hairy; synflorescences composed of 3–4-flowered axillary clusters; calyx teeth 5–8(–11) mm long; petal blades pink to purple 59. *A. cylleneus* FISCH.

- Stems of the current year sparsely hairy, soon glabrescent; synflorescences composed of 2-flowered axillary clusters; calyx teeth 2.5–5 mm long; petal blades yellowish-white, tinged purple at the margins 66. *A. siculus* RAF.
- 34 Calyx hairy all over 35
- Calyx glabrous at the base 36
- 35 Stipules 6–14 mm long; leaflets in 7–8 pairs; calyx teeth 2.5–4 mm long; standard blades at the base dilated and obtusely, gradually passing into the claw 58. *A. creticus* LAM.
 - a. Petiole and rachis densely tomentose; bracts 5–7 mm long, acute. 58a. subsp. *creticus*
 - b. Petiole and rachis with scattered rigid hairs; bracts 7–9 mm long, obtuse; standard 9.5–13.5 mm long 58b. subsp. *minoicus* BRULLO & GIUSSO
- Stipules 5–7 mm long; leaflets in 8–11 pairs; calyx teeth 5.5–6.5 mm long; standard blade at the base hastate, subabruptly contracted into the claw; standard ca. 16 mm long 62. *A. laconicus* IATROU & KIT TAN
- 36 Leaves 1.2–2.2 cm long; leaflets 3.5–6.5 mm long; bracts 9–10 × 1.6–3 mm, glabrous or sparsely hairy at midrib; petals pink; standard slightly constricted in upper third, very obtusely passing into the claw 60. *A. dolinicola* (BRULLO & GIUSSO) BRULLO & GIUSSO
- Leaves up to 5–6 cm long; leaflets up to 11–15 mm long; bracts densely hairy at least at midrib and tips, if sparsely hairy at midrib and tip (*A. nebrodensis*), then only 0.5–1 mm wide; standard distinctly constricted in the middle or lower third 37
- 37 Standard blade at base obtusely passing into the claw 65. *A. rumelicus* BUNGE
- Standard blade at base with acute to hastate auricles, subabruptly contracted into the claw 38
- 38 Bracts 6–9 mm long and 0.5–1 mm wide; calyx 6–9 mm long, teeth 3–5 mm; legumes with a beak 1–2 mm long 64. *A. nebrodensis* (GUSS.) STROBL
- Bracts up to 6–8 mm long and up to 2–2.5 mm wide; calyx up to 6–7 mm long, teeth 2–4 mm long; legumes with a beak 0.2–1 mm long 39
- 39 Leaflets up to 11 mm long and 2 mm wide, with a mucro up to 0.5 mm; calyx 4–6 mm long; synflorescences globular to shortly cylindrical, 1.5–5 × 1.5 cm; legumes compressed dorsio-ventrally. 63. *A. microcephalus* WILLD.
- Leaflets up to 15 mm long and 2.5 mm wide, with a mucro up to 1.5 mm; calyx 6–7 mm long; synflorescences globular, 1–2 cm in diameter; legumes compressed laterally 61. *A. granatensis* LAM.
- 40 All hairs simple, basifixed 41
- Most hairs medifixed or asymmetrically bifurcate 80
- 41 All petals hairy 42
- Petals glabrous or rarely standard very sparsely hairy (in *A. nummularius*) 43
- 42 Plants caulescent with stems 20–40 cm long; peduncles 5–20 cm long; racemes 10–30-flowered 55. *A. dasyanthus* PALL.
- Plants acaulescent; peduncles shorter; racemes 2–7-flowered 48b. *A. exscapus* L. subsp. *pubiflorus* (DC.) SOÓ
- 43 Calyx strongly inflated at fruiting time and up to 15 mm wide; legumes included in the calyx 54. *A. physocalyx* FISCH.
- Calyx not strongly inflated at fruiting time; legumes exerted from the calyx 44
- 44 Petals uniformly yellow 45
- Petals not uniformly yellow, mostly lilac or violet or whitish to cream 65
- 45 Inflorescences large, with a short, stout peduncle up to 2 cm long, globular to shortly cylindrical, densely many-flowered; calyx slightly inflated from the beginning, not enlarged in fruit; petals persistent; plants always tall, with a stout stem 46
- Inflorescences of other kind, sessile or pedunculated; calyx tubular; petals not persistent 48
- 46 Racemes ovoid to cylindrical, mostly 5–9.5 cm long 43. *A. alopecurus* PALL.
- Racemes globular 47

- 47 Calyx teeth 1–2(–3) mm long; bracteoles absent 44. *A. ponticus* PALL.
 – Calyx teeth 6–10 mm long; bracteoles present, one or two 42. *A. alopecuroides* L.
 a. Leaflets obtuse to slightly emarginate, 6–19 × 4–8 mm, 6–19 × 4–8 mm; stems densely covered with appressed to spreading, curled hairs 0.1–1 mm long; stipules up to 20 mm long 42a. subsp. *alopecuroides*
 b. Leaflets distinctly emarginate to cordate-emarginate, 8–10(–13) × 4–6(–7) mm, often narrowly whitish or purple margined; stems and rachis sparsely covered with spreading hairs 1–3 mm long; stipules 9–13 mm long 42b. subsp. *grosii* (PAU) RIVAS GODAY & RIVAS MART.
- 48 Petals rhombic-elliptic, slightly to distinctly tongue-like narrowed toward the tip; legumes with coriaceous, often reticulately nerved, finely warty to strongly tuberculate, hairy valves, incompletely to completely bilocular, hardly opening, often only at the tip 49
 – Petals never tongue-like narrowed; legumes with valves of other kind, incompletely to completely bilocular or unilocular, easily opening at ventral or dorsal and ventral side 51
- 49 Calyx white and black hairy; legumes with a straight beak 1–4 mm long 18. *A. haarbachii* SPRUNER
 – Calyx with white hairs only; legumes shortly acuminate, without distinct beak 50
- 50 Leaflets hairy on upper side toward the margins; racemes 9–12(–16)-flowered; bracts 6–7 mm long, ciliate at the margins 16. *A. devesae* TALAVERA, A.GONZÁLEZ & G.LÓPEZ
 – Leaflets on upper side glabrous; racemes 3–6-flowered; bracts 3–6 mm long, white hairy 19. *A. nitidiflorus* JIMÉNEZ & PAU
- 51 Plants always with a distinct, long stem 52
 – Plants mostly acaulescent, only rarely with a distinct stem (in *A. cavanillesii*) 59
- 52 Standard at least 23 mm long; leaflets glabrous on upper side 53
 – Standard at most 17 mm long; leaflets glabrous or hairy on upper side 55
- 53 Plants with stem 5–13 mm in diameter; standard 30–40 mm long; legumes ellipsoid, 14–27 mm long, densely tomentose 41. *A. graecus* BOISS. & SPRUNER
 – Plants with stem 3–5 mm in diameter; standard 23–30 mm long 54
- 54 Stem very densely spreadingly hairy; leaflets in 19–27 pairs, on underside densely hairy; legumes subglobular, 10–12 mm long, glabrous 40. *A. drupaceus* BOISS.
 – Stem glabrous; leaflets in 10–13 pairs, on underside sparsely hairy at the midvein and the margins; legumes unknown, but ovary densely long hairy 49. *A. ictericus* DINGLER
- 55 Stipules behind the stem shortly to up to the middle vaginate-connate, those of upper leaves sometimes free from each other; racemes rather densely many-flowered; legumes sessile, nearly ovoid-globose 32. *A. cicer* L.
 – Stipules all free from each other; legumes often distinctly stipitate, of other form 56
- 56 Ovary and legumes with a long distinct stipe; legumes unilocular 57
 – Legumes subsessile or sometimes very shortly stipitate, bilocular 58
- 57 Leaflets mostly in 4–6 pairs, 15–35 × 7–17 mm; standard 14–17 mm long; legumes compressed dorsio-ventrally, 10–25 mm long, 3–4 mm high and 5–7 mm wide 23. *A. frigidus* (L.) A.GRAY
 – Leaflets in 7–11 pairs, 5–23 × 1–9 mm; standard 10–11.5 mm long; legumes inflated, (12–)15–30 mm long, 7–10 mm in diameter. 24. *A. penduliflorus* LAM.
- 58 Stems prostrate to ascending, glabrous or very sparsely appressed hairy; leaflets on underside and peduncles subglabrous to very sparsely appressed hairy; calyx mostly white hairy; legumes 30–40 mm long, slightly to distinctly curved, glabrous or nearly so 26. *A. glycyphyllos* L.
 – Stems erect, more densely covered with partly spreading hairs; leaflets on underside and peduncles more densely and often partly covered with spreading hairs; calyx black hairy; legumes 15–25 mm long, straight, loosely hairy 25. *A. glycyphylloides* DC.
- 59 Dwarf plants, 3–10 cm tall; leaflets 4–8 mm long; racemes sessile, 1–3-flowered 60

- Plants mostly distinctly larger; leaflets at least 10 mm and up 15–30 mm long; racemes with a short but mostly distinct peduncle. 61
- 60 Leaflets on upper side sparsely hairy toward the margins or rarely glabrous; calyx 10–14 mm long, in basal parts sparsely, toward the teeth loosely hairy 51. *A. tremolsianus* PAU
- Leaflets on both sides densely hairy; calyx 9–10 mm long, loosely to densely hairy all over 50. *A. nummularius* LAM.
- 61 Keel blades in upper edge furnished with minute teethlets; legumes with a stipe 5–8 (–10) mm long 52. *A. utriger* PALL.
- Keel blades without minute teethlets; legumes sessile or with a very short stipe 62
- 62 Leaflets glabrous or at least in leaves of later in the year very sparsely to rarely more densely hairy at midvein and margins of underside; legumes glabrous or loosely hairy 63
- All leaflets loosely to densely hairy at least on underside; legumes loosely to densely hairy 64
- 63 Plants furnished with hairs 2–4 mm long, always acaulescent; leaflets of the first leaves in the year mostly glabrous, those of later leaves sparsely hairy on underside at midvein and margins; auricles of wing blades 2–3 mm long; legumes glabrous or sparsely hairy 46. *A. caprinus* L. subsp. *huetii* (BUNGE) PODLECH
- Plants with hairs up to 2 mm long, sometimes with a short, glabrous or very sparsely hairy stem; leaflets on upper side glabrous or sparsely hairy on underside loosely hairy, mainly at midvein and margins; auricles of wing blades 1–2 mm long; legumes loosely hairy 47. *A. cavanillesii* PODLECH
- 64 Bracts 5–8 mm long; calyx teeth distinctly shorter than the tube; legumes 15–23 mm long, with a very short beak 45. *A. angustiflorus* K.KOCH subsp. *anatolicus* (BOISS.) D.F.CHAMB.
- Bracts distinctly longer; calyx teeth mostly distinctly longer than the tube; legumes 10–15 mm long, with a beak 2–5 mm long 48. *A. exscapus* L.
 - a. Plants mostly rather densely to densely hairy; stipules 10–15(–20) mm long, at least toward the tip densely hairy; leaves up to 25 cm long; peduncles and pedicels hairy; tube of calyx loosely to densely hairy 48a. subsp. *exscapus*
 - b. Plants sparsely hairy; stipules 15–27 mm long, ciliate at the margins, otherwise glabrous; leaves up to 40 cm long; peduncles and pedicels glabrous; tube of calyx glabrous or very sparsely hairy 48c. subsp. *transsilvanicus* (SCHUR) NYÁR.
- 65 Plants acaulescent; stipules free from petiole and from each other; petals whitish with bluish keel 27. *A. depressus* L.
- Plants caulescent; stipules adnate to the petiole and mostly distinctly vaginate-connate behind the stem; petals pale lilac to violet (unknown in *A. maniaticus*) 66
- 66 Stipules free from each other or in some leaves very shortly connate 67
- Stipules behind the stem distinctly vaginate-connate, often up to the middle or higher up 68
- 67 Plants are short-living perennials; leaflets in 8–11 pairs; standard 15–19 mm long; blade rhombic-elliptic, in distal part tongue-like narrowed; legumes mostly 20–33 mm long 20b. *A. peregrinus* VAHL subsp. *warionis* (GAND.) MAIRE
- Plants are long-living perennials; leaflets in 5–7 pairs; standard 11–12 mm long; blade obovate, not tongue-like narrowed; legumes 6–8 mm long 29. *A. norvegicus* GRAUER
- 68 Calyx 4–7 mm long; standard up to 13 mm long 69
- Calyx at least 7 mm long but mostly longer; standard mostly longer 72
- 69 Petals whitish or cream with violet-tipped or violet keel; wing blades deeply emarginate to bilobed; legumes with a stipe 4–8 mm long, unilocular, glabrous 28. *A. australis* (L.) LAM.
- Petals pink, lilac or violet; wing blades rounded; legumes ± densely hairy 70

- 70 Stems 1–15 cm long, sparsely appressed white and black hairy; bracts 0.5–2 mm long; standard blade rhombic-elliptic, 6–7.5 mm wide; legumes with a stipe 3–4 mm long, nearly unilocular, black hairy 30. *A. alpinus* L.
- Stems 4–40 cm long, loosely to rather densely covered with appressed to spreading, predominantly white hairs; bracts ca. 4 mm long; standard narrowly oblong, ca. 3 mm wide; legumes sessile, bilocular, white hairy 71
- 71 Leaflets in 11–15 pairs; legumes subglobular, ca. 5 mm long; seeds one in each locule 34. *A. glaux* L.
- Leaflets in 8–11 pairs; legumes narrowly oblong, 10–16 mm long; seeds 4–5 in each locule 31. *A. bourgaeanus* COSSON
- 72 Leaflets glabrous on upper side 73
- Leaflets hairy on upper side 76
- 73 Leaflets in 12–15 pairs, 3–5 mm long, on underside with spreading hairs; petals unknown 36. *A. maniaticus* KIT TAN & STRID
- Leaflets mostly in fewer pairs, distinctly longer, on underside with appressed hairs 74
- 74 Stem with at least partly spreading, tangled hairs; bracts green, 4–7 mm long; legumes 10–14 mm wide, strongly wrinkled-warty, nearly unilocular 21. *A. verrucosus* MORIS
- Stem with appressed hairs only; bracts membranous to whitish-hyaline, 2–4 mm long; legumes up to 5–6 mm wide, not warty, incompletely bilocular 75
- 75 Stipules 4–7 mm long; calyx 8–10 mm long with teeth 3–4 mm; standard 17–20 mm long, slightly tongue-like narrowed toward the slightly retuse tip; legumes strongly curved, 20–25 mm long 22. *A. maritimus* MORIS
- Stipules 2–3 mm long; calyx 7–8 mm long with teeth 1–1.5 mm; standard 12–16 mm long, elliptic, emarginate; legumes ± straight, 9–12 mm long 37. *A. pseudopurpureus* GUSUL.
- 76 Leaflets widely elliptic to suborbicular, 3–8 × 2–7 mm 39. *A. turolensis* PAU
- Leaflets distinctly narrower, mostly at least two times longer than wide 77
- 77 Stems glabrous at the base, in upper part appressed white hairy, black hairy at the nodes; bracts 2–3 mm long; calyx 7–8 mm long with teeth 1.5–3 mm; legumes 5–7 mm long 33. *A. danicus* RETZ.
- Stems densely appressed or spreadingly hairy; bracts distinctly longer; calyx longer with longer teeth; legumes at least 9 mm long but mostly distinctly longer 78
- 78 Stipules 7–13 mm long, those of lower leaves vaginate-connate behind the stem, those of upper leaves free from each other; leaflets on upper side rather densely to densely hairy; calyx 11–14 mm long; legumes with a curved beak 2–4 mm long 38. *A. austroaegaeus* RECH.f.
- Stipules up to 9 mm long, all vaginate-connate up to the middle or higher up; leaflets on upper side sparsely to loosely hairy; calyx 8–11 mm long; legumes shortly acuminate 79
- 79 Stems covered with spreading hairs 1.5–2.5 mm long; calyx teeth 5–7.5 mm; petals creamy-white with violet keel; legumes 20–22 mm long, with coriaceous, wrinkled-warty valves 17. *A. gines-lopezii* TALAVERA et al.
- Stems covered with spreading (subsp. *hypoglottis*) or appressed (subsp. *gremlii*) hairs 0.5–0.7 mm long; calyx teeth 3–5 mm; petals purple-violet; legumes 10–14 mm long, valves not wrinkled-warty 35. *A. hypoglottis* L.
- 80 Plants acaulescent, the racemes arising from a rosette of leaves 81
- Plants caulescent, with well developed leafy stems 93
- 81 Calyx teeth as long as or longer than tube; petals mostly pale yellow 82
- Calyx teeth distinctly shorter than tube, rarely in some plants as long (*A. lacteus*) 85
- 82 Leaflets in 4–12 pairs; calyx 10–14 mm long; petals 18–25 mm long, pale yellow or whitish; legumes 7–11 mm long 83
- Leaflets in 3–6 pairs; calyx 6–8 mm long; petals 12–13 mm long; petals of other colour; legumes 4–5 mm long, bilocular 84

- 83 Leaflets in 4–10 pairs, covered with appressed hairs; bracts petals whitish; legumes distinctly grooved dorsally, with spreading hairs up to 2.5 mm long, sitting on minute tubercles 102. *A. lacteus* BOISS.
 – Leaflets in 8–12 pairs, covered with ascending to spreading hairs; bracts 5–6 mm long; petals pale yellow; legumes rounded dorsally, with ascending hairs not sitting on minute tubercles 100. *A. dolichophyllus* PALL.
- 84 Stipules shortly connate behind the stem; peduncles white hairy; petals red; legumes ca. 4 mm long, included in the calyx 77. *A. autranii* BALD.
 – Stipules free from each other; peduncles in upper part predominantly black hairy; petals pale purple or pale yellow tinged with blue; legumes 5–7 mm long, exserted from calyx 74. *A. agranioticus* BOISS.
- 85 Leaflets in 4–6 pairs 86
 – Leaflets in most leaves in distinctly more pairs 87
- 86 Ovary and legumes glabrous 103. *A. willmottianus* STOJ.
 – Ovary and legumes densely hairy 101. *A. gracaninii* MICEVSKI
- 87 Plants small, up to 6 cm tall; leaves up to 4 cm long; racemes sessile or with a short peduncle up to 1 cm; calyx 6–7 or 9–10 mm long 88
 – Plants mostly distinctly higher; most leaves considerably longer; racemes with a distinct, mostly long peduncles, if sessile (*A. lacteus*) then calyx 11–17 mm long 89
- 88 Racemes with a short peduncle; calyx 6–7 mm long, with asymmetrically bifurcate, ascending white hairs and some shorter black hairs; bracts 4–5 mm long, densely hairy; standard ca. 15 mm long 76. *A. idaeus* BUNGE
 – Racemes sessile; calyx 9–10 mm long, with appressed, only white hairs; bracts 5–9 mm long, sparsely hairy at the margins; standard 22–27 mm long 99. *A. baldacci* DEGEN
- 89 Leaflets glabrous on upper side 97. *A. monspessulanus* L.
 a. Legumes 18–35 mm long, ca. 10 times longer than wide; lower bracts 3–5 mm long; petals violet or light yellow b
 – Legumes shorter, ca. 5 times longer than wide; lower bracts 6–8 mm long; petals flesh-coloured to reddish-lilac 97c. subsp. *illyricus* (BERNH.) CHATER
 b. Petals violet; calyx up to 13 mm long 97a. subsp. *monspessulanus*
 – Petals light yellow, often suffused with pink or bluish-green; calyx up to 16 mm long 97b. subsp. *gypsophilus* ROUY
 – Leaflets hairy on upper side 90
- 90 Racemes sessile, 2–4-flowered; calyx 11–17 mm long, with strongly asymmetrically bifurcate, spreading white hairs, teeth 5–6 mm long; petals whitish *A. lacteus* BOISS.
 – Racemes with a distinct peduncle, with considerably more flowers; calyx up to 12 mm long, with appressed and at least partly black hairs; petals never whitish 91
- 91 Stipules 5–8 mm long, at margins and tip with basifixed hairs; petals yellow tinged with violet; standard 14–19 mm long; legumes 10–12 mm long and ca. 4 mm high, 3–4 times longer than wide 75. *A. fialae* DEGEN
 – At least upper stipules up to 12 mm long or longer, covered with medifixed hairs; petals pink to violet; standard 18–25 mm long; legumes longer, if short (*A. incanus* subsp. *nummularioides*) then less than 2 times longer than wide 92
- 92 Leaflets on upper side spotted with minute dark reddish dots; bracts black ciliate at the margins; bracteoles 0.5–1 mm long; calyx covered with medifixed black and few longer white hairs; wing blades emarginate 98. *A. spruneri* BOISS.
 – Leaflets on upper side without dark reddish dots; bracts black and white hairy; bracteoles 1–3 mm long; calyx covered with medifixed and partly asymmetrically bifurcate white and black hairs; wing blades obtuse 96. *A. incanus* L.
 a. Legumes 10–30 mm long and 2.5–5 mm wide 96a. subsp. *incanus*
 – Legumes 8–15 mm long and 5–10 mm wide 96b. subsp. *nummularioides* (DESF.) MAIRE

- 93 All or at least lower stipules distinctly vaginate-connate behind the stem 94
 – All stipules free from each other 104
- 94 Calyx at most up to 5 mm long 95
 – Calyx at least 6 mm long but mostly longer 99
- 95 Calyx only with black hairs; petals greenish; legumes pendulous 78. *odoratus* LAM.
 – Calyx with white hairs mixed in; petals purple to pale blue; legumes erect to spreading
 96
- 96 Leaflets glabrous or sometimes sparsely hairy on underside; calyx 2.5–3 mm long 97
 – Leaflets on upper side hairy at least toward the margins, densely hairy on underside;
 calyx 4–5 mm long 98
- 97 Calyx teeth ca. 0.3 mm long; wing blades deeply emarginate; legumes rounded dor-
 sally, incompletely bilocular 80. *A. austriacus* JACQ.
 – Calyx teeth 0.8–1.2 mm long; wing blades obtuse; legumes grooved dorsally, nearly
 unilocular 82. *A. sulcatus* L.
- 98 Leaflets in 2–6 pairs, 10–20 × 2–4 mm; calyx with mostly strongly asymmetrically
 bifurcate hairs; standard 15–17 mm long; legumes 12–20 mm long
 79. *A. arenarius* L.
 – Leaflets in 6–10 pairs, 1–6 × 0.5–2 mm; calyx with medifixed hairs: standard
 12–13 mm long; legumes 6–10 mm long 81. *A. baionensis* LOISEL.
- 99 Leaflets in 4–6 pairs, mostly wider than 10 mm 71. *A. roemeri* SIMONK.
 – Leaflets mostly in more pairs, at most up to 5 mm wide 100
- 100 Leaflets glabrous on upper side 101
 – Leaflets hairy on upper side 102
- 101 Stipules ca. 2 mm long, the lower ones shortly vaginate-connate behind the stem; leaf-
 lets in 3–7 pairs, 0.3–1 mm wide; calyx 11–13 mm long; standard 18–22 mm long;
 legumes 30–40 mm long, 1.5–2 mm in diameter 91. *A. pseudotataricus* BORISS.
 – Stipules 4–7 mm long, the lower ones connate up to the middle; leaflets in 5–11 pairs,
 2.5–4.5 mm wide; calyx 6–8 mm long; standard 10–14 mm long; legumes 9–12 mm
 long and 3–3.5 mm wide 69. *A. leontinus* WULFEN
- 102 Stipules 3–4 mm long, the lower ones vaginate-connate behind the stem up to the middle,
 the upper once free from each other; leaflets 8–10 times longer than wide; racemes
 loosely up to 10-flowered; calyx ca. 6 mm long, teeth 0.5–1 mm 73. *A. mesopterus* GRISEB.
 – Stipules mostly longer, all vaginate-connate high up; leaflets 3–4 times longer than
 wide; racemes densely many-flowered; calyx mostly longer, at least the abaxial teeth
 distinctly longer 103
- 103 Stipules loosely to densely hairy; leaflets in 5–9 pairs; peduncles 1–5.5 cm long; calyx
 with only medifixed hairs; legumes 20–30 mm long 72. *A. algerianus* SHELD.
 – Stipules glabrous or with scattered hairs only, ciliate at the margins; leaflets in
 8–15 pairs; peduncles 4–11 cm long; calyx with partly strongly asymmetrically bifur-
 cate hairs; legumes 8–10 mm long 70. *A. onobrychis* L.
- 104 Petals yellow or rarely whitish 105
 – Petals purple or violet, at least the standard or whitish tinged with purple 109
- 105 Stems herbaceous throughout, stout, up to 6 mm in diameter; stipules glabrous; calyx
 with medifixed hairs only; standard blade oblong 95. *A. asper* JACQ.
 – Stems ligneous at the base, more slender; stipules hairy; calyx at least partly with
 asymmetrically bifurcate to basifixed hairs; standard blade ± constricted below the
 middle 106
- 106 Leaflets in 3–7 pairs, longest leaflets up to 25–30 mm long 107
 – Leaflets in most leaves distinctly more pairs; longest leaflets up to 20 mm long 108
- 107 Leaflets narrowly elliptic, 4–6 times longer than wide; bracts 3–5 mm long, white and
 black hairy; legumes 10–15 mm long; petals yellow or rarely whitish
 83. *A. albicaulis* DC.

- Leaflets linear, 10–20 times longer than wide; bracts 2–3 mm long, predominantly black hairy; legumes 15–24 mm long; petals pale yellow 90. *A. peterfii* JÁV.
- 108 Bracts 2 mm long; calyx rather densely covered with appressed to slightly ascending white hairs, with few black hairs mixed in; legumes appressed hairy 85. *A. aquilanus* ANZAL.
- Bracts 2.5–5 mm long; calyx very sparsely covered with ascending white hairs and with numerous appressed black hairs; legumes villous with spreading hairs. 94c. *A. vesicarius* L. subsp. *pastellianus* (POLLINI) ARCANG.
- 109 Calyx 6–7 mm long, with teeth 0.3–1 mm; bracts 1 mm long 89. *A. muelleri* STEUD. & HOCHST.
- Calyx at least 8 mm long but mostly distinctly longer; bracts mostly longer 110
- 110 Stipules 4–8 mm long, adnate to the petiole for 2–3 mm; leaflets glabrous on upper side 86. *A. cornutus* PALL.
- Stipules at most 5 mm long (*A. hispanicus*) but mostly distinctly shorter, free from petiole or very shortly adnate to it; leaflets hairy on upper side 111
- 111 Calyx 11–16 mm long; standard 22–27 mm long 112
- Calyx and standard mostly distinctly shorter 113
- 112 Leaflets on both sides densely hairy; calyx covered with subbasifixed, ascending white hairs up to 1.8 mm and with appressed shorter medifixed black hairs; legumes 20–30 mm long 88. *A. hispanicus* BUNGE
- Leaflets on upper side sparsely, on lower side more densely hairy; calyx only with appressed, medifixed hairs; legumes 50–70 mm long 87. *A. gladius* BOISS.
- 113 Leaflets 2–three times longer than wide, 3–8 × 1–3 mm, often folded; standard 16 mm long; legumes 30–40 mm long; plants only 10–15 cm tall 84. *A. apollineus* BOISS. & HELDR.
- Leaflets narrower, 4–15 times longer than wide, flat; standard longer (in *A. varius* only rarely in some flowers 16 mm); legumes at most up to 20 mm long; plants up to 25–55 cm tall 114
- 114 Leaflets on upper side very sparsely to sparsely, on underside more densely hairy; calyx sparsely covered with slightly ascending white and numerous appressed, shorter black hairs 94b. *A. vesicarius* L. subsp. *carniolicus* (A.KERNER) CHATER
- Leaflets on upper side loosely to densely hairy; calyx loosely to densely covered with basifixed, ascending to spreading white hairs and shorter, appressed black hairs 115
- 115 Leaflets in 4–6 pairs, linear, 8–20 × 0.5–2 mm; racemes mostly 3–6-flowered; bracts 1–1.5 mm long; calyx teeth 1.5–2 mm long; stipules 1–2 mm long, often reflexed 92. *A. sericophyllus* GRISEB.
- Leaflets in 4–10 pairs, relatively wider; racemes with more flowers; bracts 2–5 mm long; at least the three abaxial calyx teeth longer and up to 4 mm; stipules 2–4 mm long, never reflexed 116
- 116 Leaflets narrowly elliptic, ca. 4 times longer than wide, 4–12 × 1.1–3 mm; calyx tube slightly inflated, with spreading white hairs up to 2 mm long; legumes shorter to slightly longer than calyx, rounded dorsally 94a. *A. vesicarius* L. subsp. *vesicarius*
- Leaflets narrowly oblong, 10–20 × 1.5–3 mm; calyx tube never inflated, with subappressed to ascending white hairs up to 1 mm long; legumes distinctly longer than calyx, grooved dorsally 93. *A. varius* S.G.GMELIN

Annual species

incl. species of sect. *Platyglottis*, which are partly annual, partly perennial

1. *Astragalus longidentatus* CHATER, Feddes
Repert. 79: 47. 1968. (*A. mauritanicus* COSS.;
A. pauciflorus LÁZARO IBIZA). [Sect. *Annulares*
 DC.]

Plants annual, mostly branched from the base, covered with hairs 1–2.5 mm long, at least some hairs 2 mm long or longer. Stems prostrate to ascending or erect, 5–40 cm long, rather thick, loosely to rather densely covered with subrigid, often once or twice bent, appressed to partly spreading white, at the nodes also with few black hairs. Stems greenish, narrowly triangular to triangular, 5–7 mm long, adnate to the petiole for 0.5–1 mm, free from each other, white and black ciliate at the margins. Leaves 3–10 cm long, subsessile; rachis loosely to densely covered with appressed to spreading hairs. Leaflets in 6–9 pairs, narrowly ovate to ovate, 5–22 × 2–12 mm, distinctly emarginate, on upper side glabrous, on underside sparsely covered with thin, appressed hairs up to 1.5 mm long. Stems 3–6.5 cm long, hairy like the stem. Racemes at anthesis densely many-flowered, later on elongating. Bracts membranous, 1–2 mm long, white and black ciliate. Pedicels 1–2 mm long, black hairy, sometimes recurved and flowers nodding. Bracteoles mostly present, 0.3–1 mm long, in upper part of the pedicel. Calyx campanulate, (5–)6–8 mm long, loosely covered with appressed to partly spreading black hairs; teeth narrowly triangular, 3–5 mm long, mostly distinctly longer than the tube. Petals yellowish or violet, more rarely whitish. Standard 11–13 mm long; blade elliptic to ovate, 6–8 mm wide, deeply emarginate to bilobed, at the base cuneately narrowed. Wings 9–11 mm long; blades narrowly oblong, rounded, ca. 6 × 2–3 mm; auricle ca. 1 mm, claw 3–4 mm. Keel 7–10 mm long; blades obliquely elliptic, with widely, rectangularly curved lower edge and nearly straight upper edge, subacute, 4.5–6 × 3–3.5 mm; auricle acute, claw 3–4 mm. Stamen-tube truncate at the mouth. Ovary sessile; style short. Legumes sessile, linear, nodding, distinctly upcurved, 20–30 mm long,

4–5 mm high. 3–4 mm wide, acutely keeled ventrally, narrowly and deeply grooved dorsally, shortly acuminate, incompletely bilocular; valves thin, slightly netlike rugulose, straw-coloured to dirty brownish, loosely covered with nearly spreading white hairs 1–1.5 mm long, often sitting on minute tubercles. Flowering time: 3–5. Occurrence: on gypsaceous and calcareous soil. Distribution: S. Spain. Hs [North Africa].

2. *Astragalus algarbiensis* BUNGE, *Mém. Acad. Imp. Sci. Saint Pétersbourg* 11(16): 9. 1868 in *clave* [et *lc.* 15(1): 6. 1869]. [Sect. *Bucerates* DC.]

Plants annual, up to 35 cm tall, very sparsely furnished with strongly asymmetrically bifurcate, flattened, white, in the inflorescence also with black hairs. Stems singular or few, sparsely branched in lower part, ascending to erect, finely sulcate, very sparsely, only near the nodes more densely covered with hairs 0.3–0.8 mm long. Stipules: whitish-membranous to greenish, 8–12 mm long, free from the petiole, behind the stem high up vaginateconnate, sometimes up to the tip. Leaves 7–10 cm long; petiole 1.5–2 cm long, like the rachis distinctly flattened, very sparsely hairy. Leaflets in 8–12 pairs, narrowly elliptic, 6–12 × 2–5 mm, rounded to emarginate, on upper side glabrous, on underside very sparsely, only at the midvein and margins somewhat more densely hairy. Peduncles thick, 7–13 cm long, finely striate, sparsely covered with white, toward the raceme also with black hairs. Racemes at anthesis densely many-flowered, strongly elongating with age and up to 15 cm long; axis black hairy. Bracts whitish-membranous, narrowly triangular-linear, 3–4 mm long, black ciliate. Pedicels ca. 1 mm long, erect, after anthesis strongly recurved and thickened. Calyx campanulate, 3–5 mm long, sparsely covered with black hairs 0.1–0.3 mm long; teeth triangular-acuminate, 1–2 mm long. Petals violet or yellowish, fading violet. Standard 9–11 mm long; blade rhombic-elliptic, toward the tip shortly narrowed, at the base with cuneate claw. Wings 8–9 mm long; blades narrowly obovate, obliquely rounded, 5–6 × 2 mm; auricle ca. 1 mm, claw 2–3 mm. Keel 6–7.5 mm long; blades oblique-obovate, with

widely nearly rectangularly curved lower edge and slightly concave upper edge, subacute, 4–4.5 × 2 mm; auricle ca. 1 mm, acute, claw 2–3 mm. Stamen-tube slightly obliquely cut at the mouth. Ovary sessile, glabrous. Legumes nodding, sessile within the calyx, obliquely ellipsoid to semicircular examined from the side, with slightly curved ventral line and nearly semicircular-curved dorsal line, 7–10 mm long, 4–5 mm high and 4 mm wide, obtusely keeled ventrally, narrowly grooved dorsally, from the groove with two bulges passing into the sides, subacute, bilocular; valves subcoriaceous, rugose, brownish, glabrous. Flowering time: 4–5. Occurrence: sandy soil near the coast. Distribution: Hs, Lu. [Morocco].

3. *Astragalus cymbicarpos* BROT., Phytogr. Lusit., Select.: 30. 1801. (*A. clandestinus* ROTH; *A. castellanus* BUNGE). [Sect. *Bucerates* DC.]

Plants annual, branched at the base, covered with asymmetrically to symmetrically bifurcate white, in the inflorescences also black hairs 0.2–0.5 mm long. Bracts mostly several, up to 30 cm long, prostrate to ascending, sparsely hairy. Stipules greenish, 5–8 mm long, from widely ovate to triangular base shortly acuminate, adnate to the petiole for ca. 1 mm, behind the stem vaginate-connate up to the middle or higher up, sparsely hairy. Leaves 5–10 cm long; petiole 0.5–3.5 cm long, like the rachis slender, very sparsely to sparsely hairy. Leaflets in 7–10 pairs, remote, narrowly obovate to narrowly cuneate, 4–10 × 2–4 mm, widely emarginate, on upper side glabrous, on underside sparsely to loosely hairy. Peduncles absent or up to 8 cm long, very sparsely furnished with white, toward the raceme also with black hairs. Racemes loosely (1–)2–5-flowered. Bracts whitish-membranous, linear-acute, 5–7 mm long, white and black ciliate. Pedicels 0.5–1 mm long, white and black hairy. Calyx campanulate, 5–7 mm long, white or black and white hairy; teeth subulate, 2.5–4 mm long, as long or slightly longer than the tube. Petals white or bluish. Standard 6–7 mm long; blade ca. 2.5 mm wide, narrowly ovate, slightly retuse, at the base shortly narrowed. Wings 4.5–5 mm long; blades narrowly oblong, rounded, ca. 3 × 0.8 mm; auricle minute, claw ca. 1.5 mm. Keel ca.

3.5 mm long; blades obliquely elliptic to nearly semicircular, with very widely curved lower edge and nearly straight upper edge, subacute, ca. 2 × 1.2 mm; auricle indistinct, claw ca. 1.5 mm. Ovary sessile, hairy; style thickish, short, glabrous. Legumes sessile, erect, obliquely narrowly ellipsoid, slightly curved, 10–23 mm long, 5 mm high and wide, rounded ventrally, narrowly grooved dorsally, passing into a rigid beak 8–13 mm long, incompletely bilocular; valves coriaceous, brown, finely net-like-rugulose or pitted-rugulose, loosely hairy. Flowering time: 4. Distribution: Hs, Lu. [Morocco].

4. *Astragalus edulis* BUNGE, Mém. Acad. Imp. Sci. Saint Pétersbourg 11(16): 9. 1868 in clave [et l.c. 15(1): 6. 1869]. [Sect. *Bucerates* DC.]

Plants annual, branched at the base, covered with strongly asymmetrically to symmetrically bifurcate, appressed white, at the stipules and in the inflorescence also black hairs 0.4–1.2 mm long. Stems many, up to 30 cm long, loosely hairy. Stipules 5–15 mm, the lower ones sometimes up to 15 mm long, from a wide base subabruptly shortly acuminate, free from the petiole, behind the stem vaginate-connate up to the middle or higher up, white hairy, at the base with black hairs mixed in. Leaves 5–13 cm long; petiole 1–2 cm long, like the rachis mostly slender, loosely to rather densely hairy. Leaflets in (5–)7–10 pairs, remote, narrowly ovate to narrowly obovate, 8–15 × 2–6 mm, rounded, on upper side glabrous, on underside loosely to densely hairy. Peduncles 28 cm long, hairy like the stem. Racemes at anthesis densely 3–10-flowered, slightly elongating with age. Bracts white-membranous, 1.5–3 mm long, linear-acute, white and black ciliate. Pedicels ca. 1 mm long, mostly black hairy. Calyx widely tubular, 4–5 mm long, densely black hairy, more rarely with some white hairs mixed in; teeth narrowly triangular, 1.5–2 mm long. Petals bluish. Standard 7–9 mm long; blade ca. 4 mm wide, elliptic, emarginate, cuneate at the base, slightly recurved in the middle. Wings 6–7 mm long; blades narrowly oblong, rounded to slightly obliquely emarginate, ca. 4.5 × 1.5 mm; auricle ca. 0.5 mm, claw 2–3 mm. Keel ca. 5 mm long; blades obliquely elliptic, with widely curved lower edge and slightly

curved upper edge, subobtuse, 3–3.5 × 2 mm; auricle short, claw 1.5–2 mm. Stamen-tube obliquely cut at the mouth. Ovary sessile, curved, glabrous. Legumes sessile, nodding, obliquely oblong, 10–18 mm long, 5–6 mm high and 4–5 mm wide, acutely keeled ventrally, widely flattened dorsally with slightly to distinctly elevated midnerve, with sharp edges passing into the sides, triangular to obtrullate-quadrangular in cross-section, very shortly acuminate, bilocular; valves thin, tough, distinctly transversely rugose, straw-coloured but often red brown-suffused, glabrous. Flowering time: 3–4. Distribution: Hs. [Canary Islands; North Africa].

5. *Astragalus hamosus* L., Sp. Pl.: 758. 1753.
(*A. paui* PAU; *A. stribrnyi* VELEN.). [Sect. *Bucerates* DC.]

Plants annual, branched at the base, covered with symmetrically to slightly asymmetrically bifurcate white, in the inflorescence also with black hairs. Stems 5–30(–80) cm long, prostrate to ascending, rather densely or rarely only sparsely covered with appressed hairs 0.4–1 mm long. Stipules whitish-membranous to greenish, (3.5–)5–9 mm long, from a wide base long acuminate, free from the petiole, behind the stem distinctly, often up to the middle vaginate-connate, at the margins and often also all over loosely covered with appressed hairs. Leaves 3–16 cm long; petiole 0.5–3 cm long, like the rachis loosely to densely, rarely only sparsely appressed hairy. Leaflets in 7–13 pairs, narrowly ovate to narrowly obovate, more rarely ovate to obovate, 6–22 × 2–7 mm, rounded, truncate or retuse, on upper side always glabrous, on underside loosely to densely, more rarely only sparsely appressed hairy. Peduncles 0.5–10 cm long, with appressed or slightly ascending hairs. Racemes 4–18-flowered. Bracts white-membranous, often with greenish midvein, 1–3 mm long, white ciliate. Pedicels 0.5–1 mm long, mostly black hairy. Bracteoles sometimes present, minute, 0.1–0.3 mm long, at the base of calyx. Calyx tubular, 4–7 mm long, loosely to densely covered with short, appressed black or black and white or sometimes only white hairs; teeth narrowly triangular, 2–4 mm long. Petals yellow or bluish violet. Standard 7–11 mm long; blade elliptic to obovate, 2.5–

4.5 mm wide, emarginate, subabruptly to gradually narrowed into the cuneate claw. Wings 6–10 mm long; blades narrowly oblong, slightly dilated upward, obliquely truncate to slightly emarginate, 4–6 × 1.5–2.5 mm; auricle 0.5–1 mm, claw 2.5–4 mm. Keel 5–8 mm long; blades obliquely elliptic-triangular, with widely, nearly rectangular-curved lower edge and nearly straight upper edge, subacute, 3–4.5 × 1.5–2.5 mm; auricle minute, claw 2.5–3.5 mm. Stamen-tube obliquely cut at the mouth. Ovary sessile, shortly hairy; style short, glabrous. Legumes sessile, linear, nodding and in different way upcurved, from nearly straight, slightly curved, semicircularly curved to uncinately and circularly curved, 15–55 mm long, 1.5–3.5 mm high and wide, rounded ventrally, rounded and narrowly deeply grooved dorsally, terete in cross-section, with a short, mostly curved beak, completely bilocular; valves coriaceous, straw-coloured, at first densely covered with appressed white hairs 0.2–0.3 mm long, often strongly glabrescent with age. Flowering time: 3–5. Occurrence: in fields, waste land, steppes, on all kind of soil, mostly in low regions, in the south up to 1700 m. Distribution: Al, Bl, Bu, Co, Cr, Ga, Gr, Hs, It, Ju (Croatia, Bosnia, Serbia), Lu, Rm, Sa, Si. [Russia, Ukraine, Near East to Pakistan, Middle Asia, North Africa].

6. *Astragalus solandri* LOWE in HOOKER'S J. Bot. Kew Gard. Misc. 8: 294. 1856. [Sect. *Bucerates* DC.]

Plants annual, mostly branched at the base, furnished with subbasifixed to strongly asymmetrically bifurcate white, in the inflorescence also black hairs 0.3–0.7 mm long, in the fruit with much shorter hairs. Stems 5–45 cm long, prostrate to ascending, slightly sulcate, loosely to rather densely covered with appressed to ascending hairs. Stipules greenish to yellowish-membranous, 3.5–8 mm long, from triangular base long acuminate, free from the petiole, behind the stem shortly or up to the middle vaginate-connate, ciliate at the margins. Leaves 3–15 cm long; petiole 0.7–3 cm long, like the rachis loosely to rather densely appressed hairy. Leaflets in 7–14 pairs, narrowly ovate to narrowly oblong, 6–13 × 2–5 mm, truncate to slightly emarginate, more rarely rounded, often minutely mucronulate, on upper

side glabrous or rarely very sparsely hairy, on underside loosely to rather densely appressed hairy. Peduncles 1.5–12 cm long, hairy like the stem. Racemes loosely 6–22-flowered. Bracts membranous, narrowly triangular, 1–1.5 mm long, white and black ciliate. Pedicels ca. 1 mm long, hairy. Calyx tubular-campanulate, 3.5–7 mm long, loosely to rather densely covered with appressed to partly ascending black and few white hairs; teeth subulate, 2–4 mm long. Petals yellow or bluish violet. Standard 7–11 mm long; blade elliptic, 3–5 mm wide, slightly to distinctly emarginate, subabruptly narrowed into the cuneate claw. Wings 6–8 mm long; blades narrowly oblong, slightly dilated upward, obliquely truncate, 4.5–5 × 1.5 mm; auricle 0.5–0.8 mm, claw ca. 3 mm. Keel 5–6.5 mm long; blades obliquely elliptic-triangular, with widely, nearly rectangularly curved lower edge and nearly straight upper edge, obtuse, 3–3.5 × 1.5–2 mm; auricle very short, claw 2–2.5 mm. Stamen-tube obliquely cut at the mouth. Ovary sessile, very shortly hairy; style short, glabrous. Legumes sessile, mostly nodding, linear, mostly sickle-shaped to nearly circularly curved, rarely nearly straight, 22–55 mm long, 2–2.5 mm high and wide, rounded to indistinctly keeled ventrally, widely flattened to rounded dorsally, with acute edges passing into the sides, in cross-section nearly quadrangular, with a short, curved, slender beak, bilocular; valves thin but tough, at the sides concavely impressed, brownish to grey brown, or greenish to straw-coloured and red brown mottled, loosely covered with appressed hairs 0.2–0.3 mm long. Flowering time: 2–5. Occurrence: on sands near the coast. Distribution: Hs (probably extinct). [Madeira, Canary Islands, Morocco].

Note: Only once found in Spain: Prov. Cádiz, S. Cathalina pr. Puerto S. Maria, 1849, *E. Bourgeau 171*.

7. *Astragalus boeticus* L., Sp. Pl.: 758. 1753. [Sect. *Cyamodes* BUNGE]

Plants annual, up to 70 cm tall, unbranched or branched at the base or higher up, covered with white, in the inflorescens and sometimes at the nodes also with black hairs 0.3–1 mm long. Stems erect or prostrate-ascending, stout, up

to 7 mm in diameter, finely sulcate, at the base densely, higher up loosely to sparsely covered with appressed to spreading hairs. Stipules greenish, 7–15 mm long, from widely triangular base long acuminate, shortly adnate to the petiole, free from each other, ciliate at the margins, sometimes with white, more rarely also with black hairs at the base and the tip. Leaves 4–18 cm long, subsessile; petiole 0.5–1.5 cm long, like the rachis sparsely to loosely, more rarely rather densely covered with appressed to spreading white hairs, sometimes with few black hairs mixed in. Leaflets in 8–12 pairs, narrowly oblong to narrowly obovate, 6–25(–35) × 3–10(–13) mm, mostly widely emarginate, on upper side glabrous, on underside sparsely to loosely, at the midvein more densely subappressed hairy. Peduncles 0.5–10 cm long, angular, sometimes longitudinally red-stripped, hairy like the stem. Pedicels loosely 2–12-flowered. Bracts whitish-membranous, 4–6 mm long, narrowly triangular, white and black ciliate. Pedicels ca. 1 mm long, mostly black hairy. Calyx tubular, 6–8 mm long, loosely covered with ± appressed black hairs with few white hairs mixed in; teeth very narrowly triangular, 3–4 mm long, ± equalling the tube. Petals whitish. Standard 8–11 mm long; blade ovate, 3.5–5 mm wide, emarginate, at the base cuneately narrowed. Wings 6–7.5 mm long; blades narrowly oblong, slightly dilated upward, rounded, 3–5 × 1–1.8 mm; auricle 0.5–1 mm, claw ca. 2.5 mm. Keel 5.5–6 mm long; blades obliquely obovate, with in distal part widely curved lower edge and slightly curved upper edge, subacute-ventrally, 3–3.5 × 1.6–2 mm; auricle minute, claw 2–3 mm. Stamen-tube truncate at the mouth. Ovary sessile, shortly hairy; style glabrous. Legumes sessile, narrowly oblong, straight or slightly curved, 20–45(–60) mm long, 7–8 mm high and 5–7 mm wide, acutely keeled ventrally, widely and deeply grooved dorsally, with a stout, uncinately recurved beak, bilocular; valves thickly coriaceous, straw-coloured to brownish, rugulose when dry, sparsely covered with appressed hairs 0.5 mm long. Flowering time: 3–6. Occurrence: all kind of soils, sand, slightly salty soils, from sea level to 500(–1000) m: Distribution: Bl, Co, Cr, Ga, Gr, Hs, It, Ju (Croatia), Lu, Malta, Sa, Si. [Turkey, Near East, Iran, North Africa].

**8. *Astragalus contortuplicatus* L., Sp. Pl.: 758.
1853. [Sect. *Cycloglottis* BUNGE]**

Plants annual, mostly branched at the base, with thin, often bent white, in the inflorescence also black hairs 1–2 mm long. Stems mostly several, prostrate to ascending, more rarely erect, 2–50 cm long, loosely to densely covered with tangled, spreading hairs. Stipules greenish, 5–10 mm long, narrowly triangular, adnate to the petiole for 2–3 mm, hairy. Leaves 5–15 cm long; petiole 1–2 cm long, like the rachis slender, often flexuous or curved, sparsely to loosely covered with tangled, spreading hairs. Leaflets in 6–11 pairs, elliptic to obovate, 4–15 × 2–8 mm, widely and deeply emarginate, on upper side sparsely to loosely, on underside up to densely covered with tangled, appressed to spreading hairs. Peduncles 1–4 cm long, hairy like the stem. Racemes at anthesis globular, densely 5–15 (–20)-flowered, later on slightly elongated. Bracts green, linear-acute, 2–3 mm long, hairy. Flowers nearly sessile. Calyx 5–6.5 mm long, shortly campanulate, densely covered with white or with white and black hairs; teeth very unequal, the three lower ones filiform, 3–5 mm long, the two upper only 2–2.5 mm long. Petals whitish or yellowish. Standard 5–7.5 mm long, 2.5–3.5 mm wide, elliptic, widely and deeply emarginate, at the base shortly cuneately narrowed. Wings 4–5.5 mm long; blades narrowly oblong, rounded, 3–3.5 × 0.5–1 mm; auricle 0.3–0.4 mm, claw 1.5–2 mm. Keel 5–6.5 mm long; blades elliptic-triangular, with widely curved lower edge and slightly concave upper edge, rounded, 3.5–4 × 1.8–2 mm; auricle minute, claw ca. 2 mm. Stamen-tube obliquely cut at the mouth. Ovary sessile, densely hairy; style glabrous. Legumes sessile, linear, strongly falcate to screw-like twisted and often forming a complete circle of less than 1 cm in diameter, 10–20 mm long, 3–3.5 mm high and 2.5–3 mm wide, keeled ventrally, slightly and narrowly grooved dorsally, with a minute beak, completely bilocular; valves thinly membranous, nearly bluish brown when ripe, rugulose to pitted or warty, loosely to rather densely covered with tangled spreading hairs. Flowering time: 6–8. Occurrence: rare in salty meadow, river bords, but also semideserts, mostly sporadic and ephemeral. Distribution: Bu,

Hu (probably extinct), It, Ju (Serbia), Rm. [Russia, Ukraine, Caucasus, Middle Asia, Mongolia, China].

**9. *Astragalus epiglottis* L., Sp. Pl.: 759. 1753.
(*A. asperulus* DUFOR; *A. epiglottoides* WILLK.).
[Sect. *Epiglottis* BUNGE]**

Plants annual, unbranched or branched at the base, covered with ± asymmetrically bifurcate, appressed or more rarely partly slightly ascending white, at the nodes and in the inflorescence also black hairs 0.5–1 mm long. Stems 4–25 cm long, singular to several, ascending to erect, rather densely hairy. Stipules greenish, 2–4 mm long, triangular or from triangular base acuminate, distinctly adnate to the petiole, behind the stem shortly vaginate-connate, white to black hairy. Leaves 2–8 cm long; petiole 0.5–2 cm long, like the rachis slender, rather densely hairy. Leaflets in (2–)3–7 pairs, narrowly elliptic, 5–12 × 1–3 mm, subacute or narrowly rounded, minutely mucronulate, on upper side loosely to rather densely, on underside densely appressed hairy. Peduncles up to 6 cm long, hairy like the stem. Racemes at anthesis densely 6–12-flowered, soon elongating and loosely flowered. Bracts ca. 0.5 mm long, narrow, white and black hairy. Flowers nearly sessile. Calyx campanulate-funnel-shaped, 2–2.5 mm long, white and toward the teeth also black hairy, sometimes merely black hairy; teeth subulate, as long to longer than the tube. Petals yellowish to yellowish bluish. Standard 3–4 mm long; blade elliptic to obovate, emarginate, subabruptly narrowed into the short claw. Wings 2.5–3.5 mm long; blades narrowly oblong, rounded, 1.5–2.2 × ca. 0.5 mm; auricle minute, claw 1–1.2 mm long. Keel ca. 2.3 mm long; blades oblong-curved, with in distal part widely curved lower edge and straight to slightly concave upper edge, obtuse, 1.2–2 × 0.5–0.6 mm; auricle minute, claw 0.8–1 mm long. Stamina five. Stamen-tube slightly obliquely cut at the mouth. Ovary sessile, hairy; style very short, glabrous. Legumes sessile, from nearly rounded base passing into a narrowly triangular, up-curved tip, 5–9 mm long, 2.5–3 mm wide and 4–6 mm wide at the base, obtusely keeled ventrally, dorsally with an narrow, toward the base strongly dilated groove, without distinct beak, nearly completely bilocular; valves thin

but tough, brownish, densely covered with subbasifixed to extremely asymmetrically bifurcate, appressed white hairs 0.1–0.3 mm long and with distinctly fewer, strongly asymmetrically bifurcate, \pm spreading hairs 0.4–0.6 mm long sitting on little tubercles. Flowering time: 3–5. Occurrence: on dry, sandy-stony flats, as weed in fields, up to 1650 m. Distribution: Cr, Ga, Gr, Hs, It, Lu, Sa, Si. [North Africa, Cyprus, Turkey, Near East].

Note: The only known locality in France was extinct due to over-collecting since long time. The species was recollected in 1958, but only 4–5 plants could be found: Var, near Cavoletta, Toulon.

10. *Astragalus oxyglottis* M.BIEB., Fl. Taur.-Cauc. 2: 192. 1808. [Sect. *Oxyglottis* BUNGE]

Plants annual, branched at the base, with appressed white, sometimes and especially in the inflorescence also with black hairs 0.1–0.3 mm long. Stems 2–25 cm long, ascending to erect, rather densely hairy, often glabrescent with age. Stipules greenish-membranous, 2–4 mm long, from triangular base long acuminate, shortly adnate to the petiole, hairy. Leaves 2–9 cm long; petiole 1–2.5 cm long, like the rachis loosely or more rarely sparsely hairy. Leaflets in 4–6(–8) pairs, cuneate-oblong to elliptic, 3–10 \times 1.5–5 mm, distinctly and mostly widely emarginate, on upper side glabrous or sparsely to loosely hairy, on underside loosely to rather densely hairy. Racemes sessile or with a peduncle up to 4 cm long and hairy like the stem, head-like, densely 4–8-flowered, in well developed plants often with 1–2 additional, remote whorls of 2–4 flowers. Bracts membranous, triangular, less than 0.5 mm long. Flowers nearly sessile. Calyx 2–2.5 mm long, campanulate, white and black hairy; teeth narrowly triangular, 0.4–0.5 mm long. Petals whitish, often with violet-nerved standard and bluish tips of the keel or bluish to violet. Standard 5–6 mm long and 2.5–3 mm wide, elliptic, emarginate, scarcely narrowed at the base. Wings 4–5 mm long; blades narrowly oblong or slightly dilated upward, slightly obliquely emarginate, 3–3.5 \times 1.5 mm; auricle 0.3–0.4 mm, claw 1–1.5 mm. Keel 3–4 mm long; blades obliquely oblong, with in distal part widely rectangularly curved lower edge and nearly straight upper edge, 2–2.5 \times 1.2 mm;

auricle minute, claw 1–1.5 mm. Stamen-tube truncate at the mouth. Ovary sessile, hairy or glabrous. Legumes sessile, starlike spreading or ascending, narrowly ovoid, widest in lower third, 7–15 mm long, 2.5–3.5 mm high and wide, sharply keeled ventrally and on the sides of the valves, beside the keels of the valves grooved, slightly vaulted and with two shallow grooves dorsally, in cross dissection quadrangular, shortly acuminate, bilocular; valves thin, tough, blackish brown when ripe, at the keels of the valves distinctly transversely rugulose, glabrous or hairy. Flowering time: 2–5. Occurrence: sandy, stony, also salty and gypsaceous soil, steppes and semideserts. Distribution: Hs. [Russia, Ukraine, Caucasus, Middle Asia, Turkey, Iran to China, Egypt].

11. *Astragalus echinatus* MURRAY, Prodr. Stirp. Götting.: 222. 1770. (*A. pentaglottis* L.; *A. cristatus* GOUAN). [Sect. *Pentaglottis* BUNGE]

Plants annual, branched at the base or more rarely higher up, covered with often curved or bent, at stem and rachis of distinctly knotted-thickened hairs. Stems 5–40 cm long, loosely to rather densely, more rarely sparsely covered with spreading white hairs 1–2 mm long, at the nodes sometimes with some black hairs mixed in. Stipules greenish, 5–8 mm long, triangular, ovate or oblong, acute to acuminate, free from petiole and from each other, white or black and white ciliate. Leaves 3–7 cm long; petiole up to 1.5 cm long or in upper leaves nearly missing, like the rachis loosely covered with spreading white hairs 1–2 mm long. Leaflets in 5–9 pairs, narrowly ovate or ovate to narrowly obovate or obovate, 4–13 \times 2–6 mm, mostly distinctly emarginate, on upper side glabrous, on underside loosely covered with ascending white hairs 0.5–1 mm long. Peduncles 1–8 cm long, stout, hairy like the stem. Racemes capitate, densely many-flowered. Bracts greenish, narrowly triangular to linear-acute, 2–4 mm long, white and black ciliate, at the margins with subsessile, minute glands. Pedicels ca. 1 mm long, thick. Calyx campanulate, 4–6 mm long, straw-coloured with greenish teeth, loosely covered with nearly spreading white and black hairs; teeth 2–2.5 mm long, unequal, the three

abaxial subulate, the two adaxial narrowly triangular. Petals yellowish or more rarely bluish violet. Standard ca. 8 mm long; blade 3.5 mm wide, rhombic-elliptic to obovate, slightly emarginate, at the base shortly cuneate. Wings 7–8 mm long; blades narrowly oblong, rounded, 4.5–5 × 1.5–2 mm; auricle 0.4–0.6 mm, claw 2.5–3 mm. Keel 6.5–7 mm long; blades obliquely elliptic, with very widely curved lower edge and slightly convex to sigmoid upper edge, subacute, ca. 4 × 2 mm; auricle short, claw 2.5–3 mm. Stamen-tube truncate at the mouth. Ovary sessile, shortly hairy; style glabrous. Legumes sessile, obliquely ovate to nearly semicircular seen from the side, with straight to slightly curved ventral line and semicircular dorsal line, ca. 8 mm long, 5–6 mm high and 4–5 mm wide, obtusely keeled ventrally, on the dorsal side with a deep, narrow groove strongly dilated toward the base, bordered laterally by bulges which diverge ovately at the base of the fruit, with a strong, slightly curved beak up to 3 mm long, bilocular; valves coriaceous, straw-coloured, very densely covered at the dorsal side with scale-like, strongly flattened, sometimes lobate, yellowish, nearly spreading hairs up to 2 mm long, beside these, especially at the ventral side with thin, spreading, white hairs up to 2 mm long. Seeds one in each locule, ca. 3 × 2 mm. Flowering time: 3–6. Occurrence: on all kind of soil, ruderal, in fields. Distribution: Cr, Ga, Gr, Hs, It, Lu, Si. [North Africa, Turkey, Syria].

12. *Astragalus scorpioides* WILLD., Sp. Pl. 3: 1280. 1802. (*A. canaliculatus* WILLD.; *A. uncinatus* BERTOL.). [Sect. *Sesamei* DC.]

Plants annual, branched at the base, covered with white, in some parts also with black hairs 0.3–1.2 mm long. Stems 4–40 cm long, prostrate to ascending, finely striate, sparsely to loosely covered with ascending to spreading white hairs. Stipules whitish to greenish, 3–5 mm long, narrowly triangular to triangular-acuminate, adnate to the petiole for 0.5–1 mm, otherwise free, with white hairs or with some black hairs mixed in. Leaves 3–8 cm long; petiole 0.5–1.5 cm long, like the rachis slender, sparsely to loosely covered with ascending to spreading hairs. Leaflets in 6–9 pairs, narrowly elliptic to narrowly obovate, 5–13 ×

1–4 mm, rounded to distinctly emarginate, on upper side glabrous, on underside sparsely to loosely appressed hairy. Racemes distributed mostly along the whole length of the stem, sessile or with a very short peduncle up to 3 mm long, 1–2(–3)-flowered. Bracts membranous, 4–5 mm long, narrowly triangular, ciliate. Flowers sessile. Calyx tubular, 6–8 mm long, loosely to rather densely subappressed white hairy, sometimes with few black hairs mixed in; teeth subulate, 4–5 mm long. Petals yellowish to bluish or pale violet. Standard 9–11 mm long; blade ca. 3 mm wide, narrowly elliptic, slightly emarginate, cuneately narrowed at the base. Wings 8–10 mm long; blades narrowly oblong, slightly obliquely emarginate, 4–5 × 1–1.2 mm; auricle ca. 0.5 mm, claw ca. 4 mm. Keel 7–7.5 mm long; blades oblique-elliptic, with in upper part rectangularly curved lower edge and nearly straight upper edge, subacute, 3.5–4 × 1.6 mm; auricle indistinct, claw 3.5–4 mm. Stamen-tube truncate at the mouth. Ovary sessile, hairy; style short, rather thick, glabrous. Legumes sessile, erect, linear, slightly to distinctly upcurved, 30–50 mm long, 2.5–3 mm high and wide, obtusely keeled ventrally, deeply V-like grooved dorsally, hence cordate in cross-section, with a short, mostly hooked beak, bilocular; valves thin, straw-coloured to brownish, at first densely covered with appressed hairs 0.05–0.3 mm long and with longer hairs up to 0.7 mm long, glabrescent to glabrous with age, as a rule the longer hairs are disappearing at first. Flowering time: 4–5. Occurrence: on dry flats, along roadside, in fields. Distribution: Hs. [North Africa].

13. *Astragalus sesameus* L., Sp. Pl.: 759. 1753. [Sect. *Sesamei* DC.]

Plants annual, branched at the base, covered with white and mainly in the inflorescence also with black hairs 0.3–1.8 mm long. Stems (7–)12–36 cm long or sometimes nearly absent, prostrate to ascending, finely sulcate, loosely to rather densely covered with subappressed to partly ascending white hairs, sometimes with scattered black hairs mixed in. Stipules green or whitish with green tip, (3–)4–6 mm long, triangular-acuminate, adnate to the petiole for 1–2 mm, densely appressed white and black hairy. Leaves

2–8(–9.5) cm long; petiole 0.4–2(–2.5) cm long, like the rachis covered with appressed to ascending white hairs, sometimes with scattered black hairs mixed in. Leaflets in 6–11(–12) pairs, narrowly elliptic to narrowly obovate, 3–10(–14) × 1–3.2(–5.5) mm, obtuse to retuse, on upper side sparsely, on underside more densely covered with appressed white hairs up to 1.1 mm long. Racemes sessile or with a densely white hairy peduncle up to 0.5 cm long, 3–10-flowered. Bracts hyaline with green tip, 1–3 mm long, narrowly triangular, white and black ciliate. Flowers subsessile. Calyx campanulate, 5–7 mm long, appressed white and black hairy; teeth linear, unequal in length, 2–3 mm long, black hairy but white ciliate at the margins. Standard 7–9 mm long; blade 2–3 mm wide, narrowly elliptic, retuse. Wings 6.2–7 mm long; blades narrowly oblong, retuse, 3.2–4 × 1 mm; auricle 0.5–1 mm, claw 3–3.5 mm. Keel 5–5.3 mm long; blades obovate-triangular, with strongly curved lower edge and slightly curved upper edge, acute, with very short auricle. Stamen-tube truncate at the mouth. Ovary sessile, hairy; style short, glabrous. Legumes sessile, erect, linear with widened base, 9–17 mm long, 3–3.5 mm high and 4.5–5 mm wide, obtusely keeled ventrally, deeply grooved dorsally, with a very short beak, bilocular; valves thin, pale brown, covered with two kinds of hairs: with very short appressed to ascending white hairs 0.1–0.2 mm long and with much longer, spreading hairs 1–1.6 mm long. Flowering time: 4–6(–7). Occurrence: on dry ground, along roadsides, in fields. Distribution: Bu, Ga, Gr, Hs, It, Ju (Croatia), Lu, Malta, Sa, Si. [North Africa, Turkey].

14. *Astragalus sinaicus* BOISS., Diagn. pl. orient., ser. 1, 9: 57. 1849. (*A. pseudostella* BUNGE). [Sect. *Sesamei* DC.]

Plants annual, branched at the base, covered with rather rigid white, at the nodes and in the inflorescence, rarely also on the leaves with additional black hairs 0.3–1.4 mm long. Stems 5–25 cm long, prostrate or sometimes erect, covered with spreading or rarely subappressed hairs up to 1.2 mm long. Stipules greenish, 4–5 mm long, triangular-acuminate, shortly adnate to the petiole, amplexicaul, vaginateconnate behind the stem up to 1 mm high, cov-

ered with subappressed white hairs with some black hairs mixed in. Leaves (1–)2–7 cm long; Petiole 0.5–1.5 cm long, like the rachis covered with ascending hairs 0.3–1.1 mm long. Leaflets in (5–)8–10(–12) pairs, narrowly elliptic to elliptic, 2–10 × 0.8–4 mm, obtuse to slightly retuse, on both sides appressed hairy. Racemes subsessile or sometimes in upper part of the stem with a peduncle up to 5 cm long, 3–7-flowered. Bracts membranous, 1–2.5 mm long, narrowly triangular-acuminate, white or black and white ciliate at the margins. Flowers subsessile. Calyx shortly tubular, 4.3–6 mm long, covered with ± appressed white hairs, with black hairs only at the teeth or sometimes all over the tube; teeth 1.3–1.6 mm long. Petals yellow, violet or pale mauve. Standard 6–8.2 mm long; blade 2–3 mm wide, narrowly elliptic, retuse, with an indistinct claw. Wings 5–7 mm long; blades narrowly oblong, obtuse, 2.8–3.2 × 1 mm; auricle ca. 0.5 mm, claw 2.3–3 mm. Keel 4–5 mm long; blades obovate-triangular, with in upper part strongly curved lower edge and slightly curved upper edge, obtuse, 1.5–1.8 × 1.1–1.2 mm; auricle minute, claw 2–3 mm. Stamen-tube truncate at the mouth. Ovary sessile, hairy; style ca. 1 mm long. Legumes subsessile, ± stellately spreading, narrowly oblong to narrowly ellipsoid, slightly widened and bigibbous at the base, with an acute tip, 6–18 mm long, 2.5–4 mm high and 2–3.5 mm wide, keeled ventrally, deeply V-like grooved dorsally, bilocular; valves covered with two kind of hairs (double indumentum): with short, subappressed or mixed with slightly ascending hairs 0.1–0.2 mm long and with much longer, ascending to spreading, often slightly curved hairs up to 1.2 mm long and often sitting on little tubercles. Flowering time: 3–5. Occurrence: in Mediterranean vegetation types at lower altitude. Distribution: Gr, Ju (Bosnia; Macedonia). [Turkey, Cyprus].

15. *Astragalus stella* L., Syst. Nat., ed. 12, 2: 734. 1767. (*A. raphaelis* FERRO; *A. polyactinus* BOISS., nom. inval.). [Sect. *Sesamei* DC.]

Plants annual, unbranched or branched at the base, covered with white, at the nodes, stipules and in the inflorescence also with black hairs 0.3–1.9 mm long. Stems 4–36(–50) cm long, prostrate to ascending, finely sulcate, cov-

ered with appressed to ascending, sometimes also with spreading hairs, often more densely toward the nodes. Stipules green, (2.5–)3–6(–7) mm long, narrowly triangular, acuminate or sometimes long cuspidate, adnate to the petiole for 0.8–1.5(–2) mm, otherwise free, densely white hairy, with black hairs mixed in. Leaves 2–7.5(–9) cm long; petiole 0.2–1 cm long, like the rachis covered with appressed to ascending hairs. Leaflets in (5–)7–11 pairs, narrowly elliptic, 2.5–10(–16) × 1.5–3.5(–5) mm, obtuse to slightly retuse, on both sides appressed hairy, mostly more densely on underside. Peduncles 2–11.5 cm long, hairy like the stem but more densely and with more black hairs toward the raceme. Racemes rather densely 4–11(–15)-flowered. Bracts membranous, 1.5–3(–3.5) mm long, narrowly triangular, with white and black hairs. Flowers subsessile. Calyx campanulate, 5–7 mm long, covered with appressed to subappressed white and black hairs; teeth subulate, 1.5–3(–3.8) mm long. Petals yellow or violet. Standard (5.5–)7–10(–11) mm long; blade 2–4 mm wide, narrowly elliptic, emarginate, contracted into a narrow claw. Wings (5–)6–8 mm long; blades narrowly oblong, obliquely bilobed to nearly rounded, (2–)3–4 × ca. 1 mm; auricle 0.8–1 mm, claw (2.5–)3–4 mm. Keel (4–)5–6 mm long; blades obovate-triangular, with widely curved lower edge and slightly curved upper edge, acute, 1.5–2 × 1–1.3 mm; auricle minute, claw (2–)2.5–3 mm. Stamen-tube truncate at the mouth. Ovary sessile or subsessile, hairy; style short, glabrous. Legumes sessile or with a stipe up to 1 mm long, star-like spreading or obliquely erect, narrowly ovate, straight or slightly up-curved, rounded and very slightly widened at the base, 10–15 mm long, 2.5–3 mm high and 3–4 mm wide, keeled ventrally, deeply and narrowly grooved dorsally, with a short and nearly straight beak or with an upcurved to nearly hooked beak 1–2 mm long, bilocular; valves coriaceous, covered with two kinds of hairs (double indumentum); densely with short appressed hairs 0.05–0.2 mm long and more loosely with ascending to spreading, sometimes curved hairs up to 1.9 mm long. Flowering time: 1–6. Occurrence: on all kinds of soil under Mediterranean and semidesertic conditions, mainly in the plains. Distribution: Ga,

Gr, Hs, Lu, Si. [Canary Islands, North Africa, Turkey].

16. *Astragalus devesae* TALAVERA, A.GONZÁLEZ & G.LÓPEZ, *Lagascalía* 21: 194. 2000. [Sect. *Platyglottis* BUNGE]

Plants perennial, covered with white hairs 1.5–3 mm long, near the nodes often also with black hairs. Rootstock up to 10 mm thick, with a pluricipital root-crown, with thick, short subterranean branches. Stems several, ascending to erect, 10–32(–45) cm long, 2–5(–5.5) mm in diameter, prostrate to ascending, densely covered with partly flexuose, spreading hairs 1–2 mm long. Stipules membranous to slightly greenish, 6–10 mm long, ovate-acuminate to triangular, nearly free from the petiole, ciliate at the margins, otherwise glabrous or with scattered hairs only. Leaves 6–14 cm long; petiole 1–4 cm long, with the rachis rather densely hairy like the stem. Leaflets in 8–13 pairs, narrowly elliptic to narrowly obovate, (5–)6–20(–23) × (1.5–)2.5–7(–8) mm, rounded to distinctly emarginate, on upper side hairy only at the margins, on underside loosely covered with tangled, subappressed to nearly spreading hairs 0.5–1 mm long. Peduncles 4–8 cm long, hairy like the stem. Racemes rather loosely (6–)9–12(–16)-flowered. Bracts narrowly triangular-acuminate, 6–7 mm long, 1.5–2.5 mm wide, ciliate at the margins. Bracteoles sometimes present. Calyx (7–)9–13 mm long, tubular, at the base slightly ventricose, obliquely cut at the mouth, covered with ascending to nearly spreading hairs; teeth narrowly triangular, 4–6 mm long, nearly glabrous on inner side. Petals pale yellow. Standard ca. 20 mm long; blade ca. 10 mm wide, rhombic-elliptic, tongue-like narrowed upward, emarginate, gradually narrowed at the base. Wings 13–15 mm long; blades narrowly oblong, slightly obliquely emarginate, 9–10 × 4 mm; auricle ca. 1.5 mm, claw ca. 5 mm. Keel 12–14 mm long; blades obliquely obovate, with in distal part rectangularly curved lower edge and slightly concave upper edge, obtuse, ca. 7 × 4 mm; auricle short, claw ca. 5 mm. Stamen-tube slightly obliquely cut at the mouth. Legumes sessile, spreading to nodding, narrowly oblong to narrowly ellipsoid, distinctly upcurved, 22–31 mm long, 7–9 mm high, 11–13 mm

wide, keeled ventrally, deeply grooved dorsally, shortly acuminate, bilocular; valves hard, thick, pale brownish, slightly warty, densely covered with \pm spreading hairs up to 3 mm long. Fruits hardly opening. Distribution: Central Spain (Prov. Ávila). Hs.

17. *Astragalus gines-lopezii* TALAVERA, PODLECH, DEVESA & VÁZQ. PARDO, *Anales Jard. Bot. Madrid* 57: 219. 1999. [Sect. *Platyglottis* BUNGE]

Plants perennial, 7–20(–32) cm tall, branched at the base, covered with hairs 1.5–2.5 mm long. Stems prostrate to ascending, up to 15 cm long, densely covered with rigid and nearly spreading hairs. Stipules greenish, 5–8(–12) mm long, adnate to the petiole, vaginate-connate behind the stem up to the middle, hairy. Leaves ca. 10 cm long; Petiole 0.5–1.5(–3) cm long, with the rachis spreadingly hairy. Leaflets in 9–11 pairs, narrowly elliptic to obovate, 12–15 \times 4–7 mm, retuse, on upper side sparsely, on underside more densely hairy. Peduncles 0.9–2(–5) cm long, hairy like the stem. Racemes rather densely 2–6(–8)-flowered. Bracts narrowly ovate, (3–)3.5–6(–8) \times 1.5–2.2(–3) mm. Pedicels 1–2 mm long. Calyx campanulate, 9–11(–12) mm long, loosely predominantly black hairy; teeth 5–7.5 mm long. Petals creamy with blue-tinges wings and blue keel. Standard 15–21 mm long; blade rhombic, gradually narrowed from the middle to the subacute tip, subabruptly contracted into the short claw. Wings 10–15 mm long; blades oblong, rounded. Keel 9–13 mm long. Legumes sessile, narrowly oblong, slightly curved, 20–22 mm long, ca. 5 mm high and 6 mm wide, obtusely keeled to scarcely grooved ventrally, grooved dorsally, shortly acuminate, incompletely bilocular; valves coriaceous, finely warty wrinkled to tuberculate, densely spreadingly hairy, glabrescent with age. Flowering time: 4–5. Distribution: 650–1000 m. Central Spain (Prov. Badajoz). Hs.

18. *Astragalus haarbachii* SPRUNER, in BOISS., *Diagn. pl. orient.*, ser. 1, 2: 50. 1843. [*A. suberosus* subsp. *haarbachii* (SPRUNER) V.A.MATTHEWS]. [Sect. *Platyglottis* BUNGE]

Plants perennial. Rootstock with a pluricipital root-crown and short, branched subterranean

stolons. Stems several, 3–25(–56) cm long, prostrate to ascending, densely covered with subrigid, white, near the nodes also black hairs 1–2.5(–3) mm long, sometimes glabrescent with age. Stipules green, (3–)4–9(–11) mm long, those of lower leaves ovate, very shortly adnate to the petiole and sometimes very shortly connate behind the stem, those of upper leaves narrowly triangular-acuminate, free, all white or white and black hairy. Leaves (2–)5–10(–13) cm long; petiole 0.4–2.2(–4.8) cm long or sometimes nearly missing, like the rachis \pm densely covered with spreading white hairs, sometimes with few black hairs mixed in. Leaflets in (5–)7–12(–15) pairs, ovate, elliptic or obovate, (1.5–)3–12(–18) \times (1.5–)3–9(–11) mm, rounded, truncate or retuse to emarginate, on upper side glabrous, on underside loosely or at the midvein more densely covered with appressed to ascending hairs, often glabrescent with age. Peduncles in upper part of the stem, (1–)2–11(–13) cm long, covered with ascending to spreading white, toward the raceme also black hairs. Racemes densely (4–)7–16-flowered, elongating with age. Bracts green, sometimes purple-suffused, (2–)4–6(–8) mm long, ovate-acuminate to narrowly triangular, black and white or nearly black hairy. Pedicels 1–3 mm long, hairy. Calyx (8–)9–13(–15) mm long, tubular, white and black hairy; teeth subulate, 2–5 mm long. Petals creamy to yellow, often purple-suffused when dry. Standard 17–27 mm long; blade (5–)7–10 mm wide, elliptic to rhombic, slightly tongue-like narrowed toward the tip, at the base cuneately narrowed. Wings 13–21 mm long; blades narrowly oblong, rounded, 9–10 \times (1.5–)2–3 mm; auricle (1.5–)2–2.5 mm, claw 6–10 mm. Keel 12–19 mm long; blades elliptic-curved, with widely nearly rectangularly curved lower edge and concave to nearly straight upper edge, obtuse, 5–10 \times 2–4 mm; auricle 0.5–1 mm, claw 6–10 mm. Stamen-tube nearly truncate at the mouth. Ovary sessile or with a stipe up to 1.5 mm long, hairy; style glabrous. Legumes with a stipe 1.5–3 mm long, narrowly oblong to narrowly ellipsoid, curved, (15–)17–30(–34) mm long, 4–9(–11) mm high, 4–11(–12) mm wide, slightly rounded ventrally, narrowly and deeply grooved dorsally, with a straight beak 1–4 mm long; valves hard, coriaceous, straw-

coloured to brown, weakly wrinkled, tuberculate, sparsely to densely covered with ascending to spreading white hairs, glabrescent with age. Fruit opening very late and only at the ventral suture and at the tip. Seeds 2–3.5 × 1.5–3 mm, pale brown to dark brown, dull. Flowering time: 3–6. Occurrence: Bushes, light forests, fields, stony slopes, 0–1100 m. Distribution: Ju (Macedonia), Bu, Cr, Gr.

Note: Plants with distinctly narrower fruits (4–6, not 6–11 mm wide) can be found in the whole area of the species, often together with the typical forms. They can be separated as:

A. haarbachii var. *argolicus* (HAUSSKN.)
PODLECH, Mitt. Bot. Staatss. München **29**: 567.
1990. [*A. argolicus* HAUSSKN.; *A. pamphylicus*
var. *argolicus* (HAUSSKN.) HAYEK.]

19. *Astragalus nitidiflorus* JIMÉNEZ & PAU, Bol. Soc. Aragonesa Ci. Nat. **9: 130. 1910. [Sect. *Platyglottis* BUNGE]**

Plants perennial, covered with white, in lower parts of stem below the nodes sometimes also with darker hairs 1.5–3 mm long. Rootstock up to 10 mm thick, with short, branched, subterranean stolons. Stems 5–26 cm long, up to 3 mm thick, prostrate to ascending, densely covered with ± spreading, somewhat rigid hairs. Stipules greenish-membranous to green, 5–9 mm long, those of lower leaves ovate, those of upper leaves narrowly triangular, acute, adnate to the petiole for 2 mm, free from each other, sparsely, at the margins densely hairy. Leaves 5–10 cm long; petiole short, 0.5–1.5 cm long, like the rachis rather densely spreadingly hairy. Leaflets in 6–10 pairs, elliptic to obovate, 6–15 × 3–8 mm, rounded to slightly emarginate, bluish green, on upper side glabrous, on underside sparsely to loosely, at the midvein more densely nearly spreadingly hairy. Inflorescences in upper part of the stem. Peduncles 2–5 cm long, often recurved, hairy like the stem. Racemes loosely 3–6-flowered. Bracts whitish to greenish, 3–6 mm long, narrowly triangular, white hairy. Pedicels 1–3 mm long, white hairy. Calyx 8–11 mm long, tubular, sparsely to loosely white hairy; teeth subulate, 4–4.5 mm long, more densely hairy than tube. Petals yellow. Standard 17–20 mm long; blade 6–7 mm wide, narrowly rhombic, tongue-like narrowed

toward the obtuse to slightly emarginate tip, cuneately narrowed at the base. Wings 12–15 mm long; blades narrowly oblong, rounded, 7–9 × 1.5–2 mm; auricle ca. 1.5 mm, claw 5–6 mm. Keel 10–12 mm long; blades narrowly oblong, curved, with widely curved lower edge and concave upper edge, obtuse, ca. 5 × 2 mm; auricle 0.5–1 mm, claw 5–7 mm. Stamen-tube slightly obliquely cut at the mouth. Ovary sessile, hairy; style glabrous. Legumes sessile, narrowly oblong, curved, 15–25 mm long, 4–5 mm high and 7–9 mm wide, obtusely keeled ventrally, widely and deeply grooved dorsally, shortly acuminate, bilocular; valves coriaceous, straw-coloured to brownish, often blackish when fully ripe, smooth to finely warty-wrinkled, densely villous with spreading hairs, slightly glabrescent with age. Flowering time: 5. Distribution: Spain (Prov. Murcia). Hs.

20. *Astragalus peregrinus* VAHL, Symb. Bot. **1: 57. 1790. (*A. kuphoensis* GAND.). [Sect. *Platyglottis* BUNGE]**

Plants annuals or short living perennials, branched at the base, covered with rather rigid hairs 0.5–2(–3) mm long. Stems several, prostrate to ascending, covered with spreading white, at the nodes and in upper part of the stem also with black hairs, glabrescent with age, especially in basal parts. Stipules green, 4–10 mm long, narrowly triangular-acuminate, adnate to the petiole for ca. 1 mm, free from each other or connate behind the stem for 0.5–1 mm. Leaves 2–11 cm long, sessile or with a petiole up to 1.5 cm long; rachis covered with spreading white hairs, rarely with few black hairs mixed in. Leaflets in (6–)8–11 pairs, elliptic to obovate, 3–10 × 2–5 mm, emarginate, more rarely rounded to truncate, on upper side glabrous, on underside sparsely to loosely covered with ascending white hairs, especially at the midvein. Peduncles 1–5(–9) cm long, with spreading white, toward the raceme also black hairs. Racemes rather densely 3–5-flowered. Bracts green, 3–6 mm long, narrowly triangular, with white and black hairs, more rarely with merely white or merely black hairs. Pedicels 2–3 mm long, hairy. Calyx (7–)8–12 mm long, shortly tubular, straw-coloured or brown- to purple-suffused, with white and black hairs, more rarely with

merely white or merely black hairs; teeth narrowly triangular, 3–5(–6) mm long. Petals (in life) pale violet to pale purple. Standard 15–19 mm long; blade 6–8 mm wide, rhombic-elliptic, in distal part tongue-like narrowed, at the base cuneately narrowed. Wings 12–14 mm long; blades narrowly oblong, rounded, 6–7 × 2–2.5 mm; auricle 1.5–2 mm, claw 5–7 mm. Keel 11–12 mm long; blades obliquely oblong, with in distal part nearly rectangularly curved lower edge and straight upper edge, subacute, 5–7 × 2–3.5 mm; auricle acute, 0.5–1 mm long, claw 5–7 mm. Stamen-tube ± truncate at the mouth. Ovary sessile, hairy; style glabrous. Legumes sessile, narrowly oblong, straight or slightly curved, widest near the base, (14–)20–50(–55) mm long, 4–5 mm high and 6–8 mm wide, obtusely keeled ventrally, rather widely and deeply grooved dorsally, with a straight beak 1(–5) mm long, incompletely bilocular (septum distinctly developed only in the middle part and here 1/3–3/4 of the fruit's height); valves hard, reticulately nerved and minutely warty, rather densely villous. Fruits opening late and only at the tip. Seeds 3–4.5 × 2–4 mm, pale yellowish, wrinkled-pitted, dull.

The species can be divided into two geographically separated subspecies.

20a. *Astragalus peregrinus* subsp. *peregrinus*

Plants annual, rarely short living perennials. Legumes (28–)35–50(–55) mm long. Distribution: Crete (Isle of Kupho). Cr. [North Africa, Near East].

20b. *Astragalus peregrinus* subsp. *warionis* (GAND.) MAIRE, Bull. Soc. Hist. Nat. Afr. Nord 39: 133. 1948. (*A. warionis* GAND.)

Plants are short-living perennials. Legumes (14–)20–33(–40) mm long. Distribution: Sicily (Isola Linosa). Si. [North Africa].

21. *Astragalus verrucosus* MORIS, *Stirpium sardoarum elenchus* 1: 12. 1827. [Sect. *Platyglottis* BUNGE]

Plants perennial, in the youth densely, later on sparsely to loosely covered with straight or curved hairs 0.3–1.5 mm long, glabrescent with age. Rootstock branched. Stems several, 10–50(–100) cm long, prostrate to ascending, covered with white, near the nodes

also with black hairs. Stipules greenish-membranous, 5–11(–14) mm long, narrowly triangular, acuminate, adnate to the petiole for 1–2 mm, behind the stem vaginate-connate for 2–5 mm, loosely covered with appressed to ascending white or white and black hairs. Leaves 6–12 cm long; petiole 1.3–2.5 cm long or sometimes very short, like the rachis sparsely to loosely covered with ascending to spreading white hairs, sometimes with black hairs mixed in, often strongly glabrescent with age. Leaflets in 8–12 pairs, narrowly ovate to narrowly obovate, 6–19 × 4–8 mm, retuse to emarginate, on upper side glabrous, on underside hairy especially at the midvein and the margins. Peduncles 1.5–5.5 cm long, at the base white, toward the raceme white and black hairy. Racemes loosely 5–8-flowered. Bracts greenish, 4–7 mm long, narrowly ovate-acuminate, white and black hairy. Pedicels ca. 1 mm long, white and black or black hairy. Calyx 9–11 mm long, shortly tubular, green, white and black hairy; teeth (2–)3–5 mm long. Petals (in life) pink-violet. Standard 16–18 mm long; blade 7–8 mm wide, rhombic, tongue-like narrowed in distal part, gradually cuneately narrowed at the base. Wings 13–15 mm long; blades narrowly oblong, obtuse, ca. 8 × 2–3 mm; auricle 1.5–2 mm, claw 6–7 mm. Keel 12–14 mm long; blades obliquely elliptic, with in distal part widely rectangularly curved lower edge and nearly straight upper edge, subobtuse; auricle 0.5–1 mm, claw 5–7 mm. Ovary sessile, sparsely hairy; style glabrous. Legumes sessile, ovoid, strongly upcurved, 20–25 mm long, 4–5 mm high and 10–14 mm wide, flattened with thickened nerve ventrally, widely and shallowly grooved dorsally, with a curved beak 2–3 mm long, nearly unilocular; valves hard, coriaceous, slightly wrinkled to strongly warty, sparsely covered with ascending hairs. Occurrence: on sand near the sea. Distribution: Sa.

Note: A very rare and highly endangered species occurring only near Flumentorgiu.

22. *Astragalus maritimus* MORIS, Fl. Sardoia 1: 523. 1837. [Sect. *Drepanodes* BUNGE]

Plants sparsely to loosely covered with flattened, curly, white, at the nodes of stems and in the inflorescence also with black hairs 0.1–0.5 mm long. Stems mostly several, 4–40 cm

long, prostrate to ascending, slightly angular-sulcate, very sparsely to loosely appressed hairy. Stipules membranous, 4–7 mm long, at the margins sparsely white and black ciliate, rarely hairy outside, adnate to the petiole for ca. 1 mm, behind the stem vaginate-connate up to the middle or higher up, the free tips narrowly triangular, acuminate. Leaves 5–15 cm long; petiole 1–3 cm long, like the rachis slightly flattened from upper side, sparsely to loosely hairy. Leaflets in (5–)7–14 pairs, glaucous, ovate to obovate, 6–16 × 4–10 mm, retuse or more rarely rounded, glabrous on upper side, on underside hairy at the margin and at the middle nerv. Peduncles 2–7 cm long, hairy like the stem. Racemes up to 10 cm long, remotely (2–)6–12-flowered; axis partly black hairy. Bracts membranous, 2–4 mm long, narrowly ovate, black hairy. Pedicels 1–2 mm long, hairy. Calyx 8–10 mm long, widely tubular, loosely covered with very short, mostly black hairs; teeth unequal, the three lower ones narrowly triangular, the two upper ones distinctly wider, all 3–4 mm long, distinctly shorter than the tube. Petals pink violet. Standard 17–20 mm long; blade 7–9 mm wide, elliptic, slightly tongue-like narrowed upward, slightly retuse, narrowed into the short, cuneate claw, slightly upcurved above the claw. Wings 13–15 mm long; blades narrowly oblong, rounded, 7–8 × 2.5–3 mm; auricle 1.5–2 mm, claw 6–7 mm. Keel ca. 12 mm long; blades obliquely obovate, with in distal part widely rectangularly curved lower edge and S-like curved upper edge, subobtuse, ca. 6 × 3–3.5 mm; auricle acute, ca. 1 mm, claw ca. 6 mm. Stamen-tube slightly obliquely cut at the mouth. Ovary sessile, hairy; style glabrous. Legumes sessile, linear, strongly curved to nearly in a circle, 20–25 mm long, 3–3.5 mm high and 5–6 mm wide, with a prominent keel-like nerve ventrally, very widely and deeply grooved dorsally, widely triangular in cross-section, shortly acuminate, incompletely bilocular (septum 3/4 of fruit's height, toward the tip of fruit reduced and often nearly vanishing); valves thin, tough, straw-coloured to brownish, often dirty grey violet suffused, loosely to rather densely shortly appressed hairy, often nearly glabrous when ripe. Fruit opening at the ventral suture, later on also at the backside. Flowering time: 4–5. Oc-

currence: near the coast on travertine-crusts. Distribution: Sardinia, Isola di S. Pietro (very local between Cala dello Spalmatore and Punta dei Cannoni).

Perennial species with basifixed hairs

23. *Astragalus frigidus* (L.) A. GRAY, Proc. Amer. Acad. Arts 6: 219. 1864. (*Phaca frigida* L.; *A. pubescens* SCHRANK.) [Sect. *Cenantrum* BUNGE]

Plants 8–35 cm tall, mostly nearly glabrous, hairs 0.3–0.5 mm long. Rootstock branched, often with ± long, slender stolons covered with scaly stipules. Stems solitary or several, erect or ascending at the base, at the base 2–5 mm in diameter, slightly sulcate, covered in the lower part with scaly stipules, glabrous or more rarely sparsely hairy, especially at the nodes. Stipules green, often quickly becoming pale, 10–20 mm long, ovate to narrowly ovate to oblong, dilatated at the base into an auricle like outgrowth, obtuse to subacute, with a ± distinct net of nerves, free, glabrous or sometimes sparsely ciliate. Leaves 5–15 cm long; petiole 1–3 cm long, like the rachis glabrous or very sparsely to sparsely appressed white hairy. Leaflets in (3–)4–6(–8) pairs, narrowly ovate to narrowly elliptic, 15–35(–45) × 7–17(–19) mm, rounded to subacute, dark green on upper side, glabrous or rarely very sparsely hairy, on underside light grey-green with a distinct darker net of nerves, sparsely or more rarely loosely appressed hairy or rarely nearly glabrous. Peduncles 5–10 cm long, slightly sulcate, sparsely, toward the raceme more densely appressed black hairy, more rarely nearly glabrous. Racemes rather densely 5–20-flowered; axis black hairy or more rarely nearly glabrous. Bracts greenish, 5–10 mm long, narrowly ovate, at the margins and toward the tip sparsely covered with white and predominantly black hairs. Pedicels 2–3 mm long, erect, black hairy. Calyx shortly tubular, 6–9 mm long, slightly gibbous at the base, obliquely cut at the mouth, yellowish, in basal part glabrous or very sparsely hairy, toward the teeth more densely, sometimes only at the teeth black hairy; teeth equal, triangular, 0.3–1 mm long, black hairy, sometimes with white hairs mixed in, black hairy on inner side. Petals

pale yellow. Standard 14–17 mm long; blade obovate to nearly orbicular, ca. 8 mm wide, deeply emarginate, narrowed at the base into a long, widely cuneate claw. Wings 13–16 mm long; blades narrowly oblong, rounded, 5–8 × 2–2.2 mm; auricle 1–1.5 mm, claw 8–9 mm. Keel 13–15 mm long; blades triangular-elliptic with widely rectangularly curved lower edge and slightly sigmoid upper edge, subacute, 5–7 × 3–3.5 mm; auricle wide, 0.5–1 mm, claw 8–9 mm. Stamen-tube strongly obliquely cut at the mouth. Ovary with a hairy stipe 5–6 mm long, black hairy. Legumes with a stipe up to 8 mm long, pendulous, narrowly ellipsoid, acuminate at both ends, 10–25 mm long, 3–4 mm high and 5–7 mm wide, ventrally and dorsally flat, unilocular; valves membranous, sparsely to loosely or rather densely covered with very short appressed black hairs, more rarely also with white or only with white hairs, sometimes also glabrous (glabrous and hairy pods in the same population and even in the same plant). Occurrence: subalpine and alpine zone, up to 3,100 m. Distribution: Au, Cz, Fe, Ga, Ge, He, It, No, Po, Su. [Russia, Mongolia, China, Japan].

24. *Astragalus penduliflorus* LAM., Fl. Franc. 2: 636. 1779. (*Phaca alpina* L.). [Sect. *Cenantrum* BUNGE]

Plants 10–50 cm tall. Rootstock long, taperroot-like, up to 10 mm in diameter, with a pluricipital root-crown. Hairs in vegetative parts white, 0.2–1 mm long, appressed to slightly ascending. Stems mostly several, ascending to mostly erect, up to 5 mm in diameter, mostly hollow, finely striate to sulcate, loosely hairy, sometimes partly glabrescent, in the leaf axils often with short non-flowering shoots. Stipules greenish, soon turned to yellowish, linear, acute to narrowly ovate, free, 7–11 mm long, hairy especially toward the margins. Leaves 3–10 cm long, sessile; rachis slender, often curved, loosely appressed hairy. Leaflets in (4–)7–11 pairs, narrowly oblong to narrowly elliptic, 5–23 × 1–9 mm, rounded and often minutely mucronulate, glabrous or sparsely hairy on upper side, loosely to rarely more densely hairy on underside, with a mostly distinct, darker, fine network of nerves. Peduncles in the upper part of the stem, 4–9 cm long, erect or obliquely ascend-

ing, loosely covered with short black and white, toward the raceme sometimes increasing black hairs. Racemes 6–14-flowered, rather dense at anthesis, later on looser and elongating. Bracts whitish, linear, acute, 2–5 mm long, white and black hairy; flowers ± horizontal to pendulous. Pedicels 3–5 mm long, dark, black hairy. Calyx 4–6(–7) mm long, obliquely campanulate, obliquely gibbous at the base, obliquely cut at the mouth, loosely covered with with very short, predominantly black, appressed or slightly ascending hairs; teeth 0.5–1.5 mm long, linear to narrowly triangular, acute, black hairy on inner side. Petals yellow. Standard 10–11.5 mm long; blade 7–9 mm wide, very widely obovate to or nearly orbicular, widely rounded and distinctly emarginate, narrowed at the base into the long, widely cuneate claw. Wings 10–11 mm long; blades narrowly oblong, rounded, 4.5 × 2 mm; auricle ca. 1 mm, claw 5–6 mm. Keel 10–11 mm long; blades obliquely elliptic curved, with widely curved lower edge and concave upper edge, 4–5 × 2–2.5 mm; auricle ca. 0.5 mm, claw 5–6 mm. Stamen-tube nearly truncate at the mouth. Ovary with a stipe 4–5 mm long, white hairy; style slender, glabrous. Legumes erect to pendulous, with a slender stipe up to 8 mm long, obliquely elliptic to nearly semicircular examined from the side, with widely curved dorsal side and ± straight so slightly concave ventral side, inflated, (12–)15–30 mm long, 7–10 mm in diameter, slightly keeled to nearly rounded ventrally and dorsally, shortly acuminate at both ends, unilocular; valves thinly membranous, light brown to straw-coloured, thinly but distinctly netlike nerved, sparsely to loosely covered with very short, appressed black hairs. Flowering time: 6–7. Distribution: Au, Cz (Slovakia), Ga, Ge, He, Hs, It, Ju (Slovenia), Po, Rm, Su.

25. *Astragalus glycyphylloides* DC., Prodr. 2: 292. 1825. [*A. glycyphyllos* L. subsp. *glycyphylloides* (DC.) MAIRE & PETITM.; *A. petrovicii* VELEN.] [Sect. *Glycyphyllus* BUNGE]

Similar to *A. glycyphyllos* but stems erect, stipules from narrow base long acuminate. Plants in the inflorescence, mainly at the calyx black hairy, sometimes also with scattered black hairs at the stems and rachides.

Hairs at stems and lower side of leaflets mostly denser and very often nearly spreading. Bracts with few minute glands at the base. Bracteoles mostly present, filiform, 0.5–1 mm long, in upper part of pedicels or at the base of calyx. Petals mostly dirty violet brown when dry. Legumes 15–20 mm long, ± straight, mostly more densely hairy. Flowering time: 6. Occurrence: oak-forests, 1,100–2,850 m. Distribution: Al, Bu, Gr, Ju (Bosnia, Serbia, Macedonia). [Ukraine, Caucasus, Turkey, Iran].

26. *Astragalus glycyphyllos* L., Sp. Pl.: 758. 1753.
[Sect. *Glycyphyllus* BUNGE]

Plants very scarcely furnished with appressed white hairs 0.2–0.4(–0.5) mm long, in the inflorescence region sometimes also with black hairs (especially in the eastern and southeastern part of its area). Rootstock long, thick, with a pluricipital root-crown. Stems mostly several, 40–80(–150) cm long, prostrate to ascending, strong, angular-sulcate, often branched, at the nodes mostly strongly zik-zak-like bent, very sparsely hairy to completely glabrous. Stipules green, 8–20 mm long, from triangular base acuminate, the upper ones mostly more narrow, glabrous or with scattered cilia at the margin, free and not or the lowest ones very shortly adnate to the petiole. Leaves 7–18 cm long, sessile or subsessile, like the rachis sparsely hairy. Leaflets in (3–)4–6(–7) pairs, 20–50 × 10–25(–30) mm, ovate to elliptic, narrowly to widely rounded, more rarely acutish, mostly minutely mucronulate, on upper side vividly green, glabrous, on underside bluish-green, scarcely hairy. Peduncles mostly in all leaf axils, 2–8 cm long, hairy like the stem. Racemes loosely many-flowered. Bracts membranous, narrowly triangular, acute, 2–3 mm long, ciliate, at the base densely furnished with minute glands. Pedicels 1–1.5 mm long, glabrous or hairy. Bracteoles absent. Calyx 5–6 mm long, obliquely campanulate, obliquely cut at the mouth, sparsely hairy to glabrous; teeth unequal, the lower three subulate, 2–3 mm long, close together, the upper two narrowly triangular, 1–1.5 mm long, distant. Petals pale greenish-yellow, in dry state often violet-suffused. Standard 12–14 mm long, above the claw slightly curved upward; blade widely elliptic, 7–8 mm wide, distinctly emar-

ginate, at the base subabruptly contracted into the short claw. Wings 11–13 mm long; blades narrowly oblong, obtuse to laterally slightly emarginate, 6–7 × 1.8–2.2 mm; auricle 1.5–2 mm, claw 5–6 mm. Keel 10–11 mm long; blades obliquely obovate-triangular, with in upper part widely curved lower edge and ± straight upper edge, subobtuse, ca. 5 × 3 mm; auricle distinct, claw 5–6 mm. Stamen-tube strongly obliquely cut at the mouth. Ovary subsessile, glabrous or sparsely hairy; style short, thickish, glabrous. Legumes subsessile or with a stipe up to 3 mm long, linear, erect, mostly slightly curved, 30–40 mm long, 4–5 mm high and 5–5.5 mm wide, keeled ventrally, widely and deeply grooved dorsally, attenuate into a short beak, bilocular; valves thin, tough, brownish to ochre-brown, very finely across-veined, glabrous or with scattered minute hairs. Flowering time: 5–8. Occurrence: 50–1,870 m. Distribution: Al, Au, Be, Br, Bu, Co, Cz, Da, Fe, Ga, Ge, Gr, Hb, He, Ho, Hs, Hu, It, Ju, Lu, No, Po, Rm, Su. [Baltic States, Moldavia, Ukraine, Russia, Caucasus, Turkey, Iran, Kazakhstan].

27. *Astragalus depressus* L., Cent. Pl. 2: 29. 1756
[et in *Amoen. Acad.* 4: 327].
(*A. helminthocarpus* VILL.; *A. leucophaeus* SM.; *A. bonannii* J.PRESL & C.PRESL). [Sect. *Tapinodes* BUNGE]

Plants caespitose, acaulescent to shortly caulescent, with thick but thin-walled, scabrous, rigid, straight to curved or bent white, in the inflorescence also with black hairs 0.5–0.8 mm long. Rootstock up to 10 mm thick, with a pluricipital root-crown, branched with short or sometimes elongated subterranean stolons. Stems missing or very short, rarely up to 10 cm long, prostrate to ascending, glabrous. Stipules whitish-membranous, obliquely inserted at the stem, free from petiole, 3–10 mm long, from the widely ovate base shortly acuminate or widely rounded, ciliate, the upper ones sometimes also hairy at the tip. Leaves 3–22 cm long; petiole shorter or nearly as long as the blade, like the rachis loosely to rather densely covered with appressed to tangled spreading hairs. Leaflets in 5–15 pairs, 3–10 × 2–6 mm, triangular-obovate, rounded to emarginate at the wide tip, dull olive-green, on upper side glabrous or hairy toward the margins, on lower

side loosely to very densely covered with subappressed, rarely nearly spreading hairs, flat or sometimes folded. Peduncles 0.3–8 cm long, hairy like the rachis. Racemes densely to loosely 15–25-flowered. Bracts white-membranous, 3–6 mm long, narrowly triangular, mostly black ciliate. Pedicels 0.3–1.5 mm long, hairy. Bracteoles linear 1–1.5 mm long, in upper part of the pedicel. Calyx tubular-campanulate, 4–7.5 mm long, whitish, loosely covered with ascending white and black, but mostly with predominantly black hairs; teeth 1–3.5 mm long, subulate. Petals whitish, at the tip, often bluish suffused, keel mostly bluish. Standard (7–)10–12 mm long; blade elliptic to obovate, (3.5–)5–6.2 mm wide, widely rounded to distinctly emarginate, gradually narrowed in the cuneate claw. Wings (6–)7.5–10 mm long; blades narrowly oblong, often somewhat dilated upward, rounded or truncate, 4.5–6 × 1.8–2.5 mm; auricle 0.6–1 mm, claw (2.5–)3–4 mm. Keel (5–)7–9 mm long; blades triangular-obovate, with in upper third widely rectangularly curved lower edge and ± straight upper edge, subacute, 4 × 2.2–2.5 mm; auricle minute, claw 3–5 mm. Stamen-tube slightly obliquely cut at the mouth. Ovary sessile, very shortly hairy; style short, thickish, glabrous. Legumes sessile, mostly nodding, linear, slightly curved or straight, acuminate at both ends, 6–18 mm long, 2.5–3 mm high and wide, keeled ventrally, ± rounded dorsally, with a short beak, incompletely bilocular, the septum ca. 2/3 of the fruits high; valves covered with short, often curved, appressed or rarely nearly spreading hairs, often glabrescent with age. Flowering time: 4–7. Occurrence: on all kind of soils, but mainly on limestone, 900–2,500 m. Distribution: Al, Bu, Cr, Ga, Gr, He, Hs, It, Ju, Rm, Si. [Turkey, North Africa].

28. *Astragalus australis* (L.) LAM., Fl. France 2: 637. 1778. (*Phaca australis* L.; *A. helveticus* (HARTM.) O.SCHWARZ; *A. krajinae* DOMIN). [Sect. *Hemiphragmium* BUNGE]

Plants up to 40(–60) cm tall, sparsely hairy or subglabrous, rarely ± densely hairy, with appressed white, in the inflorescence also black hairs 0.15–0.5 mm long. Rootstock strong, with a pluricipital root-crown, strongly branched with short, more rarely elongated stolons.

Stems prostrate to ascending, 8–30(–50) cm long, terete to angular-sulcate, sparsely hairy to glabrous. Stipules green, soon brownish drying up, the lower ones 4–5 mm long, triangular to ovate, acute, shortly adnate to the petiole, behind the stem ± high up vaginate-connate, the upper ones longer, up to 10 mm long, narrowly triangular, free from petiole and from each other, glabrous or ciliate at the margins, rarely hairy. Leaves (2–)4–10 cm long; petiole 0.5–1.5 cm long, like the rachis sparsely to loosely hairy. Leaflets in (4–)5–8 pairs, narrowly elliptic to narrowly ovate or ovate, 6–16(–25) × 2–5(–8) mm, flat, subacute, glabrous or at the lower side sparsely hairy, rarely hairy on both sides. Peduncles 4–14 cm long, angular-sulcate, at the base often glabrous, toward the raceme increasingly predominantly white hairy. Racemes at anthesis capitate, rather densely 8–16-flowered, at fruiting time distinctly elongated. Bracts whitish, narrow, 2–3(–5) mm long, black hairy. Pedicels 1–2.5 mm long, black hairy. Calyx 4–7 mm long, campanulate, obliquely cut at the mouth, loosely to rather densely predominantly black hairy; teeth subulate, unequal, 0.5–2(–2.5) mm long. Petals yellowish white to whitish, with violet-tipped keel. Standard 12–13(–15) mm long; blade slightly curved upward above the claw, obovate, 6.5–7 mm wide, slightly emarginate, cuneately narrowed at the base. Wings 10.5–11 mm long; blades narrowly oblong, somewhat dilated upward, deeply incised and nearly bilobed, including the claw slightly curved, ca. 6 × 2.5 mm; auricle narrow, 1.5–1.8 mm, claw ca. 5 mm. Keel 8–9 mm long; blades triangular with widely rectangularly curved lower edge and ± straight upper edge, rounded, 4–4.5 × 2–2.5 mm; auricle acute, ca. 0.5 mm, claw ca. 4 mm. Stamen-tube slightly obliquely cut at the mouth. Ovary with a stipe 2–3(–8) mm long, glabrous. Legumes with a stipe 4–8 mm long, nearly erect to obliquely spreading, more rarely nodding, obliquely ellipsoid, attenuate at both ends, 10–30 mm long, 4–9(–12) mm high and 4–6 mm wide, rounded ventrally, shallowly grooved dorsally, with a short beak, nearly completely unilocular, with a septum up to 1 mm wide; valves thin, brown, glabrous. Flowering time: 7–8. Occurrence: predominantly on limestone, but also on schists,

silicate, 1,800–2,600(–3,120) m. Distribution: Au, Bu, Cz (Slovakia), Ga, Ge, He, Hs, It, Ju (Slovenia, Serbia), Po, Rm. [Russia, Ukraine, Kazakhstan, Mongolia].

29. *Astragalus norvegicus* GRAUER, Pl. minus cogn. decuria: 13. 1784. (*A. oroboides* HORNEM. *Phaca lapponica* DC.; *A. arcticus* BUNGE; *A. alpinus* subsp. *arcticus* LINDM.). [Sect. *Hemiphaca* BUNGE]

Plants 20–45 cm tall, sparsely hairy with hairs 0.1–0.2 mm long. Stems 13–34 cm long, angular-sulcate, glabrous or with scattered hairs only. Stipules greenish, 3–7 mm long, triangular to ovate, the upper ones narrowly triangular, all free from petiole and from each other, glabrous. Leaves 5–8 cm long, the lower ones with a petiole up to 1.5 cm long, the upper ones subsessile; rachis sparsely furnished with subappressed, mainly black hairs. Leaflets in 5–7 pairs, narrowly ovate to ovate, 8–25 × 5–10 mm, rounded, on upper side glabrous, on underside sparsely covered with appressed white hairs, sometimes subglabrous. Peduncles several, 5–20 cm long, erect, slightly angular-sulcate, very sparsely black hairy to subglabrous. Racemes ovoid or oblong, 2.5–5 cm long, rather densely 10–20-flowered. Bracts whitish-membranous, narrowly triangular, 1.5–2.5(–3) mm long, sparsely hairy, at the base with some sessile, minute glands. Pedicels 1–2 mm long, erect, strongly recurved in upper part, flowers therefore spreading or the lower ones nodding, black hairy. Calyx 5–6 mm long, campanulate, obliquely cut at the mouth, rather densely covered with appressed black hairs 0.1–0.2 mm long, sometimes with white hairs mixed in; teeth narrowly triangular, 0.5–1 mm long, densely hairy on inner side. Petals pale lilac. Standard 11–12 mm long; blade 7 mm wide, obovate, emarginate, at the base gradually cuneately narrowed. Wings ca. 10 mm long; blades narrowly oblong, rounded, 6 × 1.5 mm; auricle 1.5 mm, claw 4 mm. Keel 8 mm long; blade obliquely elliptic, with widely curved lower edge and slightly curved upper edge, subobtuse, 3.5 × 2 mm; auricle indistinct, claw ca. 4 mm. Stamen-tube truncate at the mouth. Ovary with a stipe ca. 1 mm long, hairy; style glabrous. Legumes subsessile or with a stipe 1–1.5 mm long, nodding, ovoid to

ellipsoid, 6–8 mm long, ca. 3 mm high and 4 mm wide, obtusely keeled ventrally, shallowly grooved dorsally, abruptly shortly acuminate, mostly with persistent style, incompletely bilocular (septum 1/2–2/3 of the fruit's height); valves thin, densely very densely covered with subappressed to ascending black hairs 0.1–0.3 mm long. Flowering time: 7–8. Distribution: Au, Cz (Slovakia), No, ?Rm, Su. [Russia, Mongolia].

30. *Astragalus alpinus* L., Sp. Pl.: 760. 1753. (*Phaca astragalina* DC.). [Sect. *Komaroviella* GONTSCH.]

Plants caespitose, 5–20(–35) cm tall, with ± appressed, mostly white and black, in the inflorescence predominantly black hairs 0.1–0.3 mm long. Rootstock slender to strong, with a pluricipal root-crown, branched, with short or elongated, slender subterranean stolons. Stems several to many, slender, prostrate to ascending, 1–15(–30) cm long, sparsely to loosely hairy. Stipules greenish, often soon becoming brownish, 1.5–6 mm long, free from or very shortly adnate to the petiole, the lower ones vaginate connate behind the stem highly up, the upper ones shortly vaginate-connate to nearly free from each other, ciliate at the margins. Leaves 2–8(–12) cm long; petiole 0.5–4 cm long, with the slender rachis hairy like the stem. Leaflets in 7–12 pairs, narrowly elliptic, (3–)5–15(–20) × (1.5–)2–5(–7) mm, rounded to slightly retuse, mostly minutely mucronulate, on upper side glabrous or sparsely hairy, on underside side somewhat more densely hairy, more rarely rather densely hairy on both sides. Peduncles 3–8(–15) cm long, erect, sparsely to loosely covered with white and black, toward the raceme often with predominantly or merely black hairs. Racemes at anthesis capitate, densely 5–15-flowered, somewhat elongated at fruiting time. Bracts whitish or more rarely greenish, 0.5–2 mm long, narrowly triangular, black hairy. Pedicels 0.5–1 mm long, black hairy. Calyx campanulate, 4–6 mm long, appressed black hairy; teeth 1–3 mm long. Petals violet, standard at the base whitish, violet toward the tip, often yellow when dry, especially in chinese material. Standard 9–13 mm long; blade 6–7.5 mm wide, rhombic-elliptic to widely elliptic, widely and deeply emarginate, at the

base narrowed into the short, widely cuneate claw. Wings whitish, 7–11 mm long, distinctly shorter than standard and keel; blades narrowly oblong, rounded, 5–8 × 2–2.5 mm; auricle narrow, ca. 1 mm, claw 3–4 mm. Keel whitish with violet tip, 9–12 mm long, ± as long as the standard, shorter or longer than the wings; blades triangular, with in the middle widely nearly rectangularly curved lower edge and ± straight upper edge or elliptic-curved with widely curved lower edge and concave upper edge, obtuse, 6–8 × 3–3.5 mm; auricle acute, ca. 1 mm, claw ca. 3 mm. Stamen-tube truncate at the mouth. Ovary with a glabrous or hairy stipe 3–4 mm long, densely covered with hairs white or white and black hairy, changing to black with age; style glabrous. Legumes nodding, with a stipe 2–5 mm long, ellipsoid, straight to slightly curved, 8–10 mm long, 3.5–4 mm high and ca. 3 mm wide, keeled ventrally, deeply grooved dorsally, with a short beak, unilocular to incompletely bilocular; valves thin, loosely to densely covered with appressed to ascending or partly spreading black hairs 0.1–0.3 mm long. Flowering time: 6–7. Distribution: Au, BR, Cz (Slovakia), Fe, Ga, Ge, He, Hs, It, Ju (Slovenia), No, Po, Rm, Su. [Caucasus, Middle Asia, China].

31. *Astragalus bourgaeanus* Coss., Not. Plant. Crit. 3: 160. 1852. [Sect. *Hypoglottidei* DC.]

In flowering state extremely similar to *A. glaux*. The plants have in vegetative parts mostly fewer black hairs than *A. glaux*, the leaflets are in 8–11(–14) pairs (11–15 pairs in *A. glaux*). The peduncles are shorter: 0.5–3(–4) cm long in opposite to 1–9 cm in *A. glaux*. The blades of the keel are subacute and not widely rounded as in *A. glaux*. The legumes are quite different: narrowly oblong, 10–16 mm long, 3–3.5 mm high and 3 mm wide, keeled ventrally, deeply grooved dorsally, rounded at the base, acuminate with a hooked beak, completely bilocular; valves densely subappressed white hairy. Seeds 4–5 in each locule. Flowering time: 4–5. Distribution: Hs [North Africa].

32. *Astragalus cicer* L., Sp. Pl.: 757. 1753. [Sect. *Hypoglottidei* DC.]

Plants up to 80 cm tall, with appressed to ascending, somewhat rigid hairs 0.25–0.3 mm

long. Rootstock strongly branched, with subterranean stolons, which are terminating in only one stem. Stems (5–)25–60 cm long, often strong, finely striate, prostrate to ascending, simple, often zig-zag-like bent, rather sparsely covered with white hairs, often with black hairs mixed in. Stipules green, 3–10 mm long, narrowly triangular, acuminate, free from petiole, behind the stem shortly to up to the middle vaginate-connate, those of upper leaves sometimes free from each other, ciliate and sparsely hairy. Leaves (6–)9–20 cm long, sessile; rachis covered with ascending white hairs. Leaflets in (8–)10–15 pairs, narrowly ovate to narrowly elliptic, 5–38 × 3–13 mm, rounded to acute, mostly shortly mucronulate, grey-green, on both sides often with darker nerves, which are often impressed at upper side, on upper side sparsely hairy to subglabrous, on underside more densely covered with subappressed to ascending hairs. Peduncles erect, 4–16 cm long, white, toward the raceme increasingly black hairy. Racemes capitate to oblong, 4–6 cm long, rather densely many-flowered. Bracts linear, acute, 6–9 mm long, white and black hairy. Pedicels 0.5–1 mm long. Calyx shortly tubular, 7–9(–10) mm long, loosely appressed black hairy; teeth slightly unequal, narrowly triangular, 1–3(–4.5) mm long. Petals pale yellow. Standard (13–)14–16(–18) mm long; blade elliptic, 6–7 mm wide, ± deeply emarginate, at the base long cuneately narrowed. Wings (10–)11–13(–16) mm long; blades narrowly oblong, rounded, 6–7 × 2 mm; auricle round, 1–1.5 mm, claw ca. 7 mm. Keel (9–)10–12(–13) mm long; blades obliquely oblong to obliquely obovate, with in upper third widely rectangularly curved lower edge and nearly straight upper edge, rounded or very shortly acuminate, 4–5(–6) × 2.2(–3) mm; auricle minute, acute, claw 6–8 mm. Stamen-tube truncate at the mouth. Ovary sessile, ovoid, densely white-villous; style hairy in the basal part. Legumes sessile, very widely inflated, globular to ovoid-triangular with nearly cordate base, acuminate into the straight or slightly curved beak 1–3 mm long, 10–13(–15) mm long, 5–6 mm high and 8–13 mm wide, grooved ventrally and dorsally, bilocular; valves thin, blackish-brown if ripe, finely warty, loosely covered with ± spreading white or greyish hairs up to 1.5 mm long and

sitting on little tubercles, furthermore with mostly appressed blackish hairs up to 0.5 mm long. Flowering time: 6–8. Occurrence: On all kind of soils. Distribution: Au, Be, Bu, Cz, Ga, GE, He, Hs, Hu, It, Ju (Croatia, Serbia), Po, Rm [East Europe, Caucasus, Turkey].

Originally Mediterranean and from East Europe. Today introduced in many places of the world and naturalized.

33. *Astragalus danicus* RETZ., Obs. bot. 2: 41. 1783. [Sect. *Hypoglottidei* DC.]

Plants up to 30 cm tall, with \pm appressed to more rarely ascending, often slightly curved hairs 0.3–0.5 mm long. Rootstock slender, with a pluricipital root-crown, sometimes with short subterranean stolons. Stems mostly several, slender, 4–30 cm long, prostrate to ascending or erect, often curved, greenish or often brown to reddish brown, glabrous in lower part, toward the top more and more white hairy, below the stipules mostly with spreading black hairs. Stipules whitish-membranous, the lower ones ca. 2 mm long, glabrous, the upper ones up to 5 mm long, greenish-tipped, free from petiole, behind the stem highly up vaginate-connate with short free tips, ciliate and sparsely hairy. Leaves 2.5–6(–8) cm long; petiole 0.5–1.5(–2) cm long, like the rachis loosely white and also black hairy. Leaflets in 6–12 pairs, narrowly ovate to elliptic, more rarely linear, 2–12 \times 0.5–4 mm, rounded, on both sides sparsely to loosely hairy or on upper side nearly glabrous. Peduncles one or more rarely two in one stem, 1–10(–15) cm long, in lower part sparsely covered with white hairs, toward the raceme with increasing black hairs. Racemes capitate to short ovoid, densely 3–15(–20)-flowered. Bracts whitish-membranous, narrowly triangular, 2–3 mm long, black ciliate. Pedicels ca. 0.5 mm long, hairy. Calyx campanulate-tubular, 7–8 mm long, densely and predominately black hairy, more rarely predominantly white hairy; teeth subulate, 1.5–3 mm long. Petals violet. Standard 14–15(–17) mm long; blade 7–8 mm wide, rhombic-elliptic, deeply incised, nearly bilobed, at the base cuneately narrowed. Wings 12–13(–14) mm long; blades narrowly oblong, rounded to slightly retuse, 6.5–7 \times ca. 2 mm; auricle curved, ca. 1 mm, claw ca.

6 mm. Keel 10.5–11(–11.5) mm long; blades triangular-obovate, with in upper third widely, nearly rectangularly curved lower edge and \pm straight upper edge, subacute, 4–5 \times 2–2.5 mm; auricle acute, claw ca. 6 mm. Stamen-tube truncate at the mouth. Ovary with a stipe ca. 1 mm long, densely hairy; style glabrous. Legumes sessile, ellipsoid, slightly compressed dorsi-ventrally, 5–7 mm long, ca. 3 mm high and 4–4.5 mm wide, shallowly grooved ventrally and dorsally, nearly completely bilocular; valves thin, blackish-brown when ripe, finely ore more rarely coarsely-warty, densely covered with thin white hairs up to 1.5 mm long, sitting on little tubercles. Flowering time: 5–7. Occurrence: 100–2,500 m. Distribution: Au, Br, Cz, Da, Ga, Ge, Hb, Hs, It, Po, Su. [Baltic States, Russia, Ukraine, Middle Asia, Mongolia, China].

34. *Astragalus glaux* L., Sp. Pl.: 759. 1753. (*A. granatensis* LANGE non LAM.). [Sect. *Hypoglottidei* DC.]

Plants up to 40 cm tall, rather densely or more rarely only loosely covered with white hairs 0.4–1 mm long and nearly everywhere with black hairs mixed in. Rootstock slender, with a pluricipital root-crown, branched, without or with short subterranean stolons. Stems several, prostrate to ascending or erect, 4–40 cm long, finely sulcate, loosely to rather densely covered with appressed to partly spreading hairs. Stipules greenish-membranous, 5–11 mm long, adnate to the petiole up to 2 mm, behind the stem highly up vaginate-connate, with triangular to narrowly acuminate, remote free tips, sparsely to loosely predominately black hairy. Leaves 2–6 cm long, nearly sessile; rachis loosely to rather densely hairy. Leaflets in 11–15 pairs, narrowly elliptic or narrowly obovate to elliptic, 2–9 \times 0.8–3.5 mm, on upper side glabrous or sparsely hairy, especially toward the margins, on underside loosely to rather densely nearly appressed hairy, flat or folded. Peduncles 1–9 cm long, hairy like the stem. Racemes capitate to ovoid, densely many-flowered. Bracts whitish-membranous, narrowly elliptic, long acuminate, ca. 4 mm long, black hairy, especially toward the tip. Pedicels very short. Calyx campanulate, 4–6 mm long, the tube sparsely white hairy, toward the teeth \pm densely black-hairy; teeth \pm as

long as the tube, 2–3 mm long, subulate. Petals pink or lilac. Standard 11–13 mm long; blades ca. 3 mm wide, narrowly oblong, emarginate, at the base very short cuneately narrowed. Wings 7–8 mm long; blades narrowly oblong, rounded, 5 × 1 mm; auricle indistinct, claw 2–3 mm. Keel 5–6 mm long; blades obliquely elliptic, with slightly gibbous lower edge and in upper part curved upper edge, widely rounded, 2.2 × 1.3 mm; auricle minute, claw ca. 2 mm. Stamen-tube irregularly ± truncate at the mouth. Ovary sessile, white-villous; style thickish, short, glabrous. Legumes sessile, obliquely ovoid, ca. 5 mm long, 3–4 mm high and 2.5–3 mm wide, keeled ventrally, ± deeply grooved dorsally, acuminate with a hooked beak, bilocular; valves densely white-villous, sometimes with scalelike flattened hairs. Distribution: Ga, Hs, Lu. [North Africa].

35. *Astragalus hypoglottis* L., Mant. alt.: 274.

1771. (*A. purpureus* LAM.). [Sect. *Hypoglottidei* DC.]

Plants up to 40 cm tall, with somewhat rigid, often bent white, near the nodes of the stems and in the inflorescence also with black hairs 0.5–0.7(–0.9) mm long, sometimes sitting on little tubercles. Rootstock with a pluricipital root-crown, with ± long subterranean stolons. Stems slender, prostrate to ascending, (10–) 20–30(–40) cm long, often branched in the lower part, rather densely to densely covered with appressed or spreading hairs. Stipules green or greenish, 5–9 mm long, free from petiole, behind the stem highly up vaginateconnate, often nearly up to the top, loosely to rather densely nearly spreadingly hairy. Leaves 3–9 cm long; petiole 0.6–1.5 cm long, like the rachis loosely to rather densely covered with tangled, spreading hairs. Leaflets in 7–15 pairs, elliptic, 3–10 × 1.5–6 mm, rounded or ± distinctly retuse, on upper side sparsely to loosely nearly appressed hairy or more rarely subglabrous, on underside side more densely hairy. Peduncles 3–11 cm long, in the lower part white, in the upper part increasingly black hairy. Racemes capitate, densely 10–20-flowered. Bracts whitish to greenish, narrowly elliptic to very narrowly triangular, acute, 5–6 mm long, with nearly spreading black hairs. Flowers nearly sessile. Calyx slightly in-

flated-tubular, 8–10 mm long, the tube whitish to greenish, loosely covered with spreading black or partly white hairs; teeth green, subulate to filiform, slightly unequal, the longer ones 3.5–5 mm long. Petals purple violet. Standard 16–17 mm long; blade rhombic-elliptic, (4–)6–7 mm wide, slightly emarginate, gradually narrowed toward the tip and the base. Wings 12–14 mm long; blades narrowly oblong, rounded, 6–7 × ca. 2 mm; auricle ca. 1 mm, claw 6–7 mm. Keel 10–11 mm long; blades obliquely oblong, with in upper third widely curved lower edge and nearly straight upper edge, subacute, 4–5 × ca. 2.2 mm; auricle ca. 1 mm, claw ca. 6 mm. Stamen-tube truncate at the mouth. Ovary sessile or very short stipitate, villous; style slender, glabrous. Legumes with a stipe 0.5–1 mm long, ovoid-inflated, at the base laterally nearly bigibbous, 10–14 mm long, 4–5 mm high and 6–7 mm wide, widely rounded ventrally, deeply grooved dorsally, shortly acuminate, bilocular; valves thin, brownish, densely villous with white, sometimes also with blackish hairs.

Two geographically ± separated subspecies:

35a. *Astragalus hypoglottis* subsp. *hypoglottis*

Stems with spreading hairs. Distribution: Ga, Hs.

35b. *Astragalus hypoglottis* subsp. *gremlii* (BURNAT) GREUTER & BURDET, Willdenowia 19: 30. 1989. (*A. gremlii* BURNAT)

Stems with appressed hairs. Distribution: Al, Ga, It, Ju (Croatia, Bosnia, Serbia).

36. *Astragalus maniacus* KIT TAN & STRID, Pl. Syst. Evol. 206: 47. 1997. [Sect. *Hypoglottidei* DC.]

Plants prostrate. Rootstock with a pluricipital root-crown, with subterranean stolons ca. 3 cm long. Stems several, prostrate, 6–13 cm long, rather densely covered with rigid, spreading white hairs 0.3–1.2 mm long. Stipules green, mostly reddish-suffused, 4–5 mm long, narrowly triangular, reflexed, very shortly adnate to the petiole, shortly vaginateconnate behind the stem, at the margins with hairs up to 1 mm long and near the base with minute, sessile glands, otherwise sparsely hairy to subglabrous. Leaves 2–5 cm long, subsessile; rachis loosely hairy like the stem. Leaflets in 12–

15 pairs, widely ovate to widely obovate, 3–5 × 2–3.5 mm, widely emarginate, on upper side glabrous, on underside loosely covered with ± spreading hairs up to 1 mm long, often folded. Peduncles 2–4 cm long, hairy like the stem but in upper part nearly exclusively black hairy. Racemes short, ca. 10-flowered. Bracts whitish, triangular-ovate, 4–5 mm long, at the base 2–2.5 mm wide, covered with spreading white and predominantly black hairs. Pedicels 2–3 mm long, white and black hairy. Calyx 7–8 mm long, rather densely covered with ascending white and black hairs 0.3–1 mm long, the white hairs often blackish at the base; teeth narrowly triangular, 2.5–3 mm long. Petals unknown. Legumes narrowly oblong-elliptic, slightly curved, 20–25 mm long, ca. 5 mm high and wide, keeled ventrally, deeply grooved dorsally, with a curved beak ca. 1 mm long, bilocular; valves pale brown, loosely covered with ascending, thin white hairs partly sitting on little tubercles. Distribution: Gr (Peloponnese).

37. *Astragalus pseudopurpureus* GUSUL., Bul. Fac. Sti. Cernauti 6: 291. 1932. [Sect. *Hypoglottidei* DC.]

Plants 10–40 cm tall. Rootstock with a pluricipital root-crown. Stems several, slender, ascending to erect, sparsely to loosely covered with appressed white hairs 0.2–0.5 mm long, glabrescent in basal parts. Stipules 2–3 mm long, the lower ones whitish-hyaline, the upper ones greenish, free from the petiole, connate behind the stem up to the middle with narrowly triangular to triangular free tips, sparsely to loosely white hairy with some black hairs mixed in especially at the tip. Leaves 3–8 cm long; petiole 1–2 cm long, like the rachis slender, hairy like the stem. Leaflets in 7–12 pairs, ovate to elliptic, 4–10 × 2–4 mm, rounded to retuse or slightly emarginate, on upper side glabrous, on underside loosely covered with appressed hairs 0.2–0.4 mm long. Peduncles 2.5–4 cm long, slender, white and black hairy like the stem. Racemes capitate, densely 5–20-flowered. Bracts whitish-hyaline, 2–4 mm long, narrowly triangular, with spreading black hairs. Pedicels ca. 0.5 mm long, hairy. Calyx 7–8 mm long, shortly tubular, slightly obliquely cut at the mouth, sparsely to loosely covered with appressed black hairs up to

0.4 mm long, with some white hairs mixed in; teeth narrowly triangular, 1–1.5 mm long, sparsely hairy on inner side. Petals blue-violet. Standard 12–16 mm long; blade ca. 5 mm wide, elliptic, emarginate, at the base gradually cuneately narrowed. Wings 10–12 mm long; blades narrowly oblong, rounded, 5 × 1.5–1.8 mm; auricle ca. 1 mm, claw 5–6 mm. Keel 9–11 mm long; blade obliquely obovate, with in upper part widely, nearly rectangularly curved lower edge and straight upper edge, acute to shortly acuminate, 4.5 × 2.2 mm; auricle 0.4 mm, claw 5 mm. Stamen-tube truncate at the mouth. Ovary subsessile, densely white hairy; style glabrous. Legumes sessile to subsessile, oblong, 9–12 mm long, 3 mm high, deeply grooved dorsally, incompletely bilocular; valves transversely striate, densely covered with short, ascending white hairs. Distribution: Rm.

38. *Astragalus austroaegaeus* RECH.f., Phytion 1: 202. 1949 (*A. insulae-karpathi* EIG.). [Sect. *Malacothrix* BUNGE]

Plants 10–20 cm tall, prostrate to erect, caulescent, rather densely furnished with fine, long hairs. Rootstock up to 5 mm in diameter, scarcely divided, with elongated subterranean branches. Stems 2–8 cm long, stout, at the base up to 3 mm in diameter, angular-sulcate, very densely covered with spreading, flexuous-curved white, below the nodes also black hairs up to 2 mm long. Stipules whitish or greenish, narrowly triangular, 7–13 mm long, adnate to the petiole for 1–3 mm, the lower ones distinctly connate-vaginate behind the stem, the upper ones free from each other, black and white hairy. Leaves 3–11 cm long; petiole 0.6–1.5 cm long, like the rachis sulcate, densely covered with spreading white hairs 0.3–2 mm long. Leaflets in 10–18 pairs, elliptic to narrowly elliptic, 5–18 × 2–7 mm, acute to more rarely rounded, rather densely to densely covered on both sides with subappressed, somewhat flexuous, long white hairs, at lower side slightly more densely than on upper side. Peduncles 5–12 cm long, stout, slightly angular-sulcate, rather densely furnished with spreading white and toward the raceme increasing black hairs 0.3–2 mm long. Racemes ovoid to shortly cylindrical, up to 6 cm long, densely many-flowered; axis white and black

hairy. Bracts 6–7 mm long, narrowly triangular to linear-acute, furnished with long white and black hairs sometimes inserted on minute tubercles, especially at the margins. Pedicels ca. 1 mm long, hairy. Calyx 11–14 mm long, tubular but slightly inflated, obliquely cut at the mouth, rather densely covered with spreading white and mainly at the dorsal (lower) side and toward the teeth with black hairs up to 2 mm long; teeth subulate, 3–4 mm long, hairy on inner side. Petals mauve or violet. Standard 18–22 mm long; blade slightly curved upward, 7–8 mm wide, rhombic-elliptic, slightly to distinctly tongue-like ligulate-attenuate upward, emarginate, gradually narrowed into the cuneate claw. Wings 15 mm long; blades narrowly oblong, subacute, 7 × 2.5 mm; auricle 1.2 mm, claw 8–9 mm. Keel 14 mm long; blades obliquely elliptic-curved, with widely curved lower edge and concave upper edge, subacute, 6 × 3 mm; auricle short, claw 8–9 mm. Stamen-tube truncate at the mouth. Ovary sessile, oblong-ellipsoid, villous; style glabrous. Legumes sessile, erect to spreading, ovoid, 9–12 mm long, 5 mm high and 3 mm wide, keeled ventrally, deeply grooved dorsally, attenuate into a curved beak 2–4 mm long, bilocular; valves pale brownish, thin, densely villous, with soft spreading white hairs up to 4 mm long and inserted on little tubercles, totally enveloping the fruit. Fruit opening at both sides. Flowering time: 4–5. Occurrence: limestone, phrygana-vegetation. Distribution: Cr (Aegean Islands).

39. *Astragalus turolensis* PAU, Not. Bot. Fl. Espan. 1: 20. 1887 [et in WILLKOMM, Suppl. Prodr. Fl. Hisp.: 234. 1887]. (*A. arragonensis* FREYN). [Sect. *Malacothrix* BUNGE]

Plants nearly acaulescent to shortly caulescent, with thin, somewhat rigid, often bent white hairs 1–2 mm long, in dry state often brownish, in the inflorescence region sometimes also with few black hairs. Rootstock with a pluricipital root-crown, with short or elongated branches. Stems mostly several, often very short or up to 6(–10) cm long, subappressed to ± spreadingly hairy, at the base covered with remainders of old stipules. Stipules whitish-membranous, the lower ones ovate, subacute, 7–8 mm long, the upper ones narrowly triangular, acute, 10–17 mm long, all

adnate to the petiole for 2–3 mm and vaginateconnate behind the stem for 1–3 mm, loosely hairy. Leaves 3–12(–15) cm long; petiole 1–4(–5) cm long, like the rachis loosely to rather densely spreadingly hairy. Leaflets in 11–16 pairs, elliptic to widely elliptic to nearly orbicular, sometimes obovate, 3–8 × 2–7 mm, rounded to slightly emarginate, more rarely subacute, covered on upper side loosely, on underside more densely with ascending hairs. Peduncles 1.5–18 cm long, stout, straight to somewhat curved, densely spreadingly hairy. Racemes nearly capitate to shortly cylindrical, up to 5 cm long, densely many flowered. Bracts narrowly ovate, acute, 5–8 mm long, hairy. Flowers subsessile. Calyx tubular, 9–11 mm long, rather densely subappressed hairy; teeth subulate, 2.5–4 mm long. Petals violet. Standard 17–21 mm long; blade rhombic-elliptic, 7–8(–9) mm wide, widely rounded and emarginate, narrowed into a cuneate claw. Wings 14–16 mm long; blades narrowly oblong, rounded, 6–7 × 2–3 mm; auricle 1–1.5 mm, round, claw 8–9 mm. Keel 13–15 mm long; blades obliquely elliptic-curved, with widely curved lower edge and distinctly concave upper edge, obtuse, ca. 5 × 2.5 mm; auricle short, acute, claw 8–9.5 mm. Stamen-tube truncate at the mouth. Ovary sessile, densely appressed hairy. Legumes sessile, obliquely ovoid, 10–12 mm long, 5–6 mm high and 3–4 mm wide, keeled ventrally, deeply grooved dorsally, with a curved beak 3–4 mm long, the style long time persistent, bilocular; valves thin, brownish grey, very densely covered with somewhat rigid, whitish reddish hairs, sitting on very little tubercles, ca. 3 mm long. Flowering time: 5–6. Occurrence: on calcareous and gypsaceous soil, in fields, roadsides, grazed meadows. Distribution: Hs.

40. *Astragalus drupaceus* BOISS., Diagn. pl. orient., ser. 2, 2: 32. 1856. [Sect. *Astragalus*]

Plants 25–60 cm tall, white hairy. Stems erect, 3–3.5 mm thick, longitudinally sulcate, densely to very densely covered with long, spreading white hairs. Stipules green or greenish, 8–18 mm long, narrowly triangular, free from the petiole, ciliate at the margins, otherwise subglabrous. Leaves 8–16 cm long, the uppermost often crowded and up to 5 cm

long; petiole ca. 1 cm long, with the rachis covered with tangled, spreading hairs. Leaflets in 19–27 pairs, narrowly elliptic, 6–16 × 2–7 mm, obtuse to slightly retuse, mostly folded, on upper side glabrous or with scattered hairs only, on underside, covered with tangled, ascending or spreading hairs. Racemes sessile, loosely 3–5-flowered; axis long and spreadingly hairy. Bracts greenish to pale brownish, thickly membranous, narrowly triangular, 5–9 mm long, white ciliate. Pedicels ca. 2 mm long, spreadingly hairy. Calyx tubular to slightly bulgy, 13–16 mm long, densely covered with spreading white hairs; teeth filiform, 6–8 mm long. Petals glabrous, pale yellow, partly changing to rusty brownish. Standard 23–28 mm long; blade oblong to elliptic, sometimes slightly panduriform, 8–11(–12) mm wide, emarginate, with rounded edges passing into the narrow claw 6–9 mm long. Wings 24–26 mm long; blades narrowly oblong, rounded, 16–16.5 × 3–4 mm; auricle ca. 3 mm, claw 10–12 mm long. Keel 20–22 mm long; blades obliquely elliptic, with widely curved lower edge and concave upper edge, obtuse, 10.5–12 × 3–4 mm; auricle short, claw ca. 10 mm long. Stamen-tube obliquely cut at the mouth. Ovary ovoid, glabrous. Legumes widely ovoid to subglobular, 10–12 mm long, 8–10 mm high, slightly keeled ventrally, rounded dorsally, with a beak ca. 0.5 mm long, bilocular; valves dark red brown or blackish brown, fleshy-wrinkled in life, glabrous. Distribution: Gr (Peloponnese).

41. *Astragalus graecus* BOISS. & SPRUNER in BOISS., *Diagn. pl. orient.*, ser. 1, 2: 57. 1843. [Sect. *Astragalus*]

Plants 25–55 cm tall with white and some brownish hairs. Stem 5–13 mm in diameter, very densely covered with spreading, woolly, whitish to pale brownish hairs. Stipules whitish or yellowish, 12–25(–30) mm long, filiform or sometimes wider, adnate to the petiole for ca. 1 mm, sparsely, toward the base more densely hairy, long and densely ciliate. Leaves 15–30 cm long; petiole 1.5–3 cm long, with the rachis stout, up to 3.5 mm thick, densely covered with spreading or woolly whitish or dirty yellowish hairs. Leaflets in 20–32 pairs, ovate to suborbicular, 6–16 × 5–9 mm, emarginate, on upper side glabrous, on

underside densely covered with appressed or more rarely up to spreading hairs. Racemes sessile, numerous, 3–10-flowered; axis 1.5–8 cm long, spreadingly hairy. Bracts narrowly triangular, 10–25(–30) mm long. Pedicels 3–4 mm long, with ascending hairs. Bracteoles filiform, 2–3 mm long, in upper part of the pedicel. Calyx tubular, 15–19 mm long, densely covered with long, spreading white hairs; teeth narrowly triangular, 5–8(–10) mm long. Petals yellow, changing to golden brown or red brown when dry. Standard 30–40 mm long; blade 10–15(–17) mm wide, elliptic, deeply emarginate, gradually narrowed into a narrow claw 8–12 mm long. Wings (28–)30–38 mm long; blades narrowly oblong, rounded, 21–26 × 3–4 mm; auricle 3–4 mm, claw 11–16.5 mm. Keel 22–27(–30) mm long; blades obliquely elliptic, with gibbously curved lower edge and slightly concave upper edge, subobtuse, 11–12 × ca. 4 mm; claw 11–17 mm. Stamen-tube obliquely cut at the mouth. Ovary sparsely to densely white hairy; style hairy in lower third. Legumes ellipsoid, 14–27 mm long, 13–18 mm high, flattened ventrally and dorsally, with a straight beak 3–6 mm long, bilocular; valves coriaceous, grey brown or reddish brown to dark brown, transversally ribbed, very densely covered with short appressed and with few longer, spreading hairs. Distribution: Gr. [Libya].

42. *Astragalus alopecuroides* L., *Sp. Pl.*: 755.

1753. (*A. narbonensis* GOUAN; *A. marianorum* SENNEN). [Sect. *Alopecuroides* DC.]

Plants 50–80 cm tall. Stem 4–7 mm in diameter, ± densely equally foliate, sparsely to rather densely covered with appressed to spreading, curled hairs 0.1–1 mm long, glabrescent with age or sometimes glabrous. Stipules greenish or brownish when dry, triangular or narrowly triangular and long acuminate, 9–20 mm long, adnate to the petiole for 1–2 mm, sparsely hairy or glabrous, only at the margins long ciliate. Leaves obliquely erect or upcurved. (10–)15–19 cm long, the upper ones shorter than the lower ones; rachis stout, sparsely hairy. Leaflets in 17–20 pairs, narrowly ovate to ovate, 6–19 × 4–8 mm, obtuse to slightly emarginate, flat or folded, on upper side glabrous, on underside sparsely to loosely covered with ± spreading, tangled hairs 0.8–

1 mm long, often only at the margins and the midvein. Peduncles stout, 0.7–1 cm long, mostly hidden by the basal flowers. Racemes globular to ovoid, up to 7 cm long, 4–5(–6) cm in diameter, densely many-flowered; axis with long hairs. Bracts filiform to subulate, 7–15 mm long, green to pale yellow, ciliate. Pedicels 1–2(–3) mm long. Bracteoles one or two, filiform, 8–12 mm long, ciliate, sometimes caduceous or absent from the beginning. Calyx tubular-campanulate, ca. 17 mm long, sparsely to rather densely covered with ascending to spreading hairs 1–2.5 mm long; teeth 6–10 mm long, subulate, greenish, glabrous on inner side. Petals yellow, often brownish when dry, glabrous. Standard (20–)24–28 mm long; blade 9–12 mm wide, elliptic to obovate, emarginate, with a short, cuneate claw. Wings (15–)20–27 mm long; blades narrowly oblong, rounded, (10–)13–15 × 3–4 mm; auricle ca. 2 mm, claw 9–12 mm. Keel (15–)20–27 mm long; blades triangular, with in the middle gibbously curved lower edge and straight upper edge, obtuse, 13–14 × 6–8 mm; auricle 1–1.5 mm, claw 7–12 mm. Stamen-tube obliquely cut at the mouth. Ovary ovoid, densely white hairy; style hairy in basal third. Legumes ovoid, acuminate, 9–13 mm long, ca. 5 mm high, 2.5 mm wide, keeled ventrally, slightly grooved dorsally, bilocular; valves densely covered with spreading hairs 3–4 mm long and with subappressed, curled hairs 0.2–0.3 mm long.

Can be divided in two subspecies:

42a. *Astragalus alopecuroides* subsp. *alopecuroides*

To this correspond the above synonyms and the description. Distribution: Ga, Hs [North Africa].

42b. *Astragalus alopecuroides* subsp. *grosii* (PAU) RIVAS GODAY & RIVAS MART., Publ. Inst. Biol. Aplicada 42: 119. 1976. (*A. grosii* PAU)

Leaflets distinctly emarginate to cordate-emarginate, 8–10(–13) × 4–6(–7) mm, often narrowly whitish or purple margined. Stems and rachis sparsely covered with spreading hairs 1–3 mm long. Stipules 9–13 mm long. Occurrence: on gypsaceous soils. Distribution: S. Spain. Hs.

43. *Astragalus alopecurus* PALL., Sp. Astragal.:

11. 1800. (*A. centralpinus* BRAUN-BLANQ.).

[Sect. *Alopecuroidei* DC.]

Plants 50–90(–100) cm tall. Stem erect, up to 10 mm in diameter, sulcate, loosely to rather densely covered with soft, tangled, ascending to spreading, white or reddish hairs 1–4 mm long, sometimes glabrescent with age. Stipules 10–15(–23) mm long, narrowly triangular, adnate to the petiole for 1–2 mm, sparsely hairy. Leaves 20–30 cm long; petiole 1–3 cm long, like the rachis stout, sulcate, rather densely covered with soft, tangled, ascending to spreading hairs 0.5–2 mm long. Leaflets in 17–27 pairs, narrowly ovate to narrowly elliptic, (10–)20–35(–40) × (6–)10–13(–20) mm, obtuse to subacute, on upper side glabrous, on underside sparsely to loosely covered with subappressed, tangled, curved to flexuose hairs 0.5–1 mm long, sometimes subglabrous. Racemes nearly sessile or with a peduncle up to 1(–2) cm long, ovoid to cylindrical, (3–)5–9.5 cm long, densely many-flowered. Bracts subulate, 10–20 mm long, with hairs 1.5–2.5 mm long. Bracteoles absent. Flowers subsessile. Calyx 12–19 mm long, campanulate, slightly bulgy, densely covered with ascending to spreading hairs 1–3 mm long; teeth subulate, 5–7(–9) mm long, glabrous on inner side. Petals yellow. Standard ca. 20 mm long; blade elliptic, 5–7 mm wide, rounded, at the base subabruptly narrowed. Wings 18–20 mm long; blades narrowly oblong, obtuse, ca. 8 × 2.5 mm; claw 11–12 mm. Keel ca. 18 mm long; blades obliquely elliptic-triangular, with gibbously curved lower edge and ± straight upper edge, ca. 7 × 3.5 mm. Stamen-tube obliquely cut at the mouth. Ovary sessile, densely hairy; style hairy in lower half. Legumes sessile, included in the calyx, subglobular to ovoid, 6–8 mm long, 4–5 mm high, bilocular; valves slightly rugulose, densely covered with ascending hairs 1–2 mm long and with very short hairs. Distribution: Bu, Ga, It [Russia, Caucasus, Turkey, Iran, Middle Asia, China].

44. *Astragalus ponticus* PALL., Sp. Astragal.:

14. 1800. [Sect. *Alopecuroidei* DC.]

Plants up to 40 cm tall or even higher. Stems erect, up to 6 mm in diameter, sulcate, glabrous

or furnished with subappressed to ascending, rigid white hairs 0.3–1.5 mm long. Stipules green, often yellowish or brownish when dry, narrowly triangular, long acuminate, (10–)15–20(–25) mm long, adnate to the petiole for 1–2 mm. Leaves 10–27 cm long; sulcate, glabrous or hairy like the stem. Leaflets in 11–23 pairs, narrowly ovate, 7–20 × 3–8 mm, subacute, flat or folded, on upper side glabrous, on underside sparsely to loosely covered with appressed hairs 0.3–0.5 mm long, sometimes only at the midvein and the margins. Peduncles 0.5–1(–2) cm long, loosely hairy like the stem. Racemes spherical to shortly ovoid, 2.5–3(–4) cm in diameter, many-flowered; axis loosely hairy. Bracts filiform, 5–7 mm long, hairy. Pedicels 1–2 mm long. Bracteoles absent. Calyx tubular to slightly bulgy, 12–15 mm long, rather densely covered with subappressed hairs 0.3–1 mm long; teeth narrowly triangular, 1–2(–3) mm long, hairy on inner side. Petals glabrous, yellow. Standard 18–22 mm long; blade elliptic to slightly panduriform, ca. 7 mm wide, rounded, subabruptly contracted into the narrow claw. Wings 18–20 mm long; blades narrowly oblong, obtuse, 7–8 × 2.5 mm; auricle ca. 1 mm, claw 10–12 mm. Keel ca. 18 mm long; blades obliquely elliptic-triangular, with gibbously curved lower edge and slightly concave upper edge, obtuse, ca. 7 × 3.5–4 mm; auricle ca. 1 mm, claw 10 mm. Stamen-tube obliquely cut at the mouth. Ovary densely hairy; style hairy in lower third. Legumes ellipsoid, 8–9 mm long, 3.5–5 mm high, ca. 3 mm wide, slightly keeled ventrally, grooved dorsally, with a bent beak ca. 1.5 mm long, bilocular; valves straw coloured, slightly wrinkled, sparsely covered with appressed to subappressed hairs 0.2–0.3 mm long, often glabrous with age. Distribution: Bu, Rm, Ju (Macedonia) [East Europe, Caucasus, Turkey, Iran].

45. *Astragalus angustiflorus* K.KOCH subsp. *anatolicus* (BOISS.) D.F.CHAMB. in Fl. Turkey 3: 110. 1970. (*A. anatolicus* BOISS.; *A. maroniensis* DINGLER [Sect. *Caprini* DC.]

Plants 15–40(–50) cm tall, acaulescent to subacaulescent, rarely shortly caulescent, with white or in dry state often reddish, thin hairs 0.5–2 mm, at the rachis up to 3.5 mm long. Rootstock up to 20 mm thick, with a plu-

ricipital root-crown, with short or sometimes elongated branches, often covered with short, connate, scalelike, whitish stipules without leaves. Stems, if present, very short, loosely covered with spreading hairs. Stipules white-membranous, glabrous, 12–20 mm long, the lower ones oblong-ovate, obtuse, the upper ones narrowly triangular, adnate to the petiole for 2–4 mm, otherwise free or those of lower leaves sometimes shortly connate in front of the petiole. Leaves 15–25 cm long; petiole 4–8 cm long, like the rachis glabrous or loosely to densely spreading hairy. Leaflets remote, in (6–)8–12 pairs, 10–30 × 5–15 (–20) mm, ovate to obovate, mostly subacute, more rarely rounded, minutely mucronulate, at the base oblique-rounded or slightly cordate, more rarely widely cuneate, on upper side glabrous or sparsely hairy, on underside glabrous or hairy only at the midvein and margins or sometimes loosely to densely hairy all over. Peduncles 0.5–2(–4) cm long, glabrous or hairy. Racemes loosely 4–8(–15)-flowered. Bracts membranous, linear-acute, 5–8 mm long, hairy. Pedicels 2–5 mm long, glabrous or more rarely sparsely hairy. Calyx (10–)12–15 mm long, tubular, sparsely to loosely spreading hairy; teeth subulate, 4–5 mm long. Petals glabrous, yellow. Standard 21–26 (–28) mm long; blade (7–)8–9(–10) mm wide, obovate, emarginate, gradually narrowed into the rather short claw. Wings 16–22 mm long; blades narrowly oblong, rounded, 11–13 × 2–3 mm; auricle 1–1.5 mm, claw 7–10 mm. Keel 14–18 mm long; blades ± straight, narrowly elliptic, with slightly curved lower and upper edge, subacute to obtuse, 7–9 × 2.5–3.5 mm; auricle 0.5–1 mm, claw 7–10 mm. Stamen-tube obliquely cut at the mouth. Ovary sessile or subsessile, hairy or more rarely glabrous; style glabrous or hairy in basal part. Legumes sessile, oblong, 15–23(–35) mm long, 6–10 mm high and 6–7(–10) mm wide, rounded with prominent midvein ventrally, flattened or shallowly grooved dorsally, contracted into a very short, rigid beak, incompletely to nearly completely bilocular (septum 1/2 to nearly 1/1 of the fruit's height); valves thin but tough, straw-coloured to pale brown or reddish brown, loosely to densely villous, more rarely glabrous. Distribution: Gr [W. Turkey].

**46. *Astragalus caprinus* subsp. *huetii* (BUNGE)
PODLECH, Mitt. Bot. Staatss. München 25:
155. 1988 (*A. huetii* BUNGE). [Sect. *Caprini*
DC.]**

Plants (5–)10–30(–42) cm tall, acaulescent or rarely shortly caulescent, nearly glabrous or covered with rigid, spreading, white or reddish hairs 2–4(–5) mm long. Rootstock thick, simple or with a pluricipital root-crown, branches short or sometimes elongated, covered with remnants of old leaves. Stipules membranous, whitish or brownish when dry, slightly to distinctly longitudinally nerved, 15–20 mm long, triangular to narrowly triangular, the upper ones long acuminate, all glabrous or the lower ones ciliate at the margins and the upper ones hairy. Leaves 5–20 cm long; petiole sometimes very short or up the half the length of the rachis, rachis glabrous or loosely to densely spreadingly hairy, often at one plant the spring-leaves with glabrous, the following with hairy rachis. Leaflets glaucous, in mostly 8–11 pairs, 10–20 × 3–8 mm, glabrous or especially in the later leaves at the margins or sometimes on underside at the midvein very sparsely hairy. Racemes with a glabrous or hairy peduncle 0.5–3 cm long or rarely longer, mostly 5–8-flowered. Bracts whitish-membranous, linear-acuminate, 6–10 mm long, glabrous or hairy. Pedicels 2–5 mm long, glabrous or hairy. Calyx 13–15 mm long, tubular, in basal part sparsely to loosely, in upper part and at the teeth more densely hairy; teeth very narrowly triangular, 3–5 mm long. Petals glabrous, yellow. Standard (20–)24–28 mm long; blade (8–)10–12(–13) mm wide, elliptic to obovate, emarginate, at the base gradually narrowed. Wings (19–)22–25(–27) mm long; blades narrowly oblong, rounded, 10–12 × 2–3 mm; auricle 2–3 mm, claw 11–13 mm. Keel 17–20 mm long; blades obliquely elliptic-triangular, with nearly rectangularly curved lower edge and slightly concave upper edge, subsobtuse, 7–10 × 3–5 mm; auricle indistinct, claw 10–12(–15) mm. Stamen-tube obliquely cut at the mouth. Ovary sessile or with a short stipe, glabrous or hairy; style glabrous. Legumes shortly stipitate, narrowly oblong to oblong, 15–25 mm long, contracted into a beak 2–3 mm long, incompletely bilocular (septum 1/3–1/2 of the fruit's height); valves coriaceous, slightly rugulose or

longitudinally rugose, glabrous or sparsely hairy, glabrescent with age. Flowering time: 3–4. Distribution: Si.

47. *Astragalus cavanillesii* PODLECH, Mitt. Bot. Staatss. München 25: 161. 1988. [Sect. *Caprini* DC.]

Plants nearly acaulescent, rarely with a short stem, 20–30(–40) cm tall, sparsely to more rarely up to densely covered with thin, whitish or brownish-red hairs up to 2(–2.5) mm long. Stems absent or rarely present, up to 5(–10) cm long, straw-coloured to brown red, glabrous or very sparsely hairy. Stipules whitish-membranous, narrowly triangular to triangular, acute, finely longitudinal nerved, 8–15 mm long, at the base up to 6 mm wide, adnate to the petiole up to 1 mm, ciliate at the margins and tip. Leaves 15–25 cm long; petiole 5–10 cm long, like the rachis loosely to rather densely spreading hairy. Leaflets in 8–11(–13) pairs, ovate to obovate, 11–22 × 6–11(–13) mm, subacute to rounded, minutely mucronulate, on upper side glabrous or partly sparsely appressed hairy, on underside especially at the midvein and toward the margins loosely hairy, rarely sparsely to rather densely hairy all over. Peduncles up to 8 cm long, very sparsely to loosely spreadingly hairy. Racemes loosely (4–)6–10-flowered. Bracts membranous, narrowly linear, 6–9 mm long, ciliate at the margins. Pedicels 4–7 mm long, hairy. Calyx tubular, 14–16(–18) mm long, greenish straw-coloured, sparsely to rather densely covered with long, spreading hairs or subglabrous and ciliate only at the teeth; teeth subulate, shorter or mostly as long as the tube. Petals glabrous, yellow. Standard 25–27 mm long; blade 11–12 mm wide, obovate, distinctly emarginate, gradually narrowed at the base. Wings 22–23 mm long; blades narrowly oblong, rounded, (9–)10–13 × 3–3.5 mm; auricle 1–2 mm, claw 10–12 mm. Keel 17–19 mm long; blades oblique-elliptic, with widely curved lower edge and nearly straight upper edge, obtuse, 8–9 × 4 mm; auricle wide and short, claw 9–11 mm. Stamen-tube obliquely cut at the mouth. Ovary with a stipe ca. 1 mm long, densely hairy; style hairy high up. Legumes with a stipe ca. 1–2 mm long, narrowly ellipsoid, 16–20 mm long, 6–7 mm high and 8–10 mm wide, keeled ventrally, widely and

shallowly grooved dorsally, subabruptly contracted into a beak 3–5 mm long, incompletely bilocular (septum ca. 2/3 of the fruit's height); valves thin but tough, straw-coloured or red-brown-suffused, with long spreading hairs. Flowering time: 5–6. Occurrence: limestone and gypsaceous soils, ca. 1,200 m. Distribution: Hs (S. Spain).

48. *Astragalus exscapus* L., Mantissa Alt.: 275. 1771. (*A. hellenicus* BOISS). [Sect. *Caprini* DC.]

Plants 5–30(–40) cm tall, acaulescent or rarely shortly caulescent, mostly rather densely covered with white or in dry state reddish, spreading, somewhat rigid hairs 2–4(–6) mm long. Rootstock long, up to 10 mm thick, with a pluricipital root-crown, with mostly short, subterranean branches, in upper part covered with remnants of old stipules. Stems mostly absent or very short, rarely up to 10 cm long (mostly in sandy areas), loosely to densely hairy. Stipules whitish-membranous, with distinct longitudinal nerves, 10–27 mm long, the lower ones ovate to oblong, obtuse, the upper ones narrowly triangular, long acuminate, all adnate to the petiole for 1–3 mm, ciliate at the margins, often densely hairy, especially toward the tip. Leaves 10–40 cm long; petiole 3–15 cm long, like the rachis densely covered with spreading hairs sometimes up to 6 mm long, rarely sparsely to loosely hairy. Leaflets in 10–17(–29) Stipule pairs, narrowly ovate to narrowly obovate, 10–33(–38) × 4–12(–19) mm, rounded or feebly retuse, more rarely subacuminate, on upper side sparsely, on underside more densely or on both sides loosely to densely covered with appressed to ascending hairs. Peduncles (0.2–)1–4 cm long, glabrous or with spreading hairs. Racemes 2–7(–9)-flowered. Bracts membranous, 4–30 mm long, linear-acuminate, ciliate. Pedicels 1–6 mm long, glabrous or hairy. Calyx (10–)14–20 mm long, tubular, straw-coloured to greenish, glabrous or loosely to densely furnished with spreading hairs; teeth slightly unequal, narrowly triangular, 6–12 mm long. Petals yellow, glabrous or partly hairy. Standard 22–28 mm long; blade 6–11 mm wide, elliptic to obovate, emarginate, at the base ± gradually narrowed. Wings (15–)17–23 mm long; blades narrowly oblong,

rounded to feebly retuse, 9–13 × 2–4 mm; auricle 1–1.5 mm, claw 8–11 mm. Keel 14–21 mm long; blades oblong to elliptic, nearly straight, obtuse to subacute, 7–10 × 3–5 mm; auricle indistinct, claw 7–10 mm. Stamen-tube obliquely cut at the mouth. Ovary sessile to subsessile, densely appressed hairy; style hairy at the base or in lower half. Legumes sessile, obliquely ellipsoid to oblong, with curved ventral line and nearly straight dorsal line, 10–15 mm long, 5–10 mm high and (5–)7–9 mm wide, keeled ventrally, flat or shallowly grooved dorsally, triangular in cross-section, with a nearly straight beak 2–5 mm long, incompletely bilocular; valves vaulted, thin, straw-coloured to pale brownish, sometimes reddish brown suffused, with long spreading hairs, very rarely glabrous.

48a. *Astragalus exscapus* subsp. *exscapus* (to this belongs the above mentioned synonym)

Plants up to 25 cm tall, rather densely hairy. Stipules (8–)10–15(–20) mm long, the upper ones densely hairy at least toward the tip. Leaves (5–)10–25 cm long; petiole 2–10 cm long. Leaflets in 10–13(–20) pairs, (8–)10–18(–23) × 4–11 mm, on upper side sparsely, on underside more densely or on both sides up to densely appressed hairy. Peduncles (0.2–)1–2 cm long. Bracts 4–12 mm long. Pedicels hairy. Calyx (10–)14–15 mm long, the tube loosely to densely covered with long, spreading hairs. Flowering time: 5–7. Occurrence: relictic species in xerotherm and föhn-influenced valleys of the Alpes and the Balkan, in *Pinus*- and *Abies*-forests, in *Stipa*-communities and other steppic vegetations, on sandy, loamy, gypsaceous and marly soils, 120–2,200 m. Distribution: Au, Bu, Cz, Ge, Gr, He, Hu, It, Rm. [Moldavia, Ukraine, Turkey].

48b. *Astragalus exscapus* subsp. *pubiflorus* (DC.) Soó, Acta Bot. Acad. Sci. Hung. 12: 355. 1966. (*A. pubiflorus* DC.)

Leaflets narrowly elliptic, 20–30 × 7–8 mm. Calyx 12–13 mm long, the teeth distinctly longer than the tube. Petals partly hairy. Standard on the back along the midline or allover appressed hairy. Wings hairy on outer side in upper part or allover or sometimes glabrous. Legumes 5 mm high and wide. Other-

wise like subsp. *exscapus*. Flowering time: 5–6. Occurrence: in steppic vegetation. Distribution: Al, Bu, Ju (Serbia), Rm [Moldavia, Russia, Ukraine].

48c. *Astragalus exscapus* subsp. *transsilvanicus* (SCHUR) NYÁR. in sched. ad Fl. exsicc. Roman. nr. 1278. 1930. [*A. transsilvanicus* SCHUR; *A. exscapus* var. *transsilvanicus* (SCHUR) GAMS]

Plants up to 40 cm tall, acaulescent, sparsely hairy. Stipules 15–27 mm long, mostly only ciliate at the margins. Leaves up to 40 cm long; petiole up to 15 cm long. Leaflets in 12–13(–16) pairs, (15–)20–30(–36) × 8–14 mm. Peduncles 3–4 cm long, glabrous. Bracts linear-acute, (17–)20–30 mm long. Pedicels 7–8 mm long, glabrous. Calyx 17–20 mm long, tube glabrous or scarcely hairy; teeth up to 12 mm long. Flowering time: 5–6. Distribution: Rm.

49. *Astragalus ictericus* DINGLER, Flora 64: 381. 1881. [Sect. *Caprini* DC.]

Plants ca. 45 cm tall, distinctly caulescent, with white or in dry state often reddish-brown, thin hairs 0.5–2 mm, at the rachis up to 4 mm long. Rootstock up to 10 mm thick. Stems one or few, ca. 15 cm long, at the base 4–5 mm in diameter, slightly angular-sulcate, glabrous. Stipules white-membranous, 5–20 × 4–9 mm long, narrowly triangular to ovate, free from the petiole and from each other, hairy at the margins and sometimes at the tip. Leaves ca. 30 cm long; petiole 3–7 cm long, like the rachis rather densely covered with spreading hairs 3–5 mm long. Leaflets in 10–13 pairs, 15–30 × 10–20 mm, elliptic to widely ovate, obtuse to subacute, at the base widely and often obliquely rounded, on upper side glabrous, on underside at the midvein and margins sparsely to loosely furnished with hairs 1–2.5 mm long. Peduncles ca. 14 cm long, sparsely hairy like the stem. Racemes very loosely ca. 7-flowered. Bracts whitish-membranous, linear-acute, 7–10 mm long, sparsely hairy, at the base with minute sessile glands. Pedicels ca. 3 mm long, sparsely hairy. Calyx ca. 15 mm long, tubular, at the tube very sparsely, at the teeth loosely covered with spreading hairs 2–4 mm long; teeth subulate, 6–8 mm long. Petals glabrous, yellow. Standard 28–30 mm

long; blade 7–9 mm wide, obovate, emarginate, slightly constricted in lower third, obtusely-angularly passing into the cuneate claw. Wings 20–21 mm long; blades narrowly oblong, obtuse, ca. 16 × 3 mm; auricle ca. 2 mm, claw ca. 10 mm. Keel ca. 19 mm long; blades ± straight, narrowly ovate, elliptic, with slightly curved lower and nearly straight upper edge, obtuse, 9 × 3 mm; auricle ca. 0.6 mm, claw 10 mm. Stamen-tube obliquely cut at the mouth. Ovary sessile, densely covered with hairs 3–5 mm long; style glabrous.

Legumes unknown. Flowering time: 5. Occurrence: foothills of southern Thrakia, 370 m. Distribution: NE. Greece. Gr (Known only from the type).

50. *Astragalus nummularius* LAM., Encycl. Méth. Bot. 1: 317. 1783. [Sect. *Caprini* DC.]

Plants 3–10 cm tall, acaulescent, with thin but rather rigid white hairs 0.5–2(–2.5) mm long, often pale brownish when dry. Rootstock up to 10 mm long, mostly strongly divided, with long, thin, creeping stolons up to 10 cm long, covered with remnants of old stipules. Stipules thinly white-membranous, 5–12 mm long, 2–2.5 mm wide, adnate to the petiole for 1–2(–3) mm, the lower ones oblong to ovate, obtuse, glabrous, the upper ones narrowly triangular-acuminate, hairy. Leaves (3–)4–8(–9) cm long, subsessile or with a petiole 0.5–1.5(–2) cm long; rachis often reddish suffused, densely covered with thin, rather rigid, spreading hairs. Leaflets in (6–)8–11 pairs, blue green, obovate to nearly orbicular, 4–8(–12) × 3–6(–8) mm, emarginate or more rarely truncate, on both sides densely subappressed to spreadingly hairy, more rarely less densely hairy on upper side. Racemes subsessile, 1–2-flowered. Bracts white-membranous, 2–5 mm long, linear-acuminate, hairy. Pedicels 1–3 mm long, hairy. Calyx 9–10(–12) mm long, shortly tubular, loosely to densely spreadingly hairy; teeth subulate, (3–)4–6 mm long. Petals yellow, glabrous or standard sometimes sparsely hairy. Standard 16–18(–21) mm long; blade 6–7.5(–8) mm wide, obovate, emarginate, sometimes slightly constricted below the middle, gradually narrowed at the base. Wings 13–15(–18) mm long; blades narrowly oblong, rounded, 7–8 × 2–2.5 mm; auricle ca. 1 mm, claw 6–8 mm.

Keel 11–16 mm long; blades slightly obliquely elliptic, nearly straight, obtuse, 5–7 × 2–3 mm; auricle indistinct, claw 6–7 mm. Stamen-tube truncate at the mouth. Ovary sessile or subsessile, hairy; style hairy in lower half. Legumes sessile, obliquely ellipsoid, with curved ventral line and nearly straight dorsal line, strongly compressed laterally, (8–)10–12(–13) mm long. 7–7.5 mm high and ca. 2 mm wide, keeled ventrally, narrowly rounded dorsally, contracted into a short beak, incompletely bilocular (septum 1/3–1/2 of the fruit's height); valves thin but tough, straw-coloured or reddish-suffused, subappressed hairy. Flowering time: 4–5. Occurrence: 650–1,800 m. Distribution: Cr.

51. *Astragalus tremolsianus* PAU, Mem. Mus. Ci. Nat. Barcelona, Ser. Bot. 1(3): 17. 1925. [Sect. *Caprini* DC.]

Plants 3–5 cm tall, acaulescent, caespitose, covered with thin, soft white hairs up to 2 mm long. Rootstock up to 10 mm thick, with a pluricipital root-crown. Stipules white-membranous, 6–10 mm long, adnate to the petiole for ca. 2 mm, the lower ones ovate to narrowly ovate-obtuse, glabrous, the upper ones narrowly triangular-acute, shortly ciliate at the margins. Leaves recurved, prostrate, 3–7 cm long; petiole 1–2 cm long, like the rachis loosely to rather densely covered with spreading hairs 0.5–1.5 mm long. Leaflets in 8–12 pairs, ovate to obovate to nearly orbicular, 4–8 × 3–7 mm, rounded, sometimes minutely mucronulate, on upper side sparsely hairy toward the margins or rarely glabrous, on underside loosely to rather densely covered with ascending hairs. Racemes sessile, 1–3-flowered. Bracts white-membranous, linear-acute, 3–4 mm long, ciliate. Pedicels 1–2 mm long, sparsely hairy. Calyx 10–14 mm long, tubular, in basal part sparsely, in upper part more densely covered with spreading hairs 1.5–2 mm long; teeth subulate, 5–6 mm long. Petals glabrous, yellow. Standard 18–20 mm long; blade 6–7 mm wide, oblong to slightly panduriform, sometimes slightly constricted below the middle, emarginate, gradually narrowed into the short claw. Wings 16–17 mm long; blades narrowly oblong, rounded, ca. 10 × 2 mm; auricle ca. 1 mm, claw 6–7 mm. Keel 14–15 mm long; blades obli-

que-elliptic, straight, with slightly gibbously curved lower edge and nearly straight upper edge, subacute, ca. 7 × 3 mm; auricle wide, indistinct, claw 7–8 mm. Stamen-tube slightly obliquely cut at the mouth. Ovary subsessile, densely hairy; style hairy up to beyond the middle. Legumes ca. 10 mm long. Legumes: 6–7. Distribution: S. Spain (Sierra de Gador) Hs.

Note: The species is highly endangered because the only known population consists of few plants only.

52. *Astragalus utriger* PALL., Astragal.: 75, tab. 61. 1802. (*A. cernjavskii* STOJ.). [Sect. *Caprini* DC.]

Plants 10–15(–25) cm tall, acaulescent, with white or with age reddish brownish, somewhat stiff hairs up to 4(–5) mm long. Rootstock up to 8 mm thick, divided, with branches covered in upper part with remnants of old stipules. Stipules white-membranous, 7–8 mm long, adnate to the petiole for 2–4 mm, densely ciliate at the margins, sometimes hairy toward the tips, the lower ones ovate-obtuse, the upper ones narrowly triangular-acute. Leaves (6–) 8–20 cm long; petiole 2–6 cm long, like the rachis loosely covered with spreading hairs 1–3 mm long. Leaflets in (10–)12–17(–19) pairs, narrowly ovate to narrowly elliptic, (6–)10–15(–20) × (3–)4–6(–10) mm, narrowly rounded, on upper side glabrous, on underside sparsely to loosely covered with spreading hairs, often folded. Peduncles 1–6 cm long, with long spreading hairs. Racemes loosely 1–4(–6)-flowered. Bracts white-membranous, linear-acuminate, 4–10 mm long, ciliate. Pedicels 3–5 mm long, with spreading hairs. Calyx tubular, 10–15 mm long, loosely covered with spreading hairs; teeth from narrowly triangular base acuminate, 2–3(–4) mm long, sparsely and spreadingly hairy. Petals yellow, fading to red. Standard 20–22(–25) mm long; blade 10–12(–14) mm wide, obovate to widely obovate, emarginate, gradually narrowed into the claw. Wings 18–20(–22) mm long; blades narrowly oblong, sometimes slightly curved, rounded, 9–11 × (2–)3–4.5 mm; auricle ca. 2 mm, claw 10–11 mm. Keel 15–18(–20) mm long; blades oblique-obovate, with in upper part rectangularly curved lower edge and nearly straight upper edge, in apical part

furnished with minute teeth, shortly beak-like narrowed toward the obtuse tip, (6–)8–9 × 4–5 mm; auricle minute, acute, claw ca. 11 mm. Stamen-tube obliquely cut at the mouth. Ovary with a stipe 3–4 mm long, hairy; style hairy in basal part. Legumes with a stipe 5–8(–10) mm long, narrowly ovoid to ellipsoid, (10–)20–30 mm long, 7–10 mm high and (12–)14–18(–20) mm wide, flattened or shallowly grooved ventrally and dorsally, contracted into a straight beak 3–5(–9) mm long, completely bilocular; valves thinly coriaceous, brownish, sparsely to loosely covered with spreading hairs; fruit opening only along the ventral suture. Flowering time: 4–5. Occurrence: in steppic communities. Distribution: Ju (Macedonia) [Russia, Ukraine].

53. *Astragalus clusianus* SOLDANO, *Thaiszia* 4: 120. 1994. (*A. clusii* BOISS.). [Sect. *Poterion* BUNGE]

Plants 15–40 cm tall, mostly densely branched shrublets. Hairs white, 0.2–1.5(–2) mm long. Branches up to 30 cm long; part of the current year (1–)3–8 cm long, 3–5 mm thick, very densely woolly-tomentose, soon glabrescent with age, covered by stipules. Short lateral shoots regularly present at the base of each leaf on the main stem. Stipules of the main stems membranous, yellowish white, 1–5-nerved, 4–9 mm long, widely triangular, adnate to the petiole for 2–4 mm, embracing the stem, connate behind the stem only at the base or free from each other, densely to very densely hairy. Leaves of the main stems 1.5–6.5 cm long, erect to obliquely erect; petiole 0.4–1.5 cm long, like the rachis mostly slender, in the youth densely to very densely covered with short appressed and longer spreading hairs; terminal spine up to 1.5 times longer than the uppermost leaflets. Leaflets in (4–)5–8 pairs, rather close together, narrowly elliptic to elliptic, 3–11 × 1–3.5(–4) mm, rounded to acute, on both sides densely to very densely covered with short appressed and longer spreading hairs, those of primary leaves sometimes glabrous on upper side. Leaves of the brachyblasts 0.4–3 cm long; leaflets in 4–6 pairs, 2–9 × 0.8–3 mm, similar to those of main stem leaves. Inflorescences at the lateral brachyblasts, with peduncles 2–10 mm long, densely covered with appressed to spreading hairs.

Racemes mostly 2-flowered. Bracts 4–8 mm long, ovate, acuminate, very densely hairy. Pedicels 1–4 mm long. Bracteoles 3–6 mm long, narrowly ovate, acute. Calyx at beginning of anthesis tubular, 14–18 mm long, 3–5 mm wide, greenish yellow or red, at fruiting time bladderly enlarged, widely ellipsoid, 16–26 mm long, 10–15 mm wide, with (12–)14–20 reticulately connected nerves, at anthesis very densely, later on densely covered short and long, appressed to spreading hairs; teeth from triangular base subulate to filiform, 3.5–6 mm long. Petals yellowish white, blades sometimes pale purplish-suffused or -nerved, claws connate at the base. Standard 18–24 mm long; blade obliquely recurved, 7.5–11 × 5.5–9.5 mm, widely elliptic, emarginate, subabruptly contracted into the narrow claw. Wings 18–22 mm long; blades narrowly oblong to elliptic, obtuse, 7–9 × 2–3 mm; auricle 0.5–1.2 mm, claw 10–15 mm. Keel 16–21 mm long; blades obliquely oblong, with widely curved lower edge and sigmoid upper edge, obtuse to subacute, 5–6.5 × 2–3 mm; auricle minute, claw 10–15 mm. Stamen-tube truncate at the mouth. Ovary with a stipe 2–4 mm long, very densely hairy; style glabrous or hairy in basal half. Legumes with a stipe 2–4 mm long, 5–6 mm long, 1.5–2.5 mm high and 3.5–4 mm wide, widely rounded to flat ventrally, flat dorsally, with a beak 1.5–3 mm long; valves loosely to densely shortly appressed hairy. Flowering time: (4–) 5–6. Occurrence: dry regions, *Pinus*-forests, 350–1,500 m. Distribution: S.E. Spain. Hs.

54. *Astragalus physocalyx* FISCH., *Bull. Sci. Acad. Imp. Sci. Saint-Pétersbourg* 2: 74. 1837. [Sect. *Pogonotropis* BUNGE]

Plants up to 25 cm tall, acaulescent, nearly glabrous. Rootstock mostly undivided, in upper part densely covered with remnants of old stipules and petioles. Stipules 8–10 mm long, firm, straw-coloured, narrowly triangular, subacute, with longitudinal nerves, glabrous or sometimes very shortly ciliate at the tip, adnate to the petiole for ca. 1 mm. Leaves 8–20 cm long; petiole 2.5–7 cm long, like the rachis slightly flattened, grooved adaxially, glabrous or in young leaves sparsely furnished with fine, white, ascending hairs up to 1.5 mm long. Leaflets in 15–22 pairs, narrowly elliptic to

elliptic, shortly acuminate to more rarely rounded and shortly mucronulate, 6–24 × 2.5–8 mm, glabrous or on underside sparsely white hairy at the midvein and the margins. Racemes loosely 1–3-flowered, with a glabrous or sparsely hairy peduncle 0.5–4 cm long. Bracts whitish-hyalin, ovate, 6–8 mm long, ciliate at the margins. Pedicels 3–4 mm long, sparsely hairy. Calyx at beginning of anthesis 12–15 mm long, tubular-ventricose, soon ovoid-inflated, up to 25 mm long and 15 mm wide, constricted at the mouth, straw-coloured, glabrous or toward the teeth sparsely hairy; teeth triangular, ca. 3 mm long, especially toward the margins and on inner side densely white villous. Petals pale lilac, turning to pale yellow. Standard 31–50 mm long; blade narrowly elliptic to narrowly obovate, 10–12 mm wide, slightly retuse, gradually narrowed into the wide claw. Wings 27–40 mm long; blades narrowly oblong, widely rounded, 13–20 × 4–5 mm; auricle ca. 1 mm, claw 14–20 mm. Keel 21–24 mm long; blades obliquely elliptic-curved, with widely curved lower edge and slightly concave upper edge, subacute, 8 × 4 mm; auricle ca. 1 mm, claw 12–14 mm. Ovary with a stipe ca. 2 mm long, oblong, white hairy; style glabrous. Legumes included in the calyx, with a stipe 4–5 mm long, widely ellipsoid, ca. 10 mm long, 5 mm high and 8 mm wide, keeled ventrally, flattened dorsally, subabruptly narrowed into a straight beak ca. 3 mm long, unilocular; valves thin but tough, straw-coloured, glabrous when fully ripe. Flowering time: 4–5. Distribution: Bu, Ju (Macedonia) [Turkey].

55. *Astragalus dasyanthus* PALL., Reise Russ.

Reich. 3: 749. 1776. (*A. eriocephalus* WALDST. & KIT. [Incerta sedis])

Plants (10–)15–45 cm tall, covered with white, when dry reddish or brownish hairs. Rootstock simple or divided with short branches. Stems singular or several, up to 40 cm long, rarely very short, stout, up to 5 mm in diameter, slightly sulcate, densely covered with spreading hairs 1.5–5 mm long. Stipules whitish-membranous, 10–20(–25) mm long, narrowly triangular, acuminate, with 8–12 fine, parallel nerves, ± densely covered with ascending hairs. Leaves 10–30 cm long; petiole 1.5–6 cm long, with the rachis hairy like the

stem. Leaflets in 11–17(–20) pairs, ovate to elliptic, (6–)12–25 × 5–15 mm, rounded to subobtusate or sometimes retuse, mostly minutely mucronulate, on both sides loosely to rather densely covered with subappressed hairs 1–2 mm long. Peduncles in upper part of the stem, 5–20 cm long, erect to recurved, densely covered with ± spreading, tangled hairs 0.5–3 mm long. Racemes spherical to shortly ovoid, 3–6(–6.5) cm long, 3–5 cm in diameter, ± densely (6–)10–30 flowered. Bracts whitish-membranous, linear, acute, 10–15 mm long, 1–1.5 mm wide, densely spreading hairy. Pedicels 1–1.5 mm long, hairy. Calyx 12–15(–17) mm long, campanulate, densely covered with spreading hairs up to 5 mm long; teeth greenish, narrowly triangular, 4–6 mm long, hairy on inner side. Petals all hairy, yellow. Standard 18–25 mm long; blade oblong-elliptic, 6–7 mm wide, emarginate, gradually narrowed into the rather long claw. Wings 15–18 mm long; blades narrowly oblong, rounded, 8.5–9.5 × 2–2.5 mm; auricle 1–1.5 mm, claw ca. 7 mm. Keel 13–15 mm long; blades obliquely ovate, nearly straight, with slightly curved lower edge and nearly straight upper edge, obtuse, ca. 7 × 3–3.2 mm; auricle ca. 0.5 mm, claw ca. 7 mm. Stamen-tube nearly truncate at the mouth. Ovary sessile, densely hairy; style hairy in high up. Legumes sessile, ovoid to widely ovoid, 10–20 mm long, 6–8 mm high and 4 mm wide, keeled ventrally, shallowly grooved dorsally, with a beak ca. 2 mm long, incompletely bilocular (septum up to 3/4 of the fruit's height); valves thinly coriaceous, pale brown, densely covered with subappressed to ascending hairs 1–3 cm long. Flowering time: 5–6. Distribution: Bu, Hu, Ju (Serbia) Rm [Moldavia, Ukraine, Russia].

56. *Astragalus nevadensis* BOISS., Diagn. pl. orient., ser. 1, 2: 63. 1843. (*A. nevadensis* subsp. *granatensis* BRAUN-BLANQ.; *A. sempervirens* subsp. *nevadensis* (BOISS.) P.MONTS.; *A. giennensis* HEYWOOD). [Sect. *Adiaspastus* BUNGE]

Plants dwarf cushion-forming shrublets, 15–40 cm tall, densely branched from the base. Hairs 0.3–2 mm, at the calyx up to 3.5 mm long, mostly thin. Stems from a prostrate Rootstock ascending, up to 35 cm long; parts of the current year 1.5–10 cm long, 1–3 mm in

diameter, below the stipules densely appressed lanate, soon glabrescent. Stipules membranous, yellowish, 6–22 mm long, adnate to the petiole for 3–8 mm, connate behind the stem shortly or up to 5 mm, free tips long acuminate, with 6–11 parallel nerves at free part, ciliate at margins, glabrous otherwise. Leaves 1–6 cm long, remote, obliquely erect to subhorizontal; petiole 0.4–2.5 cm long, like the rachis \pm thick, rigid, mostly straight, sparsely to densely appressed hairy or villous; terminal spine 1/3–1/1 as long as the uppermost leaflets. Leaflets in 4–7(–8) pairs, whitish or greyish green to dark green, mostly flat, narrowly elliptic to narrowly obovate, 5–16 \times 1.5–3 mm, acute or obtuse, not mucronulate or with a mucro up to 0.7 mm long, both sides sparsely to densely appressed hairy or villous. Synflorescences 2–5 cm long and 2.5–3 cm wide, globose to ovoid or rarely shortly cylindrical, composed of 4–5-flowered axillary clusters. Bracts membranous, sometimes hyaline, yellow, sometimes red at tip, 5–15 mm long and 1.2–2 mm wide, narrowly elliptic, boat-shaped or flat, acuminate, ciliate at margins and base, glabrous otherwise. Bracteoles rarely present, 2–4 mm long, subulate or narrowly triangular, ciliate at margins, glabrous otherwise. Calyx tubular, not splitting, yellowish with mostly purple nerves and teeth, 12–18 mm long and 3–5 mm wide, with 11–13 parallel nerves, densely appressed villous; teeth 6.5–13 mm long, as long as or up to three times longer than tube, filiform from a triangular base. Petals yellow, keel violet at tip, claws of wings and keel adnate to the stamen-tube for up to 1 mm. Standard 15–18 mm long; blade 11–12 mm long and 5.5–7.5 mm wide, retuse, at base narrowed into an indistinct, cuneate claw 4–6 mm long. Wings 14.5–16 mm long; blades narrowly oblong, obtuse, 7–8 \times 2–3 mm; auricle 0.5–1 mm, claw 6.8–9 mm. Keel 11–12.5 mm long; blades obliquely elliptic, subacute, 5–5.5 \times 2.5–3 mm. Stamens 11–12 mm long, at upper 3–4 mm free from each other. Ovary with a very short glabrous stipe, densely appressed hairy; style hairy in lower half. Legumes sessile, dorsio-ventrally compressed, 6–7 mm long, 2–3 mm high and 3–5 mm wide, with a straight to curved beak 0.7–1.5 mm long; valves persistently densely appressed villous. Two subspecies:

56a. *Astragalus nevadensis* subsp. *nevadensis*

Leaflets on upper side sparsely hairy to subglabrous, on underside sparsely to densely to appressed sericeous, sometimes subappressed hairy on both sides; with a mucro 0.1–0.7 mm long. Flowering time: 7–8. Occurrence: 1,600–3,000 m. Distribution: Hs (S. Spain).

56b. *A. nevadensis* subsp. *muticus* (PAU) ZARRE & PODLECH in ZARRE, Syst. Revis. *Astragalus* sect. *Adiaspastus*, sect. *Macrophyllum*, sect. *Pterophorus*: 96. 1998. (*A. sempervirens* subsp. *muticus* (PAU) LAÍNZ; *A. muticus* PAU)

Leaflets on both sides densely appressed lanate or villous, obtuse, not mucronulate. Flowering time: 6–7. Occurrence: 1,000–2,000 m. Distribution: Hs (E. Spain).

57. *Astragalus sempervirens* LAM., Encycl. Méth. Bot. 1: 320. 1783 [*A. aristatus* L'HÉR.; *A. cephalonicus* C.PRESL; *A. sempervirens* subsp. *cephalonicus* (C.PRESL) ASCH. & GRAEBN.; *A. sempervirens* subsp. *alpinus* PIGNATTI; *A. sempervirens* subsp. *gussonei* PIGNATTI; *A. nevadensis* BOISS. subsp. *catalaunicus* BRAUN-BLANQ.; *A. sempervirens* subsp. *catalaunicus* (BRAUN-BLANQ.) LAÍNZ]. [Sect. *Adiaspastus* BUNGE]

Plants dwarf cushion forming shrublets, 15–30 cm high, densely branched from the base. Hairs 0.3–1.5 mm, at the calyx up to 2 mm long, mostly thick. Stems from a prostrate Rootstock ascending, up to 26 cm long; parts of the current year 1.5–0 cm long, 1–2.5 mm in diameter, below the stipules densely appressed lanate, soon glabrescent. Stipules membranous, white yellowish, 10–12 mm long, adnate to the petiole for 4–7 mm, connate behind the stem up to 3 mm, acuminate, with 6–11 parallel nerves at free part, younger ones sparsely tomentose to glabrous, ciliate at the margins. Leaves 1–6 cm long, crowded or \pm remote, obliquely erect to subhorizontal; petiole 0.4–2.5 cm long, like the rachis \pm thick, rigid, mostly straight, sparsely to densely covered with ascending to spreading hairs; terminal spine 1/3–1/1 as long as the uppermost leaflets. Leaflets in 5–10 pairs, dark green, folded, becoming flat with age, 3–11 mm long and 1–3.5 mm wide, narrowly elliptic, acute or obtuse, not mucronulate or with a mucro up to 0.7 mm long, both sides sparsely appressed hairy, upper side sometimes wholly glabrous.

Inflorescences compound or simple, compound ones 3–5 cm long and ca. 3 cm wide, globose to ovate or rarely shortly cylindrical, composed of 4–8-flowered axillary clusters; the simple ones with densely appressed hairy peduncle 4–13 mm long, the flowering part 5–15 mm long. Bracts membranous, yellow, sometimes red at tip, 5–9 mm long and 2–4 mm wide, ovate or rarely narrowly ovate, acuminate, ciliate at margins and base, glabrous otherwise. Bracteoles rarely present, 2–4 mm long, subulate, ciliate at margins, glabrous otherwise. Calyx tubular, not splitting, yellowish, nerves and teeth mostly purple, 9–12 mm long and 3–5 mm wide, with 11–13 parallel nerves, densely shortly villous; teeth 5–7 mm long, filiform from triangular base, much more sparsely hairy than tube, at tip mostly glabrous. Petals yellow, keel violet at tip; claws of wings and keel adnate to the stamen-tube only at the base or up to 1 mm. Standard 15–21 mm long; blade 11–15 mm long and 5.5–7.5 mm wide, mostly not sharply delimited from the claw, obovate, minutely emarginate, very shallowly constricted in lower third or not, with a widely cuneate claw 4–6 mm long. Wings 14.5–17 mm long; blades narrowly oblong, obtuse, 7–9 × 2–3 mm; auricle 0.5–1 mm; claw 6.8–9 mm. Keel 11–14 mm long; blades triangular-curved, with rectangularly curved lower edge and concave upper edge, subacute, 5–6.5 × 2.5–3 mm; claw 6–7.5 mm. Stamens 11–13.5 mm long, at upper 3–4 mm free from each other. Ovary subsessile, densely appressed hairy; style 7–9.5 mm long, hairy in proximal half. Legumes subsessile, ellipsoid, dorsiventrally compressed, 6–7 mm long, 2.5–5 mm wide and 2–3 mm high, with a straight beak 0.7–1.5 mm long; valves densely appressed hairy, not glabrescent. Occurrence: 700–2,500 m. Distribution: Ga, Gr, He, Hs, It.

58. *Astragalus creticus* LAM., Encycl. Méth. Bot. 1: 321. 1783. [Sect. *Rhacophorus* BUNGE]

Plants dwarf cushions-forming shrublets, 15–25 cm tall, densely branched at the base. Hairs 0.1–2 mm long, mostly very thin. Stems ascending or from prostrate base ascending, up to 22 cm long, parts of the current year 1–3 cm long and 1–3 mm in diameter, densely appressed hairy, ± soon glabrescent. Stipules

chartaceous, only at free part thinly membranaceous, with few to several secondary veins, yellow, 6–14 mm long, ovate-triangular, acuminate, adnate to the petiole for 3–6 mm, younger ones sparsely to densely tomentose, soon becoming glabrescent to glabrous, at the margins sparsely to densely ciliate. Leaves (1.5–)2–3.5(–4) cm long, crowded; petiole 0.2–1 cm long, like the rachis thick, rigid, straight, sparsely to densely spreading hairy, glabrescent with age; terminal spine 1/4–1/2 as long as the uppermost leaflets. Leaflets in (3–)7–10 pairs, flat or slightly boat-shaped, grey green, 3–9.5 × 1–3.5 mm, narrowly elliptic to elliptic or rarely obovate, acute, with a tiny mucro up to 0.1–0.6 mm long, on both sides with a dense double indumentum: densely tomentose with short curled hairs and sparsely to densely covered with longer and thicker, ascending to spreading hairs. Synflorescences dense, globose, 1.5–2 cm in diameter, composed of 2–3-flowered axillary clusters. Bracts 5–9 × 1.5–3 mm, boat-shaped, often incurved at the shortly acuminate tip, densely tomentose, sometimes glabrous toward the base. Calyx turbinate, splitting with age, 5.5–10 mm long, with 12–15 parallel nerves, densely covered with appressed hairs 2–3 mm long; teeth subulate to narrowly triangular, 2.5–4 mm long, mostly hidden by the indumentum. Petals pale pink, sometimes with purplish veins, drying cream, claw of wings and keel adnate to the stem-tube up to 3 mm. Standard 9.5–18 mm long and 4.5–6 mm wide, retuse, platonychoid, slightly constricted at the middle, below the constriction obtusely dilated and wider than in upper half; rarely stenonychoid and then with a blade ca. 9 × 4–7 mm, oblong-panduriform, obtusely dilated at the base, with a claw 2–4 mm. Wings 9–13 mm long; blades narrowly oblong, obtuse, 4–5.5 × 1–1.5 mm; auricle 0.2–0.4 mm, claw 5.5–7 mm. Keel 9–13 mm long; blades obliquely elliptic to obovate, with widely curved lower edge and ± straight upper edge, obtuse, 4–4.5 × ca. 2 mm; auricle minute, claw 5–8 mm. Stamens 9–12 mm long, the upper 3–4 mm free from each other. Ovary densely shortly appressed hairy; style 7–10 mm long, hairy up to the middle. Legumes ellipsoid, laterally compressed, 4.5–8 mm long and ca. 2–3 mm high, with a straight beak 0.3–0.5 mm

long, sparsely appressed hairy in lower part, densely villous in upper half. Two subspecies:

58a. *Astragalus creticus* subsp. *creticus*

Stipules with several secondary veins, free tips triangular, with scattered or sparse marginal hairs 0.5–1 mm long. Petiole and rachis with densely woolly hairs. Leaflets mostly in 7–8 pairs, glaucescent, oblong-elliptic, 4–7.5 × 1.5–3 mm, with a mucro 0.3–0.6 mm long. Bracts 5–7 mm long, acute. Calyx 5.5–8 mm long, covered with straight hairs; teeth 3.5–4 mm long. Petals pale pink. Standard 9.5–13.5 × 4–6 mm. Wings 9–12 mm long. Keel 9–12.5 mm long. Ovary 11–12 mm long; stigma acute. Flowering time: 6–7. Occurrence: rocky places on limestone, 1,200–2,450 m. Distribution: Greece (Crete) Cr.

58b. *Astragalus creticus* subsp. *minoicus* BRULLO & GIUSSO, Israel J. Pl. Sci. 51: 309. 2003

Stipules with few secondary veins, free tips narrowly triangular, with dense marginal hairs 0.5–0.6 mm long. Petiole and rachis with scattered rigid hairs. Leaflets mostly in 8–10 pairs, green to green greyish, elliptic-obovate, 4–9.5 × 1.5–3.5 mm, with a mucro 0.1–0.3 mm long. Bracts 7–9 mm long, obtuse. Calyx 9.5–10 mm long; covered with undulate hairs; teeth 2.5–3.5 mm long. Petals pink with purplish veins. Standard 14–18 × 5–7 mm. Wings 12–13 mm long. Keel 12.5–13 mm long. Ovary 16–17 mm long; stigma bilobed. Flowering time: 6. Occurrence: in the submontane belt, 900–1,100 m. Distribution: Greece (E. Crete) Cr.

59. *Astragalus cylleneus* FISCH., Bull. Imp. Soc. Natural. Moscou 26(2): 355. 1853.

[*A. parnassi* subsp. *cylleneus* (FISCH.) HAYEK; *A. calavrytensis* BEAUVERD & TOPALI]. [Sect. *Rhacophorus* BUNGE]

Plants dwarf cushion-forming shrublets, 15–30 cm tall, densely branched from the base. Hairs 0.2–1 mm, at the calyx up to 3 mm long, mostly soon falling and thin. Stems prostrate, up to 28 cm long, parts of the current year 0.5–7 cm long and 1–2.5 mm in diameter, sparsely appressed hairy, soon glabrescent. Stipules yellowish, membranous, sometimes hyalin at free part, yellowish, sometimes purple toward the tip, 5–14 mm long, narrowly triangular, long acuminate, with 1–3 parallel nerves

at free part, adnate to the petiole for 2.5–6 mm, glabrous, ciliate at the margins. Leaves 0.7–5 cm long, crowded, obliquely erect to subhorizontal; petiole 0.3–1.5 cm long, like the rachis thin or rarely thick, rigid, sparsely covered with subappressed to spreading hairs or rarely villous, soon glabrescent; terminal spine 1–2 times as long as the uppermost leaflets. Leaflets in 4–7 pairs, light to dark green, mostly folded, 3–10 × 1–3 mm, narrowly oblong, acute or rarely obtuse, with a mucro 0.2–1 mm long, on upper side glabrous, on underside sparsely covered with subappressed to spreading long hairs on midrib and toward the margins. Synflorescences globose to ovoid or rarely shortly cylindrical, 1.5–4.5 cm long and 1.5–3 cm in diameter, composed of 2-flowered axillary clusters. Bracts membranous, yellowish, sometimes purple at tip, 6–11 × 1–2 mm, narrowly oblong, acuminate, boat-shaped, densely lanate in upper half, otherwise glabrous. Bracteoles sometimes present, mostly single at the base of each calyx, membranous, yellowish, 3–6 mm long, linear or subulate, ciliate at the tip, otherwise glabrous. Calyx yellowish white, green at teeth, tubular-turbinate or turbinate, splitting with age, 8–13(–17) mm long, with 13–17 parallel nerves, densely appressed hairy, sometimes glabrous at the base; teeth subulate to filiform, 5–8(–11) mm long. Petals with yellowish white claws and pink to purple blades, claw of wings and keel adnate to the stamen-tube for 3–5 mm. Standard 13–21 mm long; blade 9–12.5 × 5–6 mm, oblong-panduriform, shallowly retuse, constricted in lower third or at the middle, acutely dilated at the base; claw 4–6.5 mm, widely cuneate. Wings 13–20 mm long; blades narrowly oblong, obtuse, 5.5–8 × 1–2 mm; auricle 0.3–1 mm, claw 8–13 mm. Keel 13–18 mm long; blades obliquely elliptic, with widely curved lower edge and ± concave upper edge, obtuse, 5–6.2 × 2–2.5 mm; claw 7.5–12 mm. Stamens 13–18 mm long, the upper 2–3 mm free from each other. Ovary densely, appressed shortly hairy; style 10–14 mm long, hairy at base or up to lower third. Legumes elliptic, dorsi-ventrally compressed, 4.5–5.5 mm long, ca. 1.5 mm high and 2–2.5 mm wide, with beak 1–1.5 mm long, glabrous at the base, densely tomentose up to middle and densely villous further up. Distribution: Gr.

**60. *Astragalus dolinicola* (BRULLO & GIUSSO)
BRULLO & GIUSSO, Israel J. Pl. Sci. 51: 309.
2003. (*Astracantha dolinicola* BRULLO &
GIUSSO). [Sect. *Rhacophorus* BUNGE]**

Plants dwarf spiny shrublets 20–40 cm tall. Stems strongly branched, 2–6 mm in diameter, old parts covered with persistent stipules and rachides; parts of the current year 2–3 cm long. Stipules chartaceous, ad margins and tip hyaline, 6–11 mm long, connate to the petiole up to the middle, free tips triangular, uninerved, without secondary veins, sparsely ciliate at the margins with hairs 0.1 mm long. Leaves 1.2–2.2 cm long; petiole short, like the rachis sparsely hairy; terminal spine ca. 2 times longer than the uppermost leaflets. Leaflets in 6 pairs, \pm elliptic, $3.5\text{--}6.5 \times 1.5\text{--}2.2$ mm, with a mucro 0.1–0.25 mm long, sparsely covered with subappressed hairs 0.3–0.5 mm long. Synflorescences ca. 1 cm in diameter, composed of ca. 2-flowered axillary clusters. Bracts hyaline, narrowly elliptic, boat-shaped, long apiculate, $9\text{--}10 \times 1.6\text{--}3$ mm, glabrous or sparsely hairy along the midrib. Bracteoles absent. Calyx turbinate-tubular, 8–10 mm long, glabrous in lower third, otherwise densely covered with ascending hairs 1–3 mm long; teeth 4–5 mm long, narrowly triangular, not hidden by the hairs. Petals pink with purplish veins on standard. Standard 12–13 mm long, platynchioid; blade 6.5–7 mm wide, slightly emarginate, slightly constricted in upper third, at the base obtusely dilated and gradually passing into a cuneate claw. Wings 13–15 mm long; blade narrowly oblong, obtuse, ca. 5.5–7 mm long. Keel 13–14 mm long; blades obovate, subacute, 5.5–6 mm long. Ovary hairy; style glabrous. Legumes \pm ovoid, 6.5–7 mm long, 3–4 mm high, densely covered with curled hairs. Flowering time: 6. Occurrence: in dry dolines of Psiloritis range, 1,400–1,500 m. Distribution: Greece (Central Crete) Cr.

**61. *Astragalus granatensis* LAM., Encycl. Méth.
Bot. 1: 321. 1783. [*A. boissieri* FISCH.;
A. creticus LAM. subsp. *boissieri* (FISCH.) RIVAS
GODAY & BORJA]. [Sect. *Rhacophorus* BUNGE]**

Plants dwarf cushion-forming shrublets, up to 40 cm tall, loosely or \pm densely branched at the base. Hairs 0.2–2.5 mm long, mostly very thin, shorter ones somewhat thicker. Stems

from prostrate base ascending, up to 37 cm long; parts of the current year 0.5–5 cm long, 1–3 mm in diameter, under the stipules densely appressed tomentose, glabrescent with age. Stipules yellow to light brown, chartaceous, 11–16 mm long, from a triangular base long acuminate, with 3–8 parallel nerves at free part arising from a loose net at the base, adnate to the petiole for 3–6 mm, younger ones sparsely tomentose, soon glabrescent, densely long ciliate at the margins. Leaves 0.5–5 cm long, obliquely erect to horizontal, rarely recurved and turning downward; petiole 0.2–1 cm long, like the rachis \pm thin, rigid, straight, younger ones densely covered with strongly curled hairs, which later on becoming sparsely and spreading; terminal spine $1/2\text{--}3/2$ as long as the uppermost leaflets. Leaflets in (4–)5–8 pairs, whitish to grey green, narrowly elliptic to narrowly obovate, $4\text{--}15 \times 1\text{--}2.5$ mm, acute or rarely obtuse, with a mucro 0.2–1.5 mm long, younger ones densely appressed shortly tomentose with some long curled hairs later becoming subappressed and straight mixed in, older ones with long, ascending to spreading hairs. Synflorescences 1–2(–4) cm long and 1.5–2 cm in diameter, \pm dense, globose to shortly cylindrical, composed of 2–3-flowered axillary clusters. Bracts 6–8 \times 1.5–2.5 mm, narrowly oblong, boat-shaped, densely tomentose in upper half, in lower half glabrous or only hairy at the midvein. Calyx turbinate, splitting, yellowish, green at the teeth, 6–7 mm long, with 12–15 parallel nerves, very densely appressed villous except of the glabrous base; teeth 3–4 mm long, subulate. Petals yellowish, blades mostly violet or purple veined, claw of wings and keel adnate to the stamen-tube up to 3 mm. Standard 9–13 mm long; blade 4–8 \times 3–5 mm, elliptic-panduriform, retuse, shallowly constricted at the middle, hastate-auriculate at the base; claw 4–6 mm. Wings 9–13 mm long; blades narrowly oblong, obtuse, 4–6 \times 0.8–1.3 mm; auricle 0.2–0.4 mm, claw 5.3–7.3 mm. Keel 8.5–12.5 mm long; blades obliquely elliptic, obtuse, 4–5 \times ca. 2 mm; claw 4.5–7.3 mm. Stamens 8–12 mm long, the upper 2–3 mm free from each other. Ovary densely shortly appressed hairy; style hairy up to lower $1/3\text{--}4/5$. Legumes ellipsoid, ca. 5 mm long, 1.5–2 mm high and ca. 3 mm wide, with a straight to curved beak

0.5–1 mm long; valves \pm sparsely appressed tomentose in lower half, very densely villous upward. Flowering time: 6–9. Distribution: Hs [Morocco].

62. *Astragalus laconicus* IATROU & KIT TAN, Willdenowia 29: 56. 1999. [Sect. *Rhacophorus* BUNGE]

Plants 10–20 cm tall, dwarf shrublets forming dense, spiny tussocks. Stems to 6 mm in diameter, with persistent stipule bases and spreading hairs. Stipules 5–7 mm long, tomentose-villous especially at the base, adnate to the petiole up to the middle, free part narrowly triangular, acuminate. Leaves paripinnate, 3–4.5 cm long; terminal spine longer than the uppermost leaflets. Leaflets in 8–11 pairs, narrowly elliptic, 3–8 \times 2–2.5 mm, acuminate-mucronulate, whitish in thickened margins, keeled on underside with a conspicuous midrib, covered with spreading, rarely appressed hairs on both sides. Synflorescences 2–4 \times 2–2.5 cm, situated 2–3 cm below tip of current year branches. Bracts obovate, 5–9 \times 5 mm, boat-shaped, villous. Bracteoles narrowly ovate, 8–9 mm long. Calyx 8–10 mm long, tubular-campanulate, firm, completely hidden by dense, long, white hairs; teeth linear-setaceous, 5.5–6.5 mm long, longer than the tube. Petals pale pink (drying cream), standard with darker pink veins. Standard ca. 16 mm long; blade 5–6 mm wide, oblong-panduriform, rounded to truncate, slightly constricted in the middle, subabruptly contracted into the rather short claw. Wings ca. 14 mm long; blades narrowly oblong, rounded, 6–6.5 \times 2 mm; auricle ca. 1 mm, claw ca. 7.5 mm. Keel ca. 13 mm long; blades obliquely elliptic, obtuse. Legumes (unripe) narrowly ovoid, densely villous. Occurrence: sandy hill slopes, 50–150 m. Distribution: Greece (Peloponnese) Gr.

63. *Astragalus microcephalus* WILLD, Sp. Pl. 3: 1332. 1802. (*A. aitensis* IVAN.). [Sect. *Rhacophorus* BUNGE]

Plants dwarf shrublets, up to 70(–150) cm tall, densely branched. Hairs 0.2–1 mm, at the calyx up to 2 mm long, thin and mostly strongly twisted. Stems prostrate or ascending; parts of the current year 3–20 cm long,

1–4 mm in diameter, under the stipules very densely tomentose, not glabrescent or late glabrescent with age. Stipules chartaceous or membranous and almost hyaline toward the tip and margins, yellowish, often with three parallel nerves, rarely with a loosely branched main nerve, 4–13 mm long, ovate, long acuminate, adnate to the petiole for 2–5 mm, at first densely tomentose, later on glabrous except the base to wholly glabrous, ciliate or not. Leaves (0.6–)1–5.5 cm long; petiole 0.2–1.5 cm long, like the rachis rigid and often stout, straight, oblique to recurved or turning back, younger ones sparsely to densely tomentose, soon glabrescent; terminal spine 1/2–1/1 as long as the uppermost leaflets. Leaflets in 4–8(–9) pairs, silvery to green, narrowly elliptic, (3–)5–11 (–14) \times 1–2(–4) mm, strongly folded to flat, acute, with a mucro up to 0.5(–1) mm long, both sides densely tomentose, sometimes gradually glabrescent with age. Synflorescences densely to loosely distributed along the current year's stem, globose to shortly cylindrical, 1.5–5 cm long and ca. 1.5 cm in diameter, composed of 2–3(–5)-flowered axillary clusters. Bracts linear to narrowly oblong, boat-shaped, 4–6 \times 0.8–2 mm, acute, densely lanate toward the tip and at midrib, otherwise glabrous. Bracteoles rarely present, ca. 3 mm long, linear to subulate. Calyx turbinate, splitting, yellowish white, 4–6(–7) mm long, with 9–12 parallel nerves, very densely villous, at the base completely glabrous; teeth subulate, 2–3(–4) mm long. Petals yellow, cream to whitish, rarely the blades pink, claws of wings and keel adnate to the stamen-tube for 1–2 mm. Standard 7–14 mm long; blade 4–8 mm long, oblong-panduriform, constricted at middle, above the constriction 2–4 mm, below it 3–5 mm wide, at the base acutely to obtusely dilated or hastate-auriculate; claw 3–5 mm, linear or oblong. Wings 7–13 mm long, as long as the standard; blades narrowly oblong, toward the base often slightly widened, obtuse, 2.5–3.5(–4) \times 0.8–1.5 mm; auricle 0.2–0.6 mm, claw filiform, 4.5–7 mm. Keel 7–12.5 mm long, \pm as long as the wings; blades obliquely elliptic, with widely curved lower edge and \pm concave upper edge, obtuse, 3(–4.5) \times 1.5–2 mm; auricle minute, claw 4–6.5 mm. Stamens 7–12 mm long, at upper 1–2 mm free from each other. Ovary hairy; style 4.5–8 mm

long, hairy at the base or up to the middle. Legumes ovoid-ellipsoid, laterally compressed, 3–5 mm long, 2–3.5 mm high and 1.5–2.5 mm wide, with a curved beak 0.2–1 mm long; valves very densely long villous at the tip densely to sparsely tomentose toward the base. Seeds light to dark brown, sometimes with black dots, 2.5–3 × ca. 2 mm, smooth. Distribution: Bulgaria (Stara Planina, Aitos). Bu. [Caucasus, Turkey].

64. *Astragalus nebrodensis* (GUSS.) STROBL, Österr. Bot. Z. 37: 245. 1887. (*A. siculus* var. *nebrodensis* GUSS.). [Sect. *Rhacophorus* BUNGE]

Plants dwarf cushion-forming subshrubs, 10–20 cm high, densely branched from the base. Hairs 0.2–1.5 mm, at the calyx up to 3 mm long, mostly very thin. Stems prostrate or ascending, up to 18 cm long, parts of the current year 0.5–6 cm long, 1–2.5 mm in diameter, under the stipules densely appressed lanate, ± late glabrescent. Stipules yellowish white, thinly membranous, hyaline at tip and margins, 8–16 mm long, narrowly ovate to ovate, acuminate, with 3–5 parallel nerves at free part, adnate to the petiole for 3–6 mm, ciliate at the margins, otherwise glabrous. Leaves 0.7–5 cm long, crowded, obliquely erect; petiole 0.4–1.1 cm long, like the rachis straight, thin or thick, rigid, densely spreadingly hairy, glabrescent with age; terminal spine 1/3–1/1 as long as the uppermost leaflets. Leaflets in (3–)5–8 pairs, slightly folded to flat, greyish, 3–15 × 0.7–3 mm, narrowly oblong, obtuse, with a mucro 0.2–0.7 mm long, on both sides at first densely covered with short, appressed curled hairs and with long, subappressed, straight hairs, becoming sparsely appressed villous. Synflorescences globose, 1.5–2.5 cm in diameter, composed of 3–4-flowered axillary clusters. Bracts yellowish white, sometimes purple at tip, thinly membranous, 6–9 × 0.5–1 mm, narrowly oblong, acuminate, boat-shaped, sparsely appressed hairy in upper half and at the midrib, otherwise glabrous. Calyx thinly membranous, yellowish white, with green to brown teeth, turbinate, splitting with age, 6–9 mm long, with 12–15 parallel nerves, densely appressed hairy, glabrous at the base; teeth 3–

5 mm long, subulate. Petals with yellowish white claws, tinged with pink or purple at blade margins, claws of wings and keel adnate to stamen-tube for 3–4 mm. Standard 11–15 mm long; blade 8–10 × (3–)4–6.5 mm, oblong-panduriform, retuse, constricted at lower third, hastate at the base; claw 3–5 mm, cuneate. Wings 10.5–14.5 mm long; blades narrowly oblong, obtuse, 4–6 × 1–2 mm; auricle 0.3–0.6 mm, claw 6.5–9 mm. Keel 10.5–14 mm long; blades obliquely elliptic, with widely curved lower edge and concave upper edge, obtuse, sometimes minutely mucronulate, 4–5.5 × 1.5–2.5 mm; claw 6.5–8.5 mm. Stamens 10–14 mm long, the upper 3 mm free from each other. Ovary densely shortly sericeous; style 8–11 mm long, hairy up to lower half. Legumes ovoid-ellipsoid, 4–5 mm long, ca. 2 mm high and 2.5 mm wide, with a straight beak 1–2 mm long, sparsely appressed hairy in lower part, densely villous upwards, glabrous at the base. Distribution: N. Sicily. Si.

65. *Astragalus rumelicus* BUNGE, Mém. Acad. Imp. Sci. Saint Pétersbourg 11(16): 81. 1868 in clave [et l.c. 15(1): 137. 1869]. (*A. veluchensis* BOISS.; *A. creticus* LAM. subsp. *rumelicus* (BUNGE) MAIRE; *A. albanicus* ŠIRJ.). [Sect. *Rhacophorus* BUNGE]

Plants dwarf cushionous, 15–30 cm tall, densely branched at the base. Hairs 0.1–1.2 mm, at the calyx up to 2.5 mm long, thin, shorter ones thicker and curled. Stems from prostrate base ascending, up to 27 cm long, parts of the current year 0.5–5 cm long and 1–2.5 mm in diameter, under the stipules densely appressed hairy, ± soon glabrescent. Stipules membranous, hyaline at free part, whitish yellow, 6–19 mm long, narrowly ovate, long acuminate, with 1–5 parallel nerves at free part arising from a loose net at the base, adnate to the petiole for 2–8 mm, younger ones sparsely tomentose, very soon becoming glabrous, ciliate at the margins or not. Leaves 0.8–6 cm long, crowded, obliquely erect to turning down; petiole 0.2–2 cm long, like the rachis thin, rigid, straight to curved, younger ones sparsely spreadingly hairy, glabrescent with age; terminal spine 1/4–1/1 as long as the uppermost leaflets. Leaflets in (2–)4–7(–8) pairs, ± remote, light to dark green or whitish green,

± flat, 3–15 × 0.6–2.5 mm, narrowly oblong, acute, with a mucro 0.2–1 mm long, on both sides sparsely covered with appressed to spreading hairs, glabrescent, or in the youth densely covered with short, curled hairs with some subappressed straight, long hairs mixed in. Synflorescences ± dense, ± globose, 2–3 cm long and 1.5–2 cm wide, composed of 2–3-flowered axillary clusters. Bracts 4–8 × 0.6–2 mm, narrowly oblong, acuminate, boat-shaped, densely tomentose in upper third, in lower part glabrous or hairy only at the midrib. Bracteoles absent. Calyx turbinate, splitting with age, yellowish white, with green teeth, 5–9 mm long, with 10–15 parallel thin nerves, glabrous toward the base, very densely appressed hairy in upper part; teeth 2.5–5 mm long, subulate. Petals yellowish white, blades sometimes pink to violet veined, claws of the wings and keel adnate to the stamen-tube for 1–3 mm. Standard 10–16 mm long; blade 7–13 × 2.5–6 mm, elliptic-panduriform, retuse, constricted in the middle, obtusely or rarely acutely dilated at the base; claw 1–4(–5) mm, widely cuneate. Wings 10–15.5 mm long; blades narrowly oblong, obtuse, 4.5–6(–7) × 0.6–1.5 mm; auricle 0.2–0.5 mm, claw 7–9 mm. Keel 10–15.5 mm long; blades obliquely elliptic, with widely curved lower edge and straight or sigmoid upper edge, obtuse or very minutely mucronulate, 5–7 × 1.5–2.2(–3) mm; claw 5.5–8.5 mm. Stamens 10–15 mm long, the upper 2.5–4 mm free from each other. Ovary densely appressed shortly hairy; style 8–13 mm long, hairy in the lower half. Legumes known only immature. Distribution: S. Balkan peninsula. Al, Gr, Ju (Macedonia).

66. *Astragalus siculus* RAF., Caratt. Nuov. Gen.: 72. 1810. [*A. granatensis* LAM. subsp. *siculus* (RAF.) FRANCO & P.C.SILVA]. [Sect. *Rhacophorus* BUNGE]

Plants dwarf cushion-forming subshrubs, 15–30 cm tall, densely branched from the base. Hairs 0.2–1.5 mm, at the calyx up to 2.5 mm long, mostly very thin. Stems prostrate or ascending, up to 27 cm long, parts of the current year 0.5–7(–13) cm long and 1–2.5 mm in diameter, under the stipules densely appressed hairy, ± late glabrescent. Stipules

yellowish white, membranous, hyaline at tip and margins, 8–16 mm long, narrowly ovate, acuminate, with 3–5 parallel nerves at free part, adnate to the petiole for 3–5 mm, glabrous, ciliate at the margins. Leaves 0.7–5 cm long, crowded, obliquely erect; petiole 0.4–1.1 cm long, like the rachis straight, thin or thick, rigid, sparsely spreadingly hairy, soon glabrescent; terminal spine once to three times longer than the uppermost leaflets. Leaflets in (3–)5–8 pairs, folded, at first greyish green, becoming green, 3–11 × 0.7–3 mm, narrowly oblong or rarely obovate to oblong, obtuse, with a mucro 0.2–0.7 mm long, on upper side hairy only toward the margins, on underside sparsely covered with subappressed hairs. Synflorescences globose or rarely ovoid, 1.5–3 cm long and 2–2.5 cm wide, composed of 3–4-flowered axillary clusters. Bracts yellowish white, sometimes purple at tip, membranous, 7–9 × 0.5–1 mm, narrowly oblong-ovate, acuminate, boat-shaped, sparsely appressed hairy at tip and midrib, otherwise glabrous. Bracteoles 1 or 2 at the base of each calyx, 6–8.5 mm long and ca. 0.5 mm wide, linear, hairy like the bracts. Calyx membranous, yellowish white, with green to brown teeth, turbinate, splitting with age, 6.5–11 mm long, with 12–15 parallel nerves, densely appressed hairy throughout; teeth 2.5–5 mm long, subulate. Petals yellowish white, blades tinged with pink to purple at the margins, claws of wings and keel adnate to the stamen-tube for ca. 4 mm. Standard 12–17 mm long; blade 8–10.5 × 5–6.5 mm, oblong- or obovate-panduriform, shallowly retuse, constricted at lower third, hastate at the base; claw 4–6.5 mm, cuneate. Wings 12–15.5 mm long; blades narrowly oblong, obtuse, 5–7 × 1–2.5 mm; auricle 0.4–0.7 mm, claw 7.5–9 mm. Keel 11.5–15 mm long; blades obliquely elliptic, with widely curved lower edge and concave upper edge, obtuse, 4.5–6 × 1.5–2.5 mm; claw 7–9 mm. Stamens 11–15 mm long, the upper 3 mm free from each other. Ovary densely shortly sericeous; style 9–11 mm long, hairy in lower half. Legumes ellipsoid, dorsi-ventrally compressed, 5–6 mm long, ca. 2 mm high and 3.5–4 mm wide, with a straight beak 1–2 mm long, appressed hairy in proximal part, densely villous upwards, glabrous at the base. Distribution: Sicily. Si.

67. *Astragalus parnassi* BOISS., Diagn. pl. orient. ser. 1, 9: 80. 1849. [*A. thracicus* GRISEB. subsp. *parnassi* (BOISS.) STRID; *A. jankae* DEGEN & BORNM.; *A. parnassi* var. *albanicus* ŠIRJ.]. [Sect. *Pterophorus* BUNGE]

Plants dwarf cushion-forming subshrubs, 15–40 cm tall, loosely to densely branched from the base. Hairs 0.1–2 mm, at the calyx up to 4 mm long, mostly thick and long. Stems prostrate or ascending, up to 42 cm long; part of the current year 0.5–10 cm long and 1–3 mm in diameter, below the stipules densely appressed hairy, soon glabrescent. Stipules yellowish white, sometimes purple toward tips or at the back of the petiole, membranous, 5–15 mm long, acuminate, narrowly ovate to ovate, with 1–3(–5) parallel nerves at free part adnate to petiole for 3–8 mm, sparsely appressed hairy, soon or rarely gradually glabrescent. Leaves 0.9–7.5 cm long, crowded or remote, straight or upcurved, obliquely erect to horizontal; petiole 0.3–2 cm long, as the rachis thick, rigid, sparsely appressed with appressed hairs, soon glabrescent; terminal spine 1/6–1/1 as long as the uppermost leaflets. Leaflets in 4–9 pairs, green, mostly folded, 3–15 × 1–3 mm, narrowly oblong to narrowly elliptic, obtuse or rarely acute, with a mucro 0.2–1 mm long, on upper side glabrous except for ciliate margins, on underside sparsely appressed long hairy especially at the midrib and toward the margins, soon glabrescent. Synflorescences globose or rarely ovoid, 1.5–5 cm in diameter, composed of 2–6-flowered axillary clusters. Bracts membranous, whitish, sometimes purple at tip, 7–13 mm long and 0.8–2 mm wide, narrowly oblong to linear, shortly acuminate, lanate in upper half, otherwise glabrous. Bracteoles resembling the calyx teeth, whitish in lower half, purple or green upward, 8–15 mm long, filiform, hairy as the calyx. Calyx whitish yellow, turbinate, splitting with age, 10–15 mm long, with 12–17 parallel nerves, densely appressed hairy; teeth filiform, 5–9 mm long. Petals with pink to red or purple blades, claws of wings and keel adnate to the stamen-tube for 5–10 mm. Standard 14–23 mm long; blade 7–13 mm long and 4–6.5 mm wide, oblong-panduriform, obtuse or retuse, constricted at middle or lower third, hastate-auriculate at base; claw 5–12 mm, narrowly cuneate. Wings 13.5–22 mm

long; blades narrowly oblong, obtuse to subacute, 5–8.5 × 1.3–2.2 mm; auricle 0.3–1 mm, claw 8–14.5 mm. Keel 12.5–20 mm long; blades elliptic-curved, with widely curved lower edge and concave upper edge, obtuse, 4–5.5 × 1.8–2 mm; claw 7.5–14 mm. Stamens 12–20 mm long, at upper 2–3 mm free from each other. Ovary densely shortly appressed hairy; style 10–17 mm long, hairy at base or up to the middle. Legumes ellipsoid, dorsio-ventrally compressed, 4–5 mm long, 1.5–2 mm high and 2.5–3.5 mm wide, with a curved beak 0.7–1.5 mm long; glabrous at the extreme base, densely shortly appressed hairy in basal parts, densely villous upwards. Seeds light to dark brown, 2–3 × 1.8–2 mm, rugose. Two subspecies:

67a. *Astragalus parnassi* subsp. *parnassi* (synonymy see below the species)

Synflorescences 1.5–3 cm in diameter, composed of 2–4-flowered axillary clusters. Standard 14–20 mm long. Occurrence: 150–1,900 m. Distribution: S. Balkan peninsula. Al, Bu, Gr, Ju (Macedonia).

67b. *Astragalus parnassi* subsp. *calabricus* (FISCH.) ZARRE, Systematic Revision of *Astragalus* sect. *Adiaspastus*, sect. *Macrophyllum* and sect. *Pterophorus* (Fabaceae): 164. 1998. [*A. calabricus* FISCH.; *A. siculus* RAFIN. subsp. *calabricus* (FISCH.) ARCANG.]

Synflorescences 3.5–5 cm in diameter, composed of 4–6-flowered axillary clusters. Standard 18–23 mm long. Occurrence: 1,000–1,200 m. Distribution: S. Italy. It.

68. *Astragalus thracicus* GRISEB., Spicil. Fl. Rumel. Bith. 1: 55. 1843. (*A. trojanus* FISCH.; *A. parnassi* BOISS. var. *samothracicus* ŠIRJ.). [Sect. *Pterophorus* BUNGE]

Plants cushion-forming subshrubs, 15–40 cm high, loosely branched at the base. Hairs 0.2–1 mm, at the calyx up to 6 mm long. Stems ascending 5–37 cm long, parts of the current year 0.5–15 cm long and 1–3.5 mm in diameter, densely appressed hairy under the stipules, soon or gradually glabrescent. Stipules membranous or chartaceous, yellowish,

sometimes purple at tip and back of the petiole, 5–17 mm long, narrowly ovate to ovate, acuminate, with 3–8 parallel nerves at free part, adnate to petiole for 3–8 mm, sparsely to densely tomentose, soon or gradually glabrescent, ciliate at margins, sometimes glabrous all over. Leaflets 1–6.5 cm long, crowded or remote, obliquely erect to subhorizontal; petiole 0.3–2.2 cm long, at the rachis mostly straight, thick, rigid, the younger ones sparsely to densely covered with appressed to subappressed long hairs, towards the base of petiole mostly with spreading hairs; terminal spine 1/3 as long as or up to three times longer than the uppermost leaflets. Leaflets in 4–8 pairs, green, flat or weakly folded, 2.5–17 × 1–5 mm, narrowly elliptic, acute or obtuse, with a mucro 0.2–1 mm long, on upper side mostly glabrous, on underside sparsely covered with subappressed ± long hairs, ± soon glabrescent. Synflorescences 2.5–9 cm long and 2.5–5 cm wide, globose to cylindric, composed of 3–6-flowered axillary clusters. Bracts membranous to chartaceous, yellowish, sometimes purple at tip, 7–16 mm long and 1.5–5 mm wide, narrowly ovate, shortly acuminate, boat-shaped, sparsely to densely lanate toward tip and on midrib, otherwise glabrous. Bracteoles filiform, 8–16 mm long, whitish in lower half, purple upwards, hairy as calyx. Calyx yellowish white, purple at teeth, turbinate-tubular, splitting with age, 8–22 mm long, with 12–17 parallel nerves, densely appressed hairy, also at the base; teeth 5–12 mm long. Petals pink to purple, claws of wings and keel adnate to the stamen-tube for 5–10 mm. Standard 15–25 mm long; blade 7–14 mm long and 4.5–7 mm wide, oblong–panduriform, retuse, shallowly constricted at lower third, hastate at the base; claw 6–11 mm long, cuneate. Wings 15–23 mm long; blades narrowly oblong, obtuse, 5–7.5 × 1–2 mm; auricle 0.3–0.7 mm long; claw 10–16 mm long. Keel 13.5–21 mm long; blades obliquely elliptic, with widely curved lower edge and ± straight upper edge, 4–5.5 × ca. 2 mm; claw 8.5–16 mm long. Stamens 13.5–20 mm long, upper 2–3 mm free from each other. Ovary densely shortly appressed hairy; style 11–15 mm long, mostly glabrous. Legumes ovoid, dorsiventrally compressed, 3–4 mm long, 1.5–2 mm high and 2.5–3 mm wide, with a hooked beak

0.7–1.5 mm long, densely shortly appressed hairy at base, densely villous further up. Two subspecies:

68a. *A. thracicus* subsp. *thracicus* (Synonyms see below the species)

Calyx hair up to 4.5 mm long. Synflorescences longer than wide, rarely globose, 2.5–3.5 cm wide. Bracts densely appressed lanate in upper half. Calyx 8–19 mm long. Standard 15–21 mm long. Occurrence: 50–900 m. Distribution: Greece. Gr. [Turkey].

68b. *A. thracicus* subsp. *monachorum* (ŠIRJ.) STRID, Mount. Fl. Greece 1: 457. 1986. (*A. monachorum* ŠIRJ.)

Synflorescences wider than long or rarely globose, 3–5 cm wide. Bracts glabrous or very sparsely appressed hairy along the midrib. Calyx 18–22 mm long. Standard 20–24 mm long. Distribution: NE. Greece (Athos mountains). Gr.

Perennial medifixed hairy species

69. *Astragalus leontinus* WULFEN, in JACQUIN, Misc. 2: 59. 1781. (*A. murrü* HUTER). [Sect. *Onobrychoidei* DC.]

Plants 6–25(–30) cm tall, subcaulescent to shortly caulescent, more rarely long caulescent, with appressed white, in the inflorescence also black hairs. Rootstock with a pluricipital root-crown, often with long subterranean stolons. Stems 1–5(–10) cm long, branched at the base, ascending to erect, rather densely covered with medifixed, appressed hairs 0.3–0.5 mm long, glabrescent with age. Stipules 4–7(–9) mm long, membranous or sometimes with greenish tips, narrowly triangular, very shortly adnate to the petiole, the lower ones vaginate-connate behind the stem up to the middle, the upper ones free, sparsely or more rarely up to rather densely furnished with white hairs 0.3–0.5(–1) mm long, rarely with some black hairs mixed in, at the margins also with basifixed hairs and at the base with minute, sessile glands. Leaves 4–8(–12) cm long; petiole 0.5–2.5 cm long, like the rachis slen-

der, sparsely hairy like the stem, sometimes subglabrous, at the insertion of the leaflets with groups of sessile, minute glands. Leaflets in 5–11 pairs, narrowly elliptic, 5–15(–23) × (1.5–)2.5–4.5(–5.5) mm, obtuse to subacute, on upper side glabrous, on underside sparsely to rather loosely furnished with appressed hairs 0.3–0.7 mm long. Peduncles (3–)4–10(–16) cm long, sparsely to more rarely rather densely covered with medifixed white or white and black hairs 0.3–0.5 mm long. Racemes ovoid, densely 10–20-flowered, later on elongating and up to 6 cm long. Bracts membranous, 2–3 mm long, narrowly triangular to narrowly ovate-acuminate, sparsely furnished with partly asymmetrically bifurcate white and black or predominantly black hairs. Pedicels ca. 0.5 mm long, hairy; flowers and fruits erect. Calyx 6–8 mm long, shortly tubular, obliquely cut at the mouth, with appressed, predominantly black hairs 0.1–0.3(–0.5) mm long, with white hairs mixed in or more rarely at the ventrally side with predominantly white, at the dorsal side with predominantly black hairs; teeth from triangular base subulate-acuminate, unequal, 1–2.5(–3.5) mm long, white hairy on inner side. Petals glabrous, violet. Standard 10–14(–17) mm long; blade 4–6 mm wide, narrowly obovate, emarginate, at the base gradually narrowed. Wings 10–12.5(–15.5) mm long; blades narrowly oblong, rounded but sometimes laterally slightly emarginate, 4.5–6(–9) × 1.2–2.5 mm; auricle 1 mm, claw 5–6.5 mm. Keel 9–12 mm long; blades obliquely obovate, with in upper part curved lower edge and nearly straight upper edge, 4.5–6 × 1.7–2.5 mm; auricle short, claw 5–6.5 mm. Stamen-tube truncate at the mouth. Ovary sessile or with a stipe up to 1 mm long, hairy; style glabrous. Legumes sessile or subsessile, narrowly ovoid to narrowly oblong, 9–12 mm long, 3 mm high and 3–3.5 mm wide, keeled ventrally, widely grooved dorsally, contracted into a curved beak ca. 1 mm long, incompletely bilocular (septum ca. 1/2 of the fruit's height); valves rather densely covered with ± medifixed, often flexuose black hairs 0.3–0.5 mm long and mostly also with asymmetrically bifurcate white hairs up to 1 mm long. Flowering time: 7–8. Occurrence: 580–2,700 m. Distribution: Alps. Au, Ga, He, It.

70. *Astragalus onobrychis* L., Sp. Pl.: 760. 1753.
[*A. moldavicus* (DC.) STEUD.; *A. linearifolius* PERS.; *A. chlorocarpus* GRISEB.; *A. pancicii* HEUFF.; *A. dacicus* HEUFF.; *A. skorpilii* VELEN.; *A. sofianus* VELEN.; *A. varnensis* DAVIDOV; *A. pseudohirsutus* NYÁR.]. [Sect. *Onobrychoidei* DC.]

Plants (6–)12–40(–50) cm tall, with ± medifixed, appressed white, especially in the inflorescence also with black hairs 0.5–1.5 mm long. Stems (5–)8–25(–30) cm long, erect or ascending at the base, angular-sulcate, ± equally foliate, covered with hairs ca. 0.5 mm long. Stipules (2–)3–6(–7) mm long, membranous, very shortly adnate to the petiole, behind the stem vaginate-connate high up, often to 3/4 of the length, the free tips triangular, glabrous or with scattered hairs, ciliate at the margins with hairs 0.3–1 mm long. Leaves (2–)6–8 cm long; petiole (0.5–)1–2 cm long, like the rachis grooved adaxially, sparsely covered with hairs ca. 0.5 mm long. Leaflets in 8–15 pairs, narrowly elliptic to narrowly obovate, 4–14(–20) × 1.5–3 mm, obtuse to acute, on upper side loosely hairy or rarely subglabrous, on underside more densely covered with hairs up to 1 mm long. Peduncles 4–11(–20) cm long, sulcate, longer than the leaves, covered with white or white and black hairs ca. 0.5 mm long. Racemes densely 10–40-flowered, later on elongated and up to 10 cm long in fruit. Bracts membranous, 1.5–4(–6) mm long, narrowly triangular to narrowly ovate, ciliate at the margins with hairs 0.5–1 mm long. Pedicels 0.5–1.5 mm long, flowers erect. Calyx tubular, 6–8 mm long, densely covered with medifixed to partly asymmetrically bifurcate or even subbasifixed, appressed to subappressed or more rarely slightly ascending white hairs 0.5–1 mm long and with slightly shorter, appressed black hairs, rarely only with black hairs; teeth subulate, slightly unequal, 0.8–3.5 mm long, the two adaxial teeth often 1 mm shorter than the three abaxial teeth, all white hairy on inner side. Petals glabrous, violet. Standard (13–)17–23 mm long; blade 4–8 mm wide, narrowly rhombic-elliptic, slightly tongue-like narrowed upward, rounded to emarginate. Wings (9–)12–15 mm long; blades narrowly oblong, rounded, (5–)6–8 × 1.5–2.5 mm; auricle 1–1.5 mm, claw 5–7.5 mm. Keel (8–)9–12 mm long; blades

obliquely obovate, with in upper part curved lower edge and nearly straight upper edge, 4.5–6.5 × 1.5–2.5 mm; auricle short, claw 4.5–6 mm. Stamen-tube truncate at the mouth. Ovary sessile, hairy; style glabrous or hairy in lower part. Legumes sessile or with a stipe up to 1.5 mm long, narrowly oblong, 8–10(–12) mm long, 2–3 mm high and wide, keeled ventrally, grooved dorsally, with a straight to slightly bent beak 1–2 mm long, incompletely bilocular; valves straw-coloured, densely covered with white, ± appressed to ascending hairs 0.5–1.5 mm long. Flowering time: (5–)6–7. Occurrence: in dry valleys, on steppic flats and slopes, 150–2,450 m. Distribution: Al, Au, Bu, Cz, Ga, Gr, He, Hs, Hu, It, Ju (Croatia, Serbia, Macedonia), Po, Rm. [Moldavia, Russia, Ukraine, Caucasus, Turkey, Iran, Kazakhstan, Mongolia].

71. *Astragalus roemeri* SIMONK., Természettud. Közl. (Pótfüz.) 19: 138. 1892. [Sect. *Onobrychoidei* DC.]

Plants 50–70 cm tall. Stems erect, striate, sparsely furnished with medifixed, appressed white hairs 0.5–1 mm long or subglabrous. Stipules membranous to slightly greenish, 5–6 mm long, free from the petiole, the lower ones distinctly vaginate-connate behind the stem, the upper ones nearly free from each other, sparsely white and black hairy, at the margins with minute glands. Leaves 7–12 cm long, sessile; rachis sparsely hairy like the stem. Leaflets in 4–6 pairs, elliptic, 15–35(–60) × 4–15(–20) mm, acute or obtuse and minutely mucronulate, on both sides sparsely furnished with medifixed, appressed white hairs 1–1.2 mm long or subglabrous on upper side. Peduncles 10–16 cm long, striate, sparsely hairy like the stem but in upper part also with black hairs. Racemes 5–8 cm long, loosely 12–16-flowered; axis predominantly black hairy. Bracts membranous, narrowly triangular to linear-acute, 4–5 mm long, black hairy. Pedicels ca. 1 mm long, hairy. Calyx 8–9 mm long, campanulate, strongly obliquely cut at the mouth, rather densely covered with ± medifixed black and white hairs 0.3–1 mm long; teeth subulate, 2–3 mm long, white and black hairy on inner side. Petals whitish lilac. Standard ca. 20 mm long; blade 9–10 mm wide, obovate, retuse, subabruptly

contracted into the cuneate claw. Wings 17–18 mm long; blades narrowly oblong, slightly obliquely retuse to subobtuse, 8–9 × 2.2–2.5 mm; auricle ca. 1 mm, claw 9–10 mm. Keel 15–16 mm long; blades oblong, with in upper part widely to rectangular-curved lower edge and ± straight upper edge, subacute, 6 × 3 mm; auricle acute, ca. 1 mm, claw 9–10 mm. Stamen-tube slightly obliquely cut at the mouth. Ovary glabrous. Legumes sessile, erect, narrowly oblong, 15–17 mm long, 3.5–4 mm high and 4–5 mm wide, flattened ventrally, widely grooved dorsally, contracted into a straight beak ca. 1 mm long, incompletely bilocular; valves rather thin, rather densely covered with ± symmetrically to strongly asymmetrically bifurcate, appressed white and black hairs 0.8–1 mm long, glabrescent with age. Flowering time: 6–8. Distribution: Romania (endemic in a very restricted area) Rm.

72. *Astragalus algerianus* SHELDT., Minnesota Bot. Stud. 1: 121. 1894. (*A. tenuifolius* DESF.; *A. tenuifoliolus* MAIRE). [Sect. *Ornithopodium* BUNGE]

Plants 5–40 cm tall, covered with ± medifixed hairs. Rootstock with a pluricipital root-crown, with short branches. Stems 3–35 cm long, prostrate to ascending, sulcate, densely covered in lower part with appressed white hairs 0.8–1.2 mm long, in upper part with shorter hairs mostly only up to 0.3 mm long, often with brachyblasts in the axil of the leaves. Stipules whitish-membranous, 5–8 mm long, very shortly adnate to the petiole, behind the stem vaginate-connate high up, often up to the top, loosely to rather densely white and black hairy. Leaves 3–4 cm long; petiole very short or up to 1.5 cm long, like the rachis distinctly grooved adaxially, loosely covered with appressed white hairs. Leaflets in 5–9 pairs, narrowly elliptic to elliptic, 4–7 × 1–3 mm, subacute to obtuse, rather densely appressed hairy on both sides, the margins often somewhat upcurved or leaflets folded. Leaves of the brachyblasts much shorter, often with only 2–3 pairs of leaflets. Peduncles 1–5.5 cm long, hairy like the stem. Racemes ellipsoid, many-flowered. Bracts whitish-membranous, narrowly triangular, acute, 2–3 mm long, predominantly black hairy. Pedicels ca. 1 mm

long, thick. Calyx 7–8 mm long, tubular, loosely appressed white and black hairy; teeth subulate, 2–3 mm long. Petals bluish-violet. Standard 13–17 mm long; blade 6–7 mm wide, rhombic-elliptic, widely rounded and slightly emarginate, at the base gradually narrowed into the long cuneate claw. Wings 11–15 mm long; blades narrowly oblong, rounded, 6.5–7 × 1.5–2 mm; auricle ca. 1 mm, claw 5–7 mm. Keel 9–12 mm long; blades obliquely elliptic, with in upper third widely curved lower edge and slightly concave upper edge, subobtuse, 4.5–6 × ca. 2 mm; auricle 0.5 mm, claw 5–6 mm. Stamen-tube truncate at the mouth. Ovary sessile, slightly and very shortly hairy; style glabrous. Legumes sessile, rounded at the base, long attenuate, distinctly curved, 20–30 mm long, ca. 2 mm high and wide, slightly keeled ventrally, narrowly and deeply grooved dorsally, bilocular; valves loosely to rather densely covered with appressed white hairs of different length.

Flowering time: 3–5. Distribution: Spain (Murcia). Hs. [North Africa].

73. *Astragalus mesopterus* GRISEB., Spicil. Fl. Rumel. Bith. 1: 49. 1843. [Sect. *Ornithopodium* BUNGE]

Plants 25–30 cm tall. Stems ca. 20 cm long, with long internodes, branched at the base with very short, sterile side-branches, sparsely to loosely covered with ± medifixed, appressed white, at the nodes also black hairs 0.25–0.5 mm long. Stipules membranous, 3–4 mm long, narrowly triangular, very shortly adnate to the petiole or free from it, the lower ones vaginate-connate up to the middle, the upper ones free from each other, sparsely or the upper ones loosely appressed hairy. Leaves 4–5.5 cm long, in side-branches 1–2 cm long; petiole 0.5–2 cm long, like the rachis flattend or widely, shallowly grooved adaxially, loosely hairy like the stem. Leaflets in 8–11 pairs, linear to narrowly oblong, 5–8 × 0.5–1 mm, in side-branches in 3–5 pairs, 2–3 mm long, all covered on upper side sparsely, on underside loosely with ± symmetrically to asymmetrically bifurcate, appressed white hairs 0.6–1 mm long. Peduncles 6–10 cm long, loosely or rather densely white hairy like the stem. Racemes 3–4 cm long, loosely ca. 10-flowered.

Bracts scarious, 2–2.5 mm long, narrowly ovate, black hairy. Pedicels ca. 0.5 mm long, white and black hairy. Calyx 6 mm long, tubular, slightly obliquely cut at the mouth, rather densely covered with ± medifixed, appressed, predominantly white hairs 0.2–0.5 mm long; teeth subulate, 0.5–1 mm long, densely white hairy on inner side. Petals pale violet. Standard 15 mm long; blade 5 mm wide, ovate, slightly tongue-like narrowed upward, emarginate, gradually narrowed at the base. Wings 12 mm long; blades narrowly oblong, rounded, 7 × 1.5 mm; auricle ca. 0.8 mm, claw 5 mm. Keel 10 mm long; blades obliquely curved with in distal part nearly rectangularly curved lower edge and slightly concave upper edge, subobtuse, 4 × 1.5 mm; auricle 0.4 mm, claw 6 mm. Stamen-tube truncate at the mouth. Ovary sessile, narrowly oblong, loosely white hairy. Legumes unknown. Distribution: Bulgaria, N Greece. Bu, Gr.

Note: a rare species of uncertain position. Legumes are unknown.

74. *Astragalus agraniotii* BOISS., Diagn. pl. orient. ser. 2, 2: 29. 1856. [Sect. *Hololeuce* BUNGE]

Plants 3–8 cm tall, densely caespitose, cushion-like, acaulescent, densely silvery-hairy, covered with asymmetrically bifurcate hairs. Rootstock strongly divided with blackish, subterranean branches, in upper part densely covered with remnants of old stipules. Stipules whitish-hyalin, 5–6 mm long, narrowly triangular to oblong, obtuse, adnate to the petiole for 2–3 mm, free from each other, at the margins and tip ciliate with basifixed white and sometimes few black hairs. Leaves 0.6–1.5 cm long; petiole 0.2–0.5 cm long, like the rachis densely covered with subappressed to ascending white hairs up to 1 mm long. Leaflets in 3–5(–7) pairs, mostly boat-shaped to folded, elliptic to obovate, acute to obtuse, 2–4 × 1–2 mm, on both sides very densely silvery-hairy with appressed to ascending, asymmetrically bifurcate hairs ca. 0.8 mm long. Peduncles 1–4 cm long, densely covered with subappressed, medifixed, flexuose, tangled, in lower part predominantly white in upper part predominantly black hairs up to 1 mm long and with much fewer ± spreading, strongly asymmetrically bifurcate white and black hairs up to

2.2 mm long. Racemes globose to ovoid, very densely many-flowered, 1.5–2.5 × 1–2 cm. Bracts whitish-hyalin to pale brownish, narrowly elliptic, 3–4 mm long, densely covered with subappressed, strongly asymmetrically bifurcate white hairs 0.6–1 mm long, with very short, ± medifixed black hairs mixed in. Bracteoles absent. Flowers sessile. Calyx 6–7 mm long, turbinate-campanulate, densely covered with strongly asymmetrically bifurcate, ascending to ± spreading white hairs up to 2 mm long, with shorter, subappressed black hairs mixed in; teeth subulate, 3–4 mm long, mostly black hairy. Petals pale purplish or yellowish tinged with blue. Standard 10–13 × 2–3 mm, linear, rounded, shortly narrowed at the base, without a clearly differentiated claw. Wings ca. 10 mm long; blades narrowly oblong, obtuse, 7 × 1.5 mm; auricle minute, claw 3 mm. Keel 7 mm long; blades obliquely narrowly elliptic, with slightly curved lower edge and ± straight upper edge, obtuse, 3.5 × 1.5 mm; auricle indistinct, claw as long as the blades. Stamen-tube truncate at the mouth. Stamens ca. 5 mm long, the upper 2 mm free. Ovary sessile, subglabrous. Legumes ovoid, 5–7 mm long, 2 mm high, ca. 1.5 mm wide, laterally compressed, keeled ventrally and dorsally, acute, bilocular; valves densely covered with strongly asymmetrically bifurcate, flexuose, ascending white hairs up to 1.5 mm long. Flowering time: 6–7. Distribution: S. Greece (Peloponnese). Gr.

75. *Astragalus fialae* DEGEN, Österr. Bot. Z. 50: 242. 1900. [Sect. *Hololeuce* BUNGE]

Plants 3–12 cm tall, acaulescent or shortly caulescent, covered with mostly medifixed, appressed, in vegetative parts merely white, in the inflorescence also black hairs. Rootstock strongly branched, with short or elongated subterranean stolons up to 25 cm long. Stems absent or up to 3 cm long, erect, sulcate, densely covered with hairs 0.5–1 mm long. Stipules whitish-membranous, 5–8 mm long, ovate to narrowly triangular, sometimes, especially if a stem is developed, the upper ones linear-acuminate and up to 12 mm long, adnate to the petiole for 2–3 mm, otherwise free from each other, at the margin and tips ciliate with basifixed hairs. Leaves 1.5–8 cm long; petiole

0.3–2 cm long, like the rachis densely covered with appressed white hairs up to 0.5 mm long. Leaflets in 8–12 pairs, narrowly elliptic or especially the little ones obovate, 2–9 × 1–3 mm, subacute to acute, on both sides sparsely to loosely covered with hairs up to 1 mm long. Peduncles 0.5–7 cm long, sulcate, loosely to densely covered with appressed to subappressed black and white hairs up to 0.5 mm long, sometimes with few ascending white hairs up to 1 mm long mixed in. Racemes short, rather densely 4–12-flowered, slightly elongating in fruit. Bracts whitish-membranous, narrowly triangular to linear-acute, 4–6 mm long, sparsely hairy with mostly basifixed white and black hairs. Bracteoles absent or minute, subulate, 0.5–1 mm long, at the base of calyx. Pedicels ca. 1 mm long, predominantly black hairy. Calyx ca. 9 mm long, shortly tubular, loosely to rather densely covered with symmetrically to asymmetrically bifurcate, subappressed to ascending or sometimes spreading white and black, sometimes with nearly only black hairs up to 1 mm long; teeth subulate, 3–3.5 mm long. Petals yellowish, tinged with violet. Standard 14–19 mm long; blade 7–8 mm wide, elliptic to widely elliptic, emarginate, gradually narrowed at the base. Wings 11–15 mm long; blades narrowly oblong, together with the claw curved, obtuse, gibbous above the auricle, 7–9 × 2–2.2 mm; auricle 2 mm, claw 5–7 mm. Keel 11–14 mm long; blades with widely curved lower edge and ± sigmoid to concave upper edge, subacute to obtuse, 6–7 × 3 mm; auricle ca. 0.5 mm, claw as long as the blades. Stamen-tube ± truncate at the mouth. Stamens 7–8 mm long, the upper 3 mm free. Ovary sessile, narrowly oblong, densely white hairy; style glabrous. Legumes sessile, obliquely narrowly ellipsoid, 10–12 mm long, ca. 4 mm high, 3 mm wide, keeled ventrally, slightly grooved dorsally, with a straight or slightly curved beak 1.5–2 mm long, bilocular; valves densely covered with curled, tangled subappressed to ascending, mostly ± medifixed white and black hairs up to 0.5 mm long and with fewer, strongly asymmetrically bifurcate, flexuose, ± spreading white hairs up to 2 mm long. Flowering time: 6–7. Distribution: Al, Ju (Bosnia; Serbia).

76. *Astragalus idaeus* BUNGE, Mém. Acad. Imp. Sci. Saint Pétersbourg 11(16): 107. 1868 in clave [et l.c. 15(1): 187. 1869]. [Sect. *Hololeuce* BUNGE]

Plants 4–6 cm tall, ± acaulescent, very densely covered with asymmetrically to strongly asymmetrically bifurcate, subappressed to ascending, tangled hairs 1–2 mm long. Rootstock divided, the very short branches densely covered with remnants of old stipules. Stipules membranous, 2.5–4 mm long, shortly adnate to the petiole, otherwise free, the lower ones ovate-triangular, glabrous or in upper part at the margins with white hairs ca. 0.5 mm long, the upper ones narrowly triangular, sparsely hairy. Leaves 1–3 cm long; petiole 0.3–1 cm long, like the rachis very densely hairy. Leaflets in 6–12 pairs, elliptic, 3–6 × 1–2 mm, on both sides very densely hairy like the rachis, mostly folded. Peduncles 0.5–1 cm long, densely covered with strongly asymmetrically bifurcate, ascending to spreading white hairs up to 2 mm long. Racemes globose, densely many-flowered, ca. 2 cm in diameter. Bracts membranous, 4–5 mm long, narrowly triangular, densely covered with asymmetrically to strongly asymmetrically bifurcate, flexuose-curved, ascending to spreading white hairs 1.5–2 mm long and with much shorter, subappressed black hairs. Pedicels 1 mm long, hairy. Bracteoles minute. Calyx 6–7 mm long, campanulate-tubular, densely covered with strongly asymmetrically bifurcate, ascending, tangled white hairs 1.5–2 mm long, with some shorter black hairs mixed in; teeth narrowly triangular, 2–2.5 mm long. Petals colour unknown. Standard ca. 15 mm long; blade ovate, ca. 7 mm wide, emarginate. Wings ca. 12 mm long; blades narrowly oblong. Keel ca. 11 mm long. Ovary hairy. Legumes unknown. Distribution: Greece (Central Crete). Cr.

Note: An obviously rare and not well known species.

77. *Astragalus austrani* BALD., Bull. Herb. Boiss. 3: 196. 1895. [Sect. *Baldaccia* SYTIN & PODLECH]

Plants small, low, caespitose, acaulescent, in vegetative parts only with white hairs. Rootstock strongly divided, branches ca. 3 mm thick, up to 2–3 cm long, densely and completely covered with remnants of old stipules. Stipules membranous, white yellow, nearly

stellately arranged, ovate-acute, 5–6 mm long, 1.5–2.5 mm wide, shortly adnate to the petiole and shortly vaginate-connate behind the stem, ciliate at the margins with basifixed hairs 0.4–0.8 mm long, otherwise glabrous. Leaves 0.5–1 cm long; rachis densely covered with medifixed, subappressed hairs ca. 0.5 mm long. Leaflets in 4–6(–9) pairs, obovate, 2–3 × 1.5 mm, on both sides densely covered with ± medifixed, subappressed hairs up to 0.8 mm long. Peduncles ca. 3 cm long, densely covered with ± medifixed, appressed to subappressed short hairs and with fewer basifixed, ascending hairs up to 1 mm long. Racemes ovoid, ca. 3 cm long, densely many-flowered. Bracts whitish-membranous, ca. 5 mm long and 1 mm wide, narrowly triangular, loosely covered with white hairs up to 1 mm long, with few black hairs mixed in. Pedicels ca. 0.3 mm long. Calyx 7–8 mm long, campanulate, obliquely cut at the mouth, tube whitish-membranous, sparsely hairy with medifixed to basifixed white hairs 0.3–0.5 mm long, with few black hairs mixed in; teeth subulate, ca. 5 mm long, furnished with basifixed white hairs ca. 1 mm long and with medifixed, short black hairs. Petals red, glabrous. Standard 12 mm long; blade distinctly nerved, ca. 3 mm wide, narrowly oblong, widest in lower third, slightly emarginate, scarcely narrowed at the base without distinct claw. Wings ca. 8 mm long; blades narrowly oblong, upcurved, narrowed toward the obtuse tip, 5–1.5 mm; auricle ca. 0.5 mm, claw ca. 3 mm. Keel ca. 7 mm long; blades straight, obtuse, ca. 2 mm wide. Stamens ca. 5 mm long. Ovary linear, rather densely covered with appressed hairs; style short, thick, glabrous. Legumes ellipsoid, ca. 4 mm long, 2 mm high, shortly acuminate, with the persistent glabrous style, obtusely keeled ventrally, grooved dorsally, bilocular; valves densely covered with strongly asymmetrically bifurcate, subappressed to ascending white hairs up to 0.8 mm long. Distribution: Albania. Al.

Note: An obviously very rare plant, known only from two collections.

78. *Astragalus odoratus* LAM., Encycl. Méth. Bot. 1: 311. 1785. [Sect. *Uliginosi* A. GRAY]

Plants 7–35(–45) cm tall, covered with appressed, ± medifixed hairs 0.1–0.5 mm long.

Rootstock branched, with short to elongated stolons. Stems several, 2–30 cm long, erect or ascending at the base, finely striate, sparsely to rather densely covered with white hairs, with black hairs mixed in, often glabrescent with age. Stipules whitish-membranous, 5–9 mm long, all free from the petiole, the lower ones triangular, behind the stem often connate up to the top, sparsely ciliate to glabrous, the upper ones narrowly triangular-acuminate, connate behind the stem high up but not to the top, loosely to rather densely covered with white, sometimes also with black hairs, especially at the base. Leaves 3–12 cm long; petiole short, 0.5–2.5 cm long, like the rachis sparsely to rather densely covered with short, appressed white hairs. Leaflets in 7–16 pairs, narrowly elliptic, 6–17(–25) × 1.5–6 mm, rounded to subacute, glabrous on upper side, loosely to rather densely hairy on underside. Peduncles 2–6 cm long, sparsely to rather densely covered with white, below the raceme also with few black hairs. Racemes oblong, 2–5 cm long, rather densely many-flowered. Bracts whitish-membranous, 1–2 mm long, narrowly ovate, black hairy. Pedicels ca. 1 mm long, black hairy; flowers at anthesis ± spreading, later on nodding. Bracteoles sometimes present, minute, 0.5 mm long, whitish-membranous, at the base of the calyx. Calyx 4–4.5 mm long, campanulate, slightly gibbous at the base, slightly obliquely cut at the mouth, loosely covered with very short, appressed black hairs; teeth unequal, 0.5–1 mm long, the upper ones widely triangular, the lower ones narrowly triangular. Calyx greenish white to yellowish green. Standard 8–11 mm long; blade obovate, ca. 4.5 mm wide, widely rounded and emarginate, ± gradually narrowed into the short claw. Wings 8–9 mm long; blades narrowly oblong, rounded, 5.5 × 1.5 mm; auricle 1.5 mm, claw 3.5 mm. Keel 7.5–8 mm long; blades obliquely obovate-triangular, with in upper part widely rectangularly curved lower edge and nearly straight upper edge, rectangularly acute, 4 × 2.5 mm; auricle ca. 0.5 mm, claw 3.5 mm. Stamen-tube obliquely cut at the mouth. Ovary sessile, ellipsoid, glabrous. Legumes sessile, nodding, oblong, 8–12 (–15) mm long, 3 mm high and wide, abruptly contracted into a beak 1–2 mm long, slightly keeled to nearly flat ventrally but with promi-

nent nerve ventrally, slightly grooved dorsally, incompletely bilocular; valves coriaceous, finely hairy with appressed white or rarely black or mixed white and black hairs. Flowering time: 5–7. Occurrence: on pastures, fields, humid meadows, on gypsaceous and salty soil. Distribution: Ju (Macedonia), Gr. [Caucasus, Turkey, Syria, Iran].

79. *Astragalus arenarius* L., Sp. Pl.: 759. 1753.
[Sect. *Craccina* (STEVEN) BUNGE]

Plants 15–35 cm tall. Stems 10–30 cm long, slender, decumbent to erect, mostly branched, rather densely to densely covered with appressed, ± medifixed to asymmetrically bifurcate white hairs 0.4–0.5 mm long. Stipules ± whitish-membranous, (3–)4–6 mm long, triangular-acuminate, vaginate-connate to 1/2–2/3 of the length, rather densely hairy like the stem, at the margins also with basifixed hairs. Leaves (2–)3–5 cm long, sessile to subsessile; rachis slender, distinctly grooved adaxially, hairy like the stem, rarely glabrescent. Leaflets in 2–6(–9) pairs, linear to narrowly elliptic, (6–)10–20(–28) × (0.5–)2–4 mm, obtuse or minutely mucronulate, on upper side sparsely to loosely, on underside rather densely to densely covered with appressed to partly ascending, medifixed to partly strongly asymmetrically bifurcate hairs 0.5–0.7 mm long, rarely glabrous on upper side and nearly so on underside, flat or folded. Peduncles 1.5–3.5 cm long, loosely hairy like the stem, sometimes glabrescent. Racemes 1.5–3 cm long, loosely 3–7-flowered. Bracts whitish-membranous, 1–1.5 mm long, ovate-triangular to narrowly triangular, subglabrous to sparsely white hairy, at the margins with basifixed hairs. Pedicels 1.5–3 mm long, white and black hairy; flowers obliquely erect. Calyx 4–5 mm long, tubular-campanulate, loosely to rather densely covered with mostly strongly asymmetrically bifurcate, subappressed white hairs 0.5–0.6 mm long and with shorter black hairs, rarely glabrous with exception of the teeth; teeth narrowly triangular, 0.5–1 mm long, densely white hairy on inner side. Petals light purple or lilac, rarely white. Standard (14–)15–17 mm long; blade 7–8 mm wide, obovate, emarginate, at the base gradually narrowed into the short claw. Wings 14–16 mm long; blades narrowly elliptic, scarcely

retuse, 6.5–7 × 2.5–3 mm; auricle 0.5–0.7 mm, claw 6–9 mm. Keel (9–)10–12 mm long; blades obliquely obovate, with in upper part widely rectangularly curved lower edge and ± straight upper edge, subacute, ca. 5 × 2.2–2.5 mm; auricle short, claw 6–7 mm. Stamen-tube truncate at the mouth. Ovary with a stipe 2–3 mm long, mostly densely white hairy; style glabrous or hairy at the base. Legumes with a slender stipe ca. 2 mm long, ascending to erect, linear-oblong, 12–20 mm long, 3–4 mm high, compressed laterally, keeled ventrally, grooved dorsally, with a straight beak 2–3 mm long, bilocular; valves thinly coriaceous, densely covered with medifixed to asymmetrically bifurcate, subappressed, tangled white hairs 0.6–0.9 mm long, rarely glabrous. Distribution: Cz, Fe, Ge, Hu, Po, Su. [Baltic States, East Europe].

80. *Astragalus austriacus* JACQ., Enum. Stirp. Vindob.: 263. 1762. (*A. tenuifolius* L.). [Sect. *Craccina* (STEVEN) BUNGE]

Plants in the vegetative parts very sparsely hairy, with mostly appressed, asymmetrically bifurcate to subbasifixed white, at the nodes and in the inflorescence also with black hairs 0.3–0.5 mm long. Rootstock mostly short, up to 5 mm in diameter, with a pluricipital root-crown, branched. Stems prostrate to ascending or erect, (3–)10–45(–50) cm long, angular-sulcate, sparsely hairy to glabrous. Stipules whitish-membranous, free from petiole, the lower ones 1.5–3 mm long, behind the stem vaginate-connate highly up with two short free tips, the upper ones 3–4 mm long, narrowly triangular, free from each other. Leaves (1.5–) 2–6 cm long; petiole short, like the rachis slender, sparsely hairy to glabrous. Leaflets in 5–10 pairs, linear to narrowly elliptic, (1.5–)4–25 × 0.3–2 mm, distinctly emarginate, glabrous on upper side, sparsely hairy to glabrous on underside. Peduncles in the axils of upper leaves, 2.5–6 cm long, erect, sparsely hairy. Racemes loosely 5–20-flowered. Bracts whitish-membranous, triangular, ca. 1 mm long. Pedicels 1–1.5 mm long, hairy. Calyx campanulate, 2.5–3 mm long, obliquely cut at the mouth, loosely covered with very short, appressed, mainly black hairs; teeth ca. 0.3 mm long, unequal, the three abaxial triangular, the two adaxial very widely triangular, all hairy on

inner side. Petals pale blue, the keel often violet-tipped. Standard 7–8 mm long; blade ca. 5 mm wide, orbicular-obcordate, widely and deeply emarginate, at the base narrowed into the cuneate claw. Wings 7–8 mm long; blades narrowly cuneate, gradually but distinctly dilated toward the obliquely and deeply emarginate tip, 4–5 × ca. 2 mm; auricle ca. 0.5 mm, claw 2.5–3 mm. Keel 5.5–6 mm long; blades triangular-obovate, with in upper part widely rectangularly curved lower edge and ± straight upper edge, obtuse, 2.5–3 × ca. 1.5 mm; auricle minute, claw ca. 3 mm. Stamen-tube truncate at the mouth. Ovary subsessile, sparsely hairy. Legumes sessile, spreading, narrowly ellipsoid, acuminate at both ends, 5–15 mm long, ca. 2 mm high and 1.5–2 mm wide, keeled ventrally, rounded dorsally, incompletely bilocular (septum ca. 2/3 of the fruit's height); valves sparsely to loosely covered with short white hairs. Flowering time: 7. Occurrence: limestone, salty steps, gypsaceous soils. Distribution: Au, Bu, Cz, Ga, Hs, Hu, It, Ju (Serbia), Rm. [Ukraine, Russia].

81. *Astragalus baionensis* LOISEL., Fl. Gall. 1: 474. 1807. [Sect. *Craccina* (STEVEN) BUNGE]

Plants with ± medifixed, mostly appressed, often flexuous, white, only at the calyx also black hairs 0.3–0.5 mm long. Rootstock slender, branched, with long creeping, subterranean stolons. Stems several, branched, prostrate to ascending, slender, often flexuous, 15–40 cm long, loosely to rather densely hairy. Stipules whitish-membranous, 3–7 mm long, free from petiole, all behind the stem highly up vaginate-connate, with two short, narrowly triangular tips, hairy. Leaves 1–3 cm long; petiole very short, like the rachis rather densely appressed hairy. Leaflets in 6–10 pairs, narrowly elliptic, 1–6 × 0.5–2 mm, subobtuse, on upper side covered with subappressed to nearly obliquely spreading hairs, sometimes only toward the margins, on lower side densely subappressed hairy, ± strongly boat-shaped to folded. Peduncles in upper part of the stem, 1–3 cm long, hairy like the stem. Racemes short, 3–8-flowered. Bracts hyalin-membranous, 1–3 mm long, hairy. Pedicels ca. 0.5 mm long. Calyx shortly tubular, 4–5 mm long, obliquely cut at the mouth, loosely to rather densely white and black hairy; teeth

slightly unequal, 0.3–0.5 mm long, triangular, on both sides densely white hairy. Petals pale blue. Standard 12–13 mm long; blade ca. 5 mm wide, elliptic to obovate, emarginate, at the base indistinctly narrowed into the widely cuneate claw. Wings 10–11 mm long; blades narrowly oblong, slightly dilated upward, slightly and obliquely emarginate, 5–6 × 1.5–1.8 mm; auricle 0.4–0.5 mm, claw 5–6 mm. Keel 9–10 mm long; blades obliquely obovate, with in upper part widely curved lower edge and slightly convex upper edge, subacute, 4–4.5 × 2 mm; auricle minute, claw ca. 5 mm. Stamen-tube truncate at the mouth. Ovary subsessile, appressed white hairy; style glabrous. Legumes sessile, erect, oblong, shortly and obtusely attenuate at both ends, 6–10 mm long, 3–4 mm high and 2.5–3 mm wide, keeled ventrally, rounded dorsally, sometimes with a short beak up to 1 mm long, more rarely only with persistent style, nearly completely bilocular; valves pale to dark brown, white hairy. Flowering time: 5–7(–9). Occurrence: on dunes at the coast. Distribution: Coastal area of Southwestern France and the neighbouring Spain (here probably extinct). Ga, Hs.

82. *Astragalus sulcatus* L., Sp. Pl.: 756. 1753.
[Sect. *Craccina* (STEVEN) BUNGE]

Plants 20–80 cm tall, sparsely covered with mostly strongly asymmetrically bifurcate to subbasifixed, appressed hairs 0.3–0.8 mm long. Rootstock with a pluricipate root-crown. Stems mostly several, 20–60 cm long, erect, angular-sulcate, branched, with numerous lateral branches in the leaf axils, sparsely to loosely furnished with white and especially toward the nodes also with black hairs, sometimes glabrous. Stipules membranous to greenish, ovate to narrowly triangular, 3–4 mm long, those on lateral branches shorter, the lower ones shortly to distinctly connate behind the stem, free from the petiole, the upper ones free, all sparsely white ciliate or with few black and white hairs or glabrous. Leaves 4–8 cm long, subsessile; rachis slender, angular, hairy like the stem. Leaflets in leaves of the main stem in 8–11 pairs, linear to narrowly oblong, 10–25 × 1–4(–7) mm, those in leaves of lateral branches mostly shorter and narrower, on

upper side glabrous or nearly so, on underside with scattered appressed white hairs, often completely glabrous. Peduncles erect, 2.5–4 cm long, sparsely covered with white and black hairs 0.2–0.3 mm long. Racemes 3–6 cm long, remotely 6–20-flowered; axis angular-sulcate, mainly black hairy. Bracts whitish-membranous, ovate to narrowly triangular, 1.5–3 mm long, sparsely black ciliate, at the base of margins often with minute, sessile to subsessile glands. Pedicels ca. 1 mm long, black hairy. Calyx campanulate, 3(–4) mm long, slightly obliquely cut at the mouth, sparsely covered with black and sometimes also with some white hairs up to 0.3 mm long; teeth linear, 0.8–1.2 mm long, hairy on inner side. Petals pale violet. Standard 6.5–8(–9) mm long; blade elliptic to rhombic-ovate, 4–4.5 mm wide, deeply emarginate, at the base gradually narrowed but without distinct claw. Wings 5–7(–8) mm long; blades narrowly obovate, widest in upper third, obtuse, 4.5–5 × 1.8–2 mm; auricle ca. 0.5 mm, claw 2–3 mm. Keel 4.5–5 mm long; blades oblong-obovate, with in upper part rectangularly curved lower edge and ± straight upper edge, subacute, 2.5 × 1.8 mm; auricle minute, claw 2–3 mm. Stamen-tube truncate at the mouth. Ovary subsessile to sessile, sparsely hairy. Legumes subsessile, obliquely ascending, oblong, straight, 9–11 mm long, 2–3 mm high, 1.5–2 mm wide, keeled ventrally, grooved dorsally, subtriquetrous in cross-section, acute, nearly unilocular to slightly semibilocular; valves thin, sparsely covered with appressed, white or predominantly black hairs up to 0.5 mm long. Occurrence: on humid, often saline meadows, rarely in dryer steppic vegetations. Distribution: Au, Cz, Hu, Rm. [Russia, Kazakhstan, Mongolia, China].

83. *Astragalus albicaulis* DC., Astragal.: 166, t. 21. 1802. (*A. glaucus* M.BIEB.). [Sect. *Dissitiflori* DC.]

Plants a subshrub 20–40(–50) cm tall, in vegetative parts densely covered with mostly appressed, medifixed white hairs 0.5–1.2 mm long, in the inflorescence also with black hairs. Rootstock strong, branched, the short to elongated branches covered with brownish bark. Stems of the current year 1.5–10 cm

long, erect. Stipules 3–6 mm long, greenish, narrowly triangular to linear acute, adnate for 1–2 mm to the petiole, loosely to rather densely white hairy, sometimes with black hairs mixed in. Leaves 3–8 cm long; petiole 0.6–2.5 cm long, like the rachis densely hairy. Leaflets in 3–5(–6) pairs, mostly narrowly elliptic, 6–25 × 1–6(–10) mm, acute to rounded, densely silvery or more rarely sparsely to loosely appressed hairy on both sides. Peduncles 10–25 cm long, sulcate-striate, white hairy, toward the raceme also with black hairs. Raceme capitate to ovoid, densely 7–18-flowered, in fruit often elongating up to 9 cm; axis black and white hairy. Bracts whitish, narrowly triangular, 3–5 mm long, white and black hairy. Pedicels ca. 0.5 mm long, hairy. Calyx 10–12 mm long, tubular or slightly inflated, covered with ascending, medifixed to basifixed white hairs up to 1 mm long and much shorter appressed, medifixed black hairs, sometimes with five blackish lines ending in the teeth; teeth subulate, 2–4 mm long, densely white and black hairy on inner side. Petals whitish to yellow. Standard (18–)20–27 mm long; blade 7–9 mm wide, oblong-obovate, emarginate to bilobed, slightly to distinctly constricted in lower third, at the base angularly or even hastate-auriculately widened and abruptly contracted into the claw. Wings 17–20 mm long; blades narrowly oblong to obovate, obtuse or sometimes slightly obliquely retuse, 7–8 × 2.2–3.5 mm; auricle minute, curved, ca. 0.4 mm, claw ca. 12 mm. Keel 15–17 mm long; blades obliquely obovate-triangular, with widely, ± rectangularly curved lower edge and ± straight to slightly concave upper edge, subacute, 5–6 × 2.4–3.5 mm; auricle minute, claw ca. 11 mm. Stamen-tube nearly truncate at the mouth. Ovary sessile, densely white hairy; style glabrous. Legumes sessile, erect, narrowly oblong, 10–15 mm long, ca. 4 mm high, 2.5 mm wide, keeled ventrally, shallowly grooved to narrowly flattened dorsally, with an oblique, subulate beak 1–2 mm long, bilocular; valves rigidly coriaceous, shaggy with strongly asymmetrically bifurcate to basifixed, ascending to spreading white hairs up to 1 mm long. Flowering time: 5–6(–7). Occurrence: steppic vegetation. Distribution: Bu, Rm. [Moldavia, Ukraine, Russia-Europe].

84. *Astragalus apollineus* BOISS. & HELDR. in BOISSIER, *Diagn. pl. orient. ser. 2*, 2: 27. 1856. [Sect. *Dissitiflora* DC.]

Plants 10–15 cm tall, subshrubby. Root-stock divided, with short to long subterranean branches. Stems branched, parts of the current year 2–5 cm long, slender, very densely covered with medifixed, appressed white hairs 0.5–0.7 mm long, sometimes with few black hairs mixed in, especially at the nodes. Stipules 2–2.5 mm long, ovate, shortly adnate to the petiole, sparsely to loosely appressed white hairy, sometimes with few black hairs mixed in. Leaves 2–6 cm long; petiole 1–2 cm long, with the rachis slender, densely hairy like the stem. Leaflets in 5–7 pairs, narrowly elliptic to elliptic, 3–8 × 1–3 mm, obtuse, covered on upper side sparsely to loosely, on underside loosely to densely with appressed, medifixed hairs 0.5–1 mm long, often folded. Peduncles 6–12 cm long, densely hairy like the stem, toward the raceme with increasing black hairs. Racemes short, 4–6-flowered. Bracts 2–2.5 mm long, narrowly triangular to ovate, black hairy. Pedicels 0.5–1 mm long, white and black hairy. Calyx 9–11 mm long, tubular, densely covered with tangled, strongly asymmetrically to subbasifixed, subappressed to spreading black hairs up to 1 mm long and with subbasifixed, spreading white hairs up to 2 mm long; teeth narrowly triangular, 2–3.5 mm long, densely hairy on inner side. Petals violet. Standard ca. 16 mm long; blade obovate, ca. 8 mm wide, emarginate, below the middle slightly constricted, angularly passing into the cuneate, rather short claw. Wings ca. 16 mm long; blades narrowly obovate, obtuse, to slightly obliquely retuse, 7–8 × 2.5–3 mm; auricle ca. 0.3 mm, claw 8–9 mm. Keel ca. 14 mm long; blades obliquely elliptic, with widely curved lower edge and slightly concave upper edge, subacute, ca. 6 × 2.5 mm, claw ca. 8 mm. Stamen-tube truncate at the mouth. Ovary sessile, linear. Legumes linear, 30–40 mm long. Flowering time: 6–7. Distribution: S. Greece. Gr.

85. *Astragalus aquilanus* ANZAL., *Webbia* 24: 726. 1970. [Sect. *Dissitiflora* DC.]

Plants subshrubby, often ligneous only at the base, 20–50 cm tall, in vegetative parts covered with appressed, medifixed, white hairs,

only at the nodes also with some black hairs. Rootstock branched in upper part, with short to \pm elongated subterranean stolons. Stems several, non-flowering or flowering, 5–25 cm long, ascending to erect, angular-sulcate, very densely covered with hairs ca. 0.5 mm long. Stipules 2–3 mm long, greenish, narrowly triangular to triangular, nearly free from the petiole, loosely to rather densely covered with white and black hairs. Leaves 4–11 cm long; petiole 1–1.5 cm long, like the rachis slender, loosely to rather densely hairy like the stem. Leaflets in 7–10 pairs, narrowly elliptic, 7–17 \times 1–3(–4) mm, obtuse to shortly acuminate, on upper side sparsely, on underside loosely covered with hairs 0.8–1.2 mm long, flat or sometimes with slightly incurved margins. Peduncles 8–20 cm long, angular-sulcate, loosely to rather densely white hairy like the stem. Raceme ovoid, to shortly cylindrical, 3–7 cm long, rather densely 8–15-flowered, scarcely elongated at fruiting time. Bracts narrowly triangular, ca. 2 mm long, predominantly black hairy. Pedicels 1–1.5 mm long, predominantly black hairy. Calyx 9–12 mm long, tubular, not inflating with age, rather densely covered with subappressed to slightly ascending, symmetrically to asymmetrically bifurcate white hairs 0.4–1 mm long and with fewer black hairs; teeth subulate, 2–3 mm long, white hairy on inner side. Petals pale yellow. Standard ca. 19 mm long; blade 8–9 mm wide, obovate to slightly panduriform, truncate, in the lower third slightly constricted, at the base slightly to distinctly angular-hastate, subabruptly narrowed into the cuneate claw. Wings ca. 17 mm long; blades narrowly oblong to narrowly elliptic, rounded, ca. 7 \times 2.5 mm; auricle ca. 0.5 mm, claw 9 mm. Keel 14 mm long; blades obliquely obovate-curved, with widely, \pm rectangularly curved lower edge and concave upper edge, subacute, ca. 5 \times 2.5 mm; auricle ca. 0.5 mm, claw 9 mm. Stamen-tube truncate at the mouth. Ovary sessile, hairy; style glabrous. Legumes erect, sessile, rupturing the calyx, narrowly oblong, 12–17(–20) mm long, 3–4 mm high and 2.5–3 mm wide, slightly keeled ventrally, rounded dorsally, with a slightly curved beak 1.5–3 mm long, bilocular; valves greenish-brown to pale brown, rather densely covered with strongly asymmetrically to nearly symmetrically bifur-

cate, often flexuose, appressed white hairs 0.3–0.6 mm long, with some black hairs mixed in, glabrescent with age to nearly glabrous. Distribution: Central Italy. It.

86. *Astragalus cornutus* PALL., Reise Russ. Reich. 1: 499. 1771. (*A. vimineus* PALL.). [Sect. *Dissitiflora* DC.]

Plants shrubby, 30–60(–100) cm tall. Rootstock divided, with rather slender branches, covered with greyish brown to reddish brown bark. Stems erect, branched, the older parts ligneous, with reddish brown bark, glabrous, stems of the current year (3–)5–25(–50) cm long, slightly angular, in lower part sparsely, in upper part often more densely covered with \pm medifixed, appressed white, below the nodes black hairs 0.4–1 mm long. Stipules narrowly triangular, acuminate, 4–8 mm long, adnate to the petiole for 2–3 mm, loosely to rather densely covered with subappressed, partly asymmetrically bifurcate white and black hairs, at the margins also with basifixed hairs. Leaves 3.5–6(–11) cm long; petiole 0.5–1 cm long, like the rachis slender, sparsely to loosely, more rarely to rather densely white hairy like the stem, sometimes with few black hairs mixed in. Leaflets in 5–9 pairs, narrowly oblong to narrowly elliptic, 10–30 \times 1.5–6 mm, acute or obtuse and sometimes shortly mucronulate-acuminate, on upper side glabrous or sometimes with few hairs toward the margins, on underside sparsely to loosely, more rarely rather densely covered with symmetrically to asymmetrically bifurcate, appressed white hairs 0.8–1.1 mm long. Peduncles 4–6 cm long, slightly angular-sulcate, sparsely to loosely covered with white and toward the raceme with increasing black hairs. Racemes subcapitate, (2–)3–4 cm long, densely 7–20(–45)-flowered, not elongating in fruit. Bracts membranous, narrowly triangular, 2–3(–5) mm long, covered with white and black hairs, at the margins also with basifixed hairs. Pedicels ca. 1 mm long, covered with predominantly black, ascending hairs. Calyx 9–11 mm long, tubular, sometimes slightly turbinate-attenuate toward the slightly obliquely gibbous base, slightly obliquely cut at the mouth, covered with strongly to extremely asymmetrically bifurcate to basifixed, tangled,

ascending white hairs 1–1.5 mm long and with symmetrically to asymmetrically bifurcate, subappressed, flexuose black hairs 0.4–0.6 mm long in different relations, sometimes predominantly white hairy on ventral side and predominantly black hairy on dorsal side; teeth subulate, 1.5–3 mm long, densely white hairy on inner side. Petals reddish purple to reddish violet or standard crimson, wings pale violet. Standard 16–21 mm long; blade obovate, 8 mm wide, shortly triangularly attenuate toward the rounded to scarcely retuse tip, slightly constricted in lower part, cuneately narrowed at the base. Wings 13–19 mm long; blades narrowly oblong, obtuse, 6.5–8 × 2.2–2.5 mm; auricle curved, 0.5 mm, claw 7–11 mm. Keel 11–16 mm long; blades obliquely obovate, with in upper part strongly curved lower edge and nearly straight upper edge, subacute, 5–6 × 2.2–2.5 mm; auricle ca. 0.5 mm, claw 6–10 mm. Stamen-tube truncate at the mouth. Ovary subsessile, narrowly oblong, hairy; style glabrous. Legumes sessile, erect or ascending, narrowly oblong, straight, 10–16 mm long, 3–4 mm high, 2.5–3 mm wide, rounded to scarcely keeled by the main nerve ventrally, grooved dorsally, abruptly contracted into a straight to slightly curved, subulate beak 2–4 mm long, bilocular; valves thinly coriaceous, rather densely covered with subappressed, ± symmetrically to asymmetrically bifurcate, flexuose black and white hairs 0.3–0.5 mm long and with subbasifixed to basifixed, ascending to nearly spreading, tangled white hairs 1–2 mm long. Flowering time: (5–)6–7. Distribution: Bu, Rm. [E. Europe, Caucasus, Turkey, Siberia].

87. *Astragalus gladiatus* BOISS., *Diagn. pl. orient.*, ser. 1, 2: 45. 1843. (*A. pugioniferus* BUNGE). [Sect. *Dissitiflori* DC.]

Plants 25–60(–80) cm tall, covered with ± medifixed, appressed, in vegetative parts white hairs. Rootstock divided, with short branches, covered with dark grey brownish bark. Stems solitary or several, in lower part ligneous, branched, parts of the current year 10–25 cm long, very densely covered with hairs 0.3–0.5 mm long. Stipules greenish, 1.5–2.5 mm long, narrowly triangular, adnate to the petiole for 0.5–1 mm, rather densely white hairy, sometimes also with few short black

hairs near the base. Leaves (2–)5–8 cm long; petiole 0.5–2 cm long, like the slender rachis hairy like the stem. Leaflets in 3–5(–7) pairs, remote, linear to nearly filiform, (4–)8–20 (–30) × 0.5–3 mm, obtuse to acute, on upper side sparsely hairy especially toward the margins, on underside loosely to rather densely covered with hairs 0.8–1 mm long. Peduncles 4–17 cm long, slender, rather densely to densely hairy like the stem, sometimes partly glabrescent with age. Racemes 3–10 cm long, loosely (2–)5–10-flowered; axis hairy like the peduncle, but sometimes with some black hairs mixed in. Bracts membranaceous, narrowly triangular, 2–4 mm long, covered with white or white and black hairs. Pedicels 1–3 mm long, white or white and black hairy. Calyx 14–16 mm long, tubular, strongly obliquely gibbous at the base, obliquely cut at the mouth, rather densely covered with appressed white hairs 0.5–0.8 mm long, and mostly also with shorter black hairs; teeth subulate to narrowly triangular, 1.5–4 mm long, densely covered with partly subbasifixed to basifixed white hairs on inner side. Petals white, tinged with pale purple. Standard 22–27 mm long; blade 9–10 mm wide, obovate, slightly to distinctly emarginate, slightly constricted below the middle, at the base subangularly passing into the cuneate claw. Wings 22–27 mm long; blades narrowly obovate to narrowly elliptic, obtuse, laterally slightly retuse, 8–10 × 3–3.5 mm; auricle 1 mm, claw 14–18 mm. Keel 19–23 mm long; blades obliquely obovate, with in upper part widely curved lower edge and nearly straight upper edge, subacute, 5–7 × 3–3.5 mm; auricle minute, claw 13–15 mm. Stamen-tube truncate at the mouth. Ovary with a stipe ca. 1 mm long, linear, white hairy; style glabrous. Legumes subsessile, narrowly linear, straight to slightly curved, obliquely ascending, 50–70 mm long, 2–2.5 mm high, 1.5 mm wide, keeled ventrally, obtusely keeled by the middle nerve dorsally, with a straight beak 5–10 mm long, incompletely bilocular; valves thinly coriaceous, rather densely covered with appressed, ± medifixed white hairs 0.5–0.6 mm long and with mostly fewer and shorter black hairs, often glabrescent with age. Flowering time: 5–6. Distribution: Central Balkan peninsula: Bu, Gr, Ju (Macedonia). [W. Turkey].

88. *Astragalus hispanicus* BUNGE, Mém. Acad. Imp. Sci. Saint Pétersbourg 11(16): 135. 1868 in clave [et l.c. 15(1): 231. 1869].
(*A. hegelmaieri* WILLK.). [Sect. *Dissitiflora* DC.]

Plants 12–60 cm tall, subshrubby, with prostrate or ascending, woody base. Rootstock elongated, up to 7 mm in diameter, branched. Stems of the current year 5–35 cm long, erect, slightly angular-sulcate, very densely covered with appressed, \pm medifixed, warty, white hairs 0.5–1.2 mm long. Stipules greenish, narrowly triangular, subobtuse to acute, 4–5 mm long, adnate to the petiole for up to 1.5 mm or the lower ones nearly free, densely hairy. Leaves 2.5–7 cm long; petiole 0.5–1.5 cm long, like the rachis densely hairy. Leaflets in 3–6 pairs, linear, 9–22 \times 1–4 mm, densely appressed hairy on both sides, slightly upfolded at the margins. Peduncles 6–17 cm long, erect, slightly sulcate, covered in lower part with white, toward the raceme often increasingly with black hairs. Racemes rather densely 8–15-flowered, at fruiting time scarcely elongated. Bracts ca. 3 mm long, narrowly ovate to narrowly triangular, mostly black hairy. Flowers nearly sessile. Bracteoles sometimes present, 0.5–0.8 mm long, laterally at the base of calyx. Calyx 11–16 mm long, tubular, obliquely cut at the mouth, densely covered with \pm medifixed, appressed, at the teeth also slightly subappressed black hairs 0.3–0.6 mm long and with subbasifixed to basifixed ascending white hairs 0.6–1.8 mm long (the black hairs sometimes only sparsely); teeth linear to subulate, 2–5 mm long, densely white hairy on inner side. Petals bluish violet. Standard 22–26 mm long; blade elliptic, 8–11 mm wide, rounded to slightly retuse, subangularly passing into the cuneate claw. Wings 20–23 mm long; blades narrowly elliptic, subacute to obtuse, 9–12 \times 3–4 mm; auricle ca. 0.5 mm, claw 12 mm. Keel 18–20 mm long; blades obliquely elliptic, with widely curved lower edge and slightly concave upper edge, subacute to obtuse, 6–8 \times 2.5–3.5 mm; auricle minute, claw 11–12 mm. Stamen tube truncate at the mouth. Ovary sessile, linear to narrowly oblong, densely white hairy; the long style glabrous. Legumes \pm erect, linear, acuminate at both ends, 20–30 mm long, ca. 4 mm high and 2.5–3 mm wide, obtusely keeled ventrally, slightly nar-

rowly grooved dorsally, with a slightly curved beak 2–5 mm long, bilocular; valves firm, very densely covered with appressed, strongly to extremely asymmetrically bifurcate white hairs 0.8–1.2 mm long. Flowering time: 3–6. Occurrence: On limestone, clay and gypsaceous soil, from sea-side to 1,800 m. Distribution: Spain. Hs.

89. *Astragalus muelleri* STEUD. & HOCHST., Flora 10: 72. 1827. (*A. vegliensis* ASCH. & GRAEBN.; *A. argenteus* VIS.). [Sect. *Dissitiflora* DC.]

Plants 10–25 cm tall, caespitose, in vegetative parts with medifixed, appressed hairs 0.3–0.6 mm long. Rootstock divided, with short to sometimes elongated subterranean branches, covered with blackish bark. Stems several to many, branched at the base, ascending to erect, ligneous at the base, parts of the current year angular-sulcate, very densely covered with medifixed, appressed white hairs, at the nodes mostly with black hairs. Stipules greenish, 1.5–2 mm long, narrowly triangular to triangular, often reflexed, very shortly adnate to the petiole, sparsely to loosely white hairy, especially at the margins, with black hairs mixed in. Leaves 4–10 cm long; petiole 1.5–3 cm long, like the rachis slender, grooved adaxially, hairy like the stem. Leaflets in 4–8 pairs, linear to narrowly elliptic, 6–20 \times 0.5–3 mm, acute, on upper side sparsely to loosely, on underside more densely white hairy, often folded. Peduncles 5–17 cm long, angular-sulcate, densely white hairy like the stem, toward the raceme often with some black hairs mixed in. Racemes 3–7 cm long, rather loosely ca. 10–20-flowered, not elongating in fruit; axis predominantly black hairy. Bracts ca. 1 mm long, narrowly triangular, black hairy. Pedicels 0.5–1 mm long, black hairy; flowers erect. Calyx 6–7 mm long, tubular, obliquely cut at the mouth, rather densely covered with medifixed, appressed black hairs 0.2–0.3 mm long and with fewer white hairs up to 0.7 mm long; teeth triangular, 0.3–1 mm long, white hairy on inner side. Petals purple lilac. Standard 15–18 mm long; blade 5–6 mm wide, elliptic, emarginate, sometimes slightly constricted in lower third, at the base subabruptly contracted into the short claw. Wings 14–16 mm long; blades narrowly oblong-elliptic, rounded, 6–6.5 \times 2–2.5 mm; auricle

0.4 mm, claw 8 mm. Keel 12–14 mm long; blades obliquely elliptic to obliquely obovate, with in the middle or upper part widely curved lower edge and \pm straight upper edge, subacute, $4.5\text{--}5 \times 2\text{--}2.5$ mm; auricle minute, claw 7.5–8 mm. Stamen-tube truncate at the mouth. Ovary sessile, white hairy; style glabrous. Legumes sessile, erect, narrowly oblong to narrowly ellipsoid, 10–15 mm long, 3–3.5 mm high, ca. 2.5 mm wide, keeled ventrally, scarcely grooved dorsally, acuminate at the tip, bilocular; valves thin but tough, densely covered with strongly asymmetrically bifurcate, subappressed white hairs 0.6–0.8 mm long, partially glabrescent with age. Flowering time: 4–5(–6). Distribution: It, Ju (Croatia).

90. *Astragalus peterfii* JÁV., in Sched. Fl. Hung.
Exsicc. 4: 38. 1916. [Sect. *Dissitiflori* DC.]

Plants 30–40 cm tall, slightly subshrubby, covered in vegetative parts with \pm medifixed, appressed, white, only at the stipules sometimes also with black hairs. Rootstock branched, with short to somewhat elongated stolones covered with dirty brownish bark. Stems several, ascending to erect, at the base lignous, branched, stems of the current year 5–20 cm long, very densely covered with hairs 0.7–1 mm long. Stipules greenish, narrowly triangular, (3–)4–6 mm long, very shortly adnate to the petiole, rather densely white hairy, sometimes with black hairs mixed in. Leaves 6–8 cm long; petiole 1.5–2.5 cm long, like the rachis slender, sulcate adaxially, densely hairy like the stem. Leaflets in 5–7 pairs, narrowly oblong to linear, $10\text{--}30 \times 0.5\text{--}3.5$ mm, obtuse, covered on upper side sparsely to loosely, on underside loosely to rather densely with hairs 0.7–1.5 mm long. Peduncle singular in the stem, 12–25 cm long, slightly angular-sulcate, loosely to more rarely rather densely white hairy like the stem, sometimes below the raceme with few black hairs mixed in. Racemes at anthesis rather densely 10–30-flowered, at fruiting time elongated and 5–12 cm long; axis with mostly asymmetrically bifurcate, ascending to spreading white and black hairs. Bracts whitish-membranous, 2–3 mm long, with asymmetrically bifurcate, predominantly black hairs. Pedicels ca. 2 mm long, white and black hairy. Calyx 10–13 mm long, tubular, slightly

obliquely gibbous at the base, slightly obliquely cut at the mouth, loosely to rather densely covered with symmetrically to strongly asymmetrically bifurcate, subappressed to ascending white hairs 0.6–1 mm long and with few to many distinctly shorter, subappressed, \pm flexuose black hairs; teeth subulate, 2–4 mm long, white hairy on inner side. Petals pale yellowish or whitish yellow. Standard 18–24 mm long; blade 6–10 mm wide, oblong to obovate, rounded to truncate, slightly constricted above the base, at the base subauriculate-angularly passing into the short claw. Wings 18–20 mm long; blades slightly narrowly obovate, subobtuse, $8\text{--}9 \times 3.2\text{--}3.5$ mm; auricle triangular, ca. 1 mm, claw 10–12 mm. Keel 15–17 mm long; blades obliquely obovate, with widely, up to rectangularly rounded lower edge and slightly concave upper edge, $5\text{--}6.5 \times 3\text{--}3.5$ mm; auricle 0.5 mm, claw 10 mm. Stamen-tube truncate at the mouth. Ovary sessile, narrowly ellipsoid, white hairy; style glabrous. Legumes sessile, erect, linear to narrowly oblong, straight, 15–24 mm long, 3–4 mm high and wide, slightly keeled ventrally, grooved dorsally, with a straight beak 2–4 mm long, bilocular; valves coriaceous, pale brownish, rather densely covered with strongly asymmetrically, ascending to spreading white hairs 1–1.5 mm long and with much shorter, subappressed to ascending black hairs, soon glabrescent and finally often nearly glabrous. Distribution: Romania. Rm.

Note: A rare endemic known only from two localities.

91. *Astragalus pseudotataricus* BORISS., in Fl.
URSS 12: 701. 1946. [Sect. *Dissitiflori* DC.]

Plants 10–25 cm tall, furnished with medifixed hairs. Rootstock divided, with short to long, branched subterranean stolons 0.5–12 cm long. Stems of the current year 1–3 cm long, slender, ascending to erect, often branched, very densely covered with appressed white hairs 0.5–0.7 mm long. Stipules ca. 2 mm long, triangular-ovate, densely covered with appressed white or black and white hairs, shortly adnate to the petiole, the lower ones indistinctly to shortly vaginate-connate behind the stem, the upper ones free from each other. Leaves 2–7 cm long; petiole 0.5–2 cm long, like the rachis very slender, loosely to rather densely or

in the youth densely hairy like the stem, sometimes with few black hairs mixed in. Leaflets in 3–7 pairs, linear, 4–10(–16) × 0.3–1(–2) mm, subobtusate, on upper side glabrous, on underside densely covered with appressed hairs ca. 0.5 mm long. Peduncles 6–9 cm long, slender, loosely covered with appressed white hairs ca. 0.5 mm long. Racemes 2–8 cm long, very remotely 2–10-flowered. Bracts ca. 1 mm long, whitish-membranous, ovate, with very short black and fewer white hairs. Pedicels 1–1.5 mm long, hairy. Calyx 11–13 mm long, tubular, obliquely gibbous at the base, obliquely cut at the mouth, rather densely covered with appressed white and black hairs 0.2–0.4 mm long; teeth narrowly triangular, 1.5–2 mm long, densely white hairy on inner side. Petals white or pale yellow. Standard 18–22 mm long; blade ca. 8 mm wide, obovate, emarginate, below the middle scarcely narrowed, at the base slightly angularly passing into the short, cuneate claw. Wings 16–20 mm long; blades narrowly oblong, obtuse, 6–7 × 2.5 mm; auricle ca. 1 mm, claw 9–10 mm. Keel 13–16 mm long; blades obliquely elliptic, with widely curved lower edge and slightly concave upper edge, obtuse, 5–5.5 × 2.5 mm; auricle very short, claw 9–10 mm. Stamen-tube truncate at the mouth. Ovary sessile, sparsely white hairy; style glabrous. Legumes sessile, obliquely ascending or rarely spreading, narrowly linear, straight to slightly curved, terete, (25–)30–40 mm long, 1.5–2 mm in diameter, ± rounded ventrally and dorsally, attenuate into a subulate beak ca. 1 mm long, incompletely bilocular; valves coriaceous, densely covered with appressed white hairs. Distribution: Romania. Rm. [East Europe].

92. *Astragalus sericophyllus* GRISEB., Spicil. Fl. Rumel. Bith. 1: 52. 1843. (*A. mayeri* MICEVSKI; *A. mariovoensis* MICEVSKI). [Sect. *Dissitiflori* DC.]

Plants subshrubby, 12–25(–30) cm tall, subcaulescent to shortly caulescent, loosely caespitose. Rootstock divided, with elongated, branched, subterranean stolons, covered with blackish brown bark. Stems of the current year nearly absent or up to 3 cm long, angular-sulcate, very densely covered with medifixed, appressed white hairs 0.3–0.5 mm long. Stipules 1–2 mm long, narrowly triangular, mostly

reflexed, nearly free from the petiole, rather densely appressed white hairy, sometimes with black hairs mixed in. Leaves (3–)4–8 cm long; petiole 1–2.5 cm long, like the rachis slender, grooved adaxially, densely hairy like the stem. Leaflets in 4–6 pairs, linear, 8–20 × 0.5–2 mm, obtuse or often cucullate-folded at the tip, on both sides densely appressed hairy, often slightly folded. Peduncles 10–16 (–20) cm long, angular, densely hairy like the stem, below the raceme sometimes with few black hairs mixed in. Racemes 2–8 cm long, rather densely to very loosely 3–6(–10)-flowered; axis with white and black hairs. Bracts 1–1.5 mm long, densely black hairy. Pedicels ca. 2 mm long, predominantly black hairy. Calyx ca. 10 mm long, tubular, slightly obliquely gibbous at the base, slightly obliquely cut at the mouth, rather densely covered with medifixed to asymmetrically bifurcate, ± flexuous, subappressed to slightly ascending black hairs 0.3–0.8 mm long and with basifixed, ± straight, ascending to partly spreading white hairs ca. 1 mm long; teeth narrowly triangular, 1.5–2 mm long, white hairy on inner side. Petals violet. Standard 21–22 mm long; blade 7–8 mm wide, obovate, truncate to indistinctly emarginate, in lower third slightly constricted, auriculate-dilated below constriction, triangularly narrowed, at the base subabruptly contracted into the short claw. Wings 19–20 mm long; blades elliptic, rounded, 8 × 3–3.5 mm; auricle minute, claw 10–11 mm. Keel 15–16 mm long; blades obliquely obovate, with in upper half widely curved lower edge and straight upper edge, acute, 5 × 3 mm, claw 10–11 mm. Stamen-tube truncate at the mouth. Ovary sessile, linear, white and black hairy; style glabrous. Legumes sessile, erect to slightly nodding, linear, 16–20 mm long, ca. 3 mm high, 2 mm wide, very narrowly rounded ventrally and dorsally, with a slender beak 2–3 mm long, incompletely bilocular (septum ca. 3/4 of the fruit's height); valves thin but tough, densely covered with medifixed to basifixed, appressed white hairs and mostly with medifixed to asymmetrically bifurcate black hairs 0.3–0.8 mm long, white and black hairs arranged in stripes or evenly mixed, sometimes the white hairs partly ascending. Flowering time: 6–7. Occurrence: 600–1,980 m. Distribution: Macedonia; Greece. Gr, Ju.

93. *Astragalus varius* S. G. GMELIN, Reise Russl. 1: 116, tab. 17. 1770. (*A. virgatus* PALL.). [Sect. *Dissitiflora* DC.]

Plants herbaceous or scarcely subshrubby, 25–55 cm tall, covered with in vegetative parts \pm medifixed, appressed, mostly white hairs. Rootstock divided, with short, rarely somewhat elongated branches, covered with dark brownish bark. Stems ligneous mostly only at the very base, often branched in lower part, (10–)15–45 cm long, slightly sulcate, very densely covered with white hairs 0.8–1 mm long. Stipules greenish, narrowly triangular, 2–4 mm long, nearly free from the petiole, rather densely white hairy, at the margins also with basifixed hairs. Leaves 4–8 cm long; petiole 0.5–1(–1.5) cm long, like the rachis slender, white hairy, rather densely to densely hairy like the stem. Leaflets in (3–)4–9 pairs, linear to narrowly elliptic, (5–)10–20(–25) \times 1.5–3(–4) mm, acute or rarely subobtuse, on upper side loosely, on underside rather densely to densely covered with white hairs 1–1.5 mm long. Peduncles 4–12 cm long, angular-sulcate, densely white hairy like the stem. Racemes 5–15(–18) cm long, loosely to rather remotely many-flowered; axis covered with strongly asymmetrically bifurcate, ascending to spreading white hairs up to 1 mm long. Bracts greenish, narrowly triangular, 2–5 mm long, predominantly white or white and black hairy, at the margins also with basifixed hairs. Pedicels ca. 1 mm long, white and black hairy. Calyx 8–10 mm long, tubular to slightly attenuate towards the slightly obliquely gibbous base, slightly obliquely cut at the mouth, loosely to rather densely covered with basifixed, subappressed to ascending white hairs 0.6–1 mm long and with much fewer, asymmetrically bifurcate, subappressed black hairs 0.3–0.5 mm long; teeth subulate to narrowly triangular, 1.5–4 mm long, densely covered with thin, basifixed white hairs on inner side. Petals violet. Standard 16–20 mm long; blade obovate, 6–9 mm wide, retuse to emarginate, slightly to distinctly constricted in lower part, at the base angularly to subabruptly passing into the short claw. Wings 15–19 mm long; blades elliptic, rounded to obliquely, slightly retuse, 6–7.5 \times 2.2–3.8 mm; auricle 0.5 mm, claw 8–10 mm. Keel 12–17 mm long; blades obliquely obovate, with in upper

part widely, rectangularly curved lower edge and nearly straight upper edge, obtuse, 4.5 \times 2.2–2.5 mm; auricle minute, claw 9–10 mm. Stamen-tube truncate at the mouth. Ovary sessile, narrowly oblong, hairy; style glabrous. Legumes sessile, erect, narrowly oblong, 13–19(–25) mm long, 2–2.5(–3) mm high, 1.7–2 mm wide, acutely keeled ventrally, grooved dorsally, abruptly contracted into a straight, mostly obliquely bent beak 2–4 mm long, incompletely to fully bilocular; valves coriaceous, densely covered with strongly asymmetrically bifurcate, appressed to ascending white hairs up to 1 mm long and sometimes also with few, much shorter black hairs. Flowering time: 5–8. Distribution: Bu, Hu, Rm. [Moldavia, Ukraine, Russia, Kazakhstan].

94. *Astragalus vesicarius* L., Sp. Pl.: 760. 1753. (*A. dealbatus* PALL.; *A. albidus* WALDST. & KIT.). [Sect. *Dissitiflora* DC.]

Plants up to 35 cm tall, subshrubby, often ligneous only at the base. Hairs at stems and leaves medifixed, appressed, at bracts and calyx mostly basifixed. Rootstock strong, with a pluricipital root-crown, sparsely to strongly branched, with \pm elongated subterranean stolons. Stems several, 2–7(–20) cm long, ascending, parts of the year 1–5 cm long, slightly angular-sulcate, very densely hairy. Stipules 2–3 mm long, greenish, narrowly triangular, free from the petiole, densely hairy. Leaves 4–6 cm long; petiole 1.5–3.5 cm long, like the rachis slender, often curved, densely hairy. Leaflets in (3–)5–10 pairs, 4–12 \times 1.1–3 mm, mostly narrowly obovate to more rarely elliptic, obtuse to subacute, on both sides mostly rather densely, rarely only loosely hairy, flat. Peduncles 3–19 cm long, strong, covered with white, just below the raceme also with few black hairs. Racemes densely 3–20-flowered, capitate to shortly ovate or wider than long, scarcely elongated at fruiting time. Bracts narrowly triangular, acute, 2.5–5 mm long, predominantly black hairy. Pedicels ca. 0.5 mm long, hairy. Calyx 8–12 mm long, at first tubular, during the anthesis somewhat swollen, more rarely distinctly to elliptically inflated (particularly in the eastern part of its area), very densely villous with spreading, basifixed white and particularly toward the

teeth also black hairs up to 2 mm long, sometimes with few, short, asymmetrically bifurcate to nearly basifixed, nearly appressed black hairs, or the calyx predominantly with white and in this case also \pm appressed white hairs or nearly exclusively with short black hairs; teeth subulate, 2–4 mm long, white hairy on inner side. Petals purplish to violet or (particularly in the eastern part of ist area) wings and keel often whitish, in dry state often yellowish brown, more rarely all petals yellowish. Standard 17–23 mm long; blade 6–10 mm wide, obovate to slightly panduriform, emarginate, in the lower third slightly constricted, at the base angularly passing into the cuneate claw. Wings 15.5–20(–21.5) mm long; blades narrowly oblong to gibbously elliptic, 6.5–7 \times 2.5–3.5 mm, rounded; auricle ca. 0.5 mm, claw 10–11 mm. Keel 13–16(–18) mm long; blades obliquely elliptic-triangular, with very widely, \pm rectangularly curved lower edge and \pm straight to slightly concave upper edge, subacute, ca. 6 \times 3 mm; claw 8–11 mm. Stamen-tube nearly truncate at the mouth. Ovary nearly sessile, hairy; style glabrous. Legumes erect, nearly sessile, rupturing the calyx, narrowly oblong, 8–15 mm long, 3.5–4(–5) mm in diameter, slightly keeled ventrally, rounded dorsally, with a curved beak 2–3 mm long, the style up to 7 mm long often longtime persistent, bilocular; valves covered sparsely with short basifixed to medifixed appressed black hairs and densely with basifixed, villous white hairs up to 1.2 mm long, sometimes the black hairs missing. Three subspecies:

94a. *Astragalus vesicarius* subsp. *vesicarius*

(to this subspecies belongs the above synonyms and the description).

Flowering time: 4–7. Distribution: Al, Au, Bu, Ga, Hs, Hu, It, Ju (Croatia, Bosnia, Serbia, Macedonia), Rm. [Moldavia, Russia-Europe, Ukraine].

94b. *Astragalus vesicarius* subsp. *carniolicus*
(A.KERNER) CHATER, Feddes Repert. 79:
52. 1968. (*A. carniolicus* A.KERNER;
A. tymphaeus QUÉZEL & CONTANDR.)

Differs from the type subspecies by the following characters: Stems longer, up to 30 cm long. Leaves longer, up to 11 cm long. Leaflets up to 20 mm long, mostly acute, sparsely

hairy, green, on upper side sparsely to very sparsely hairy, on lower side somewhat more densely hairy. Bracts linear. Calyx widely tubular, somewhat inflated already at anthesis, predominantly covered with mostly appressed black hairs and only few ascending white hairs; teeth mostly longer. Petals mostly deep violet. Peduncles up to 28 cm lang; Racemes mostly elliptic, \pm strongly elongating after anthesis. Distribution: NE. Italy; Slovenia; Croatia. It, Ju.

94c. *Astragalus vesicarius* subsp. *pastellianus*
(POLLINI) ARCANG., Comp. Fl. Ital.: 186.
1882. (*A. pastellianus* POLLINI; *A. venostanus*
FRITSCH)

Differs from the very similar subsp. *carniolicus* by the yellowish to yellow coloured petals. Distribution: NW. and N. Italy. It.

Note: The species forms a relatively variable complex regarding hight, density of the indument, size of calyx and its enlargement at fruiting time. The relations between black and white, appressed and spreading, basifixed and bifurcate hairs at the calyx can vary in distinct populations.

The three subspecies are only weakly separated. Subsp. *carniolicus* und subsp. *pastellianus* are only different by petals colour. This is the reason for the longtime confusion in nomenclature. The violet-flowered subsp. *carniolicus* is different from subsp. *vesicarius* by higher growth, longer and acute leaflets which are less densely hairy and by mostly predominantly black hairy calyx. Introgressions between the two subspecies can be found in the western Balkans where the areas are touching. In Romania there are probably transitions to *A. albicaulis*.

**95. *Astragalus asper* JACQ., Misc. Austriaca 2:
335. 1782. [Sect. *Pedina* (STEVEN) BUNGE]**

Plants (25–)40–60(–70) cm tall, covered with exception of fruit with \pm medifixed, appressed hairs. Rootstock with a pluricypital root-crown. Stems mostly several, (12–) 20–45 cm long, up to 6 mm in diameter, erect, sulcate, sparsely to loosely covered with white hairs 0.8–1 mm long, glabrescent with age. Stipules greenish, 5–7 mm long, narrowly triangular-acute, adnate to the petiole for ca. 1 mm, glabrous. Leaves 5–9 cm long, subsessile or with petiole up to 1 cm long; the rachis

sulcate, sparsely hairy like the stem, at the insertion of leaflets with minute, sessile glands. Leaflets in 7–14 pairs, narrowly oblong to narrowly elliptic, 12–25 × 1.5–3 mm, on upper side with sparsely to loosely, on underside loosely to rather densely covered with white hairs 0.6–0.8 mm long, sometimes on upper side only with scattered hairs. Peduncles 7–22 cm long, erect, angular-sulcate, hairy like the stem, below the raceme sometimes with few black hairs mixed in. Racemes 6–18 cm long, rather densely many-flowered; axis white or black or white and black hairy. Bracts narrowly triangular, 3–5 mm long, with scattered white and black hairs, near the base with minute, sessile glands. Flowers subsessile, with hairy pedicel up to 0.5 mm long. Calyx tubular, 9–12 mm long, sparsely to loosely covered with appressed white and black or rarely merely black hairs 0.5–0.8 mm long; teeth subulate, 2–4 mm long, densely white hairy on inner side. Petals yellow. Standard 15–19 mm long; blade 4.5–5 mm wide, oblong, deeply emarginate, subabruptly contracted into the rather long claw. Wings 13–16 mm long; blades narrowly oblong, slightly obliquely retuse, 5.5–6.5 × 2–2.5 mm; auricle ca. 1 mm, claw 8–9 mm. Keel 13–15 mm long; blades obliquely oblong, with widely curved lower edge and concave upper edge, obtuse, 5–6 × 2.5 mm; auricle 0.3–0.5 mm, claw 8–9 mm. Stamen-tube obliquely cut at the mouth. Ovary sessile, linear, hairy; style glabrous. Legumes sessile, erect, linear to narrowly oblong, 15–22 mm long, 2.5–3 mm high and wide, keeled ventrally, grooved dorsally, with a straight to slightly curved beak 2–3 mm long, nearly fully bilocular; valves coriaceous, blackish brown when ripe, loosely covered with symmetrically to asymmetrically bifurcate, appressed white hairs 0.4–0.7 mm long; fruit opening along the ventral suture. Flowering time: 5–6. Occurrence: on wet meadows, often on salty soil. Distribution: Au, Bu, Cz, Hu, Ju (Slovenia, Serbia), Rm. [Ukraine, Russia].

96. *Astragalus incanus* L., Sp. Pl., ed. 2: 1072.

1763. [*A. incurvus* DESF.; *A. incanus* subsp. *incurvus* (DESF.) RIVAS GODAY & BORJA].
[Sect. *Incani* DC.]

Plants 5–30 cm tall, often prostrate, with appressed, ± medifixed, in vegetative parts

white hairs 0.2–0.6 mm long. Rootstock up to 12 mm in diameter, repeatedly branched, branches slender to strong, short to elongated, in upper part densely covered with remnants of old stipules and sometimes also of old petioles. Stipules whitish, narrowly triangular, 8–15 mm long, adnate to the petiole for 2–3 mm, loosely to rather densely hairy, at the margin with short, subsessile glands. Leaves (2–) 4–18 cm long; petiole (0.5–)1.5–7 cm long, like the rachis sulcate adaxially, rather densely appressed hairy. Leaflets in 4–13 pairs, elliptic to obovate or nearly orbicular, 1.5–15 × 1–8 mm, subacute to rounded or slightly retuse, mostly shortly acuminate-mucronulate, on both sides loosely to densely hairy. Peduncles 1–15(–20) cm long, angular-sulcate, loosely covered with white, toward the raceme also with black hairs. Racemes at anthesis short, densely 7–22-flowered, at fruiting time elongated and up to 15 cm long; axis with white and black hairs. Bracts whitish to greenish, narrowly ovate, 2–5 mm long, white or black or white and black hairy, at the margin with short, subsessile glands. Pedicels 1–2 mm long, black and white hairy. Bracteoles whitish to greenish, 3 mm long, narrowly ovate to linear-acute, laterally at the base of calyx, hairy, at the margins sometimes with subsessile, short glands. Calyx (6–)8–12 mm long, tubular, slightly oblique at the base, obliquely cut at the mouth, loosely covered with medifixed to partly asymmetrically bifurcate white and black hairs; teeth subulate, 1–4 mm long, white hairy on inner side. Petals violet, pink or lilac. Standard 18–24 mm long; blade slightly upcurved at the middle, 7–8 mm wide, elliptic, shortly narrowed upward, emarginate, gradually narrowed into the short claw. Wings 15–18 mm long; blades narrowly oblong, slightly gibbous above the auricle, subacute, sometimes obliquely, slightly emarginate, 7–8.5 × 2–3 mm; auricle 1–1.5 mm, claw 7–10 mm. Keel 13–16 mm long; blades oblong-upcurved to obliquely oblong, with widely curved lower edge and concave to nearly straight upper edge, obtuse, 5–6 × 2.5 mm; auricle 0.5–1 mm, claw 7–10 mm. Stamen-tube truncate at the mouth. Ovary sessile, linear, white hairy; style glabrous. Legumes sessile, erect, oblong, straight or slightly upcurved, 10–30 mm long, 2.5–5 mm high

and 2–4(–5) mm wide, keeled ventrally, slightly grooved dorsally, subabruptly contracted into a somewhat recurved or bent beak 1–3 mm long, bilocular; valves rather thin but firm, straw-coloured, often distinctly dark reddish mottled, loosely to rather densely white hairy, often completely glabrous with age. Flowering time: 3–6. Occurrence: gypsaceous and calcareous soil, in fields.

Two subspecies which can be distinguished only by different fruit form and which are widely sympatric:

96a. *Astragalus incanus* subsp. *incanus*

To this belongs the above description of the fruits and the above synonyms. Distribution: Ga, Hs. [North Africa].

96b. *Astragalus incanus* L. subsp. *nummularioides* (DESF.) MAIRE in JAHAND. & MAIRE, Cat. Pl. Maroc: 414. 1932
[*A. nummularioides* DESF.; *A. macrorhizus* CAV.; *A. incanus* L. subsp. *macrorhizus* (CAV.) LAÍNIZ]

Legumes sessile, erect, ovoid to shortly cylindrical or nearly globose to shortly clavate, (6–) 8–15(–20) mm long, 5–9 mm high and (4–) 5–10 mm wide, widely rounded to obtusely keeled ventrally with a slightly to distinctly elevated, thickened, pale nerve, widely flattened and slightly grooved dorsally, rounded at the tip with a straight or bent beak 1–2.5 mm long, bilocular; valves thick, coriaceous, straw-coloured to pale brownish, often indistinctly to distinctly violet-mottled, slightly rugulose, at first densely white hairy, glabrescent with age. Fruit hardly opening at both sides, with 5–8 seeds in each locule. Distribution: Sp. [North Africa].

97. *Astragalus monspessulanus* L., Sp. Pl.: 761. 1753. (*A. praecox* BAUMG.; *A. chaubardii* BUNGE; *A. macedonicus* HELDR. & CHARREL; *A. atticus* HAUSSKN.; *A. vandasii* VELEN.; *A. glacialis* LOVRIC). [Sect. *Incani* DC.]

Plants 9–25 cm tall, often caespitose, prostrate to ascending, sparsely covered with appressed symmetrically to sometimes asymmetrically bifurcate hairs 0.2–0.5 mm long. Rootstock up to 15 mm in diameter, often repeatedly branched, branches often elongated, in upper part densely covered with blackish rem-

nants of old leaves. Stipules membranous, the lower ones triangular, up to 5 mm long, the upper ones from a wide base narrowly triangular, up to 15 mm long, adnate to the petiole for 2–3 mm, rather densely hairy, more rarely glabrescent. Leaves 4–20 cm long, petiole 1–7 cm long, like the rachis grooved adaxially, loosely to rather densely hairy. Leaflets in 7–21 pairs, elliptic to nearly orbicular, 3–11 × 2–8 mm, subacute to rounded or slightly emarginate, glabrous on upper side, scarcely to loosely, more rarely rather densely hairy on underside. Peduncles 6–13 cm long, often ascending and curved, loosely to rather densely covered with white, toward the raceme with increasing black hairs, sometimes glabrescent with age. Racemes at first densely, later on loosely 10–30- or more flowered. Bracts whitish to greenish, narrowly triangular to linear, acute, 3–8(–10) mm long, sparsely and mostly white hairy. Pedicels 1–3 mm long, mostly white hairy. Bracteoles whitish, linear, 1–2 mm long laterally at the base of calyx. Calyx 8.5–12(–16) mm long, tubular, slightly obliquely gibbous at the base, obliquely cut at the mouth, sparsely appressed white and black hairy; teeth subulate, 3–5(–6.5) mm long, hairy on inner side. Corolla violet to purplish or dark pink or flesh-coloured to light yellow, sometimes suffused with pink, or blue green. Standard 17–25 mm long; blade slightly upcurved at the middle, 7–8 mm wide, narrowly elliptic to narrowly oblong, emarginate to bilobed, sometimes slightly constricted below the middle, gradually narrowed into the short cuneate claw. Wings 14–20 mm long; blade narrowly oblong, obliquely emarginate, 9 × 2.5 mm; auricle 0.5–1.5 mm, claw 9–10 mm. Keel 13–17 mm long; blades obliquely elliptic, with widely curved lower edge and straight upper edge, subacute, 7 × 3 mm; auricle short, claw 9–10 mm. Stamen-tube truncate at the mouth. Ovary sessile, linear, sparsely white hairy; style glabrous. Legumes sessile, linear, slightly to strongly curved upwards, (15–)20–30(–50) mm long, 2–4 mm high and 1–3 mm wide, slightly keeled ventrally, narrowly rounded to keeled dorsally, with a beak 1–3 mm long, bilocular; valves reddish brown, slightly rugulose-verruculose, loosely to densely white hairy, glabrescent with age. Flowering time: 4–7. Three subspecies.

Note: The two subspecies *monspessulanus* and *gypsophilus* are rather well separated geographically. The subsp. *monspessulanus* is the eastern type and reaches Spain only in the north-eastern corner, whereas subsp. *gypsophilus* is distributed nearly all over Spain and in Morocco. Beside of the clear character of flower colour there are some more tendencies in respect of other characters but these are not enough to be used as diagnostic. So the calyx of subsp. *monspessulanus* is mostly somewhat shorter than in subsp. *gypsophilus* (up to 13 mm long with teeth up to 4.5 mm long against up to 16 mm long with teeth up to 5.5 mm long). The fruits of subsp. *monspessulanus* are mostly somewhat shorter and higher than in subsp. *gypsophilus* (18–30 mm in average against 20–35 mm in length and 3.2–4 mm in average against 2–3 mm in height).

97a. *Astragalus monspessulanus* subsp. *monspessulanus*

Petals violet or more rarely pale violet. Calyx up to 13 mm long with teeth up to 4.5 mm long. Legumes 18–30 mm long and 3.2–4 mm high in average. Bracts narrowly triangular to narrowly ovate, the lower ones 3–4 (–5) mm long. Distribution: Bu, Ga, Gr, He, Hs, It, Ju (Croatia, Bosnia, Macedonia), Rm. [Moldavia, Ukraine, North Africa].

97b. *Astragalus monspessulanus* L. subsp. *gypsophilus* ROUY, Excurs. Bot. Espagne: 39. 1884 [et in Bull. Soc. Bot. France 35: 116. 1888]. (A. *chlorocyaneus* BOISS. & REUT.; A. *monspessulanus* subsp. *chlorocyaneus* (BOISS. & REUT.) BOLOS et al.; A. *cossoni* BUNGE; A. *teresianus* SENNEN & ELIAS)

Petals light yellow, often suffused with pink or bluish-green, sometimes with violet tips. Calyx up to 16 mm long with teeth up to 5.5 mm long. The legumes 20–35 mm long and 2–3 mm high in average. Flowering time: 4–8. Occurrence: On loamy, calcareous and gypsaceous soil, on dry meadows. Distribution: Sp. [North Africa].

97c. *Astragalus monspessulanus* L. subsp. *illyricus* (BERNH.) CHATER in Feddes Repert. 79: 51. 1968. (A. *illyricus* BERNH.; A. *wulfenii* W.D.J.KOCH; A. *soyeri* BUNGE)

A weakly defined subspecies with flesh-coloured to reddish-lilac petals. The legumes are

higher and mostly shorter than in subsp. *monspessulanus*, 5–6 mm high and more obviously laterally compressed. The bracts are linear, acute, the lower ones (3–)6–8(–10) mm long. Flowering herbarium material is difficult to name. Distribution: Italy, Adriatic coast regions from Trieste up to the southern Balkan Peninsula. It, Ju (Slovenia, Croatia, Bosnia). (The indications from Bulgaria and most parts of Greece are probably all wrong.)

98. *Astragalus spruneri* BOISS., Diagn. pl. orient., ser. 1, 2: 79. 1843. (A. *thessalus* BOISS.; A. *tempskyanus* FREYN). [Sect. *Incani* DC.]

Plants 6–20 cm tall, often prostrate to ascending, with appressed, ± medifixed, in vegetative parts white hairs 0.3–0.5 mm long. Rootstock ad 10 mm in diameter, simple or divided, with short to sometimes elongated branches, densely covered in upper part with remnants of old leaves. Stipules whitish the lower ones triangular, 6–7 mm long, rather densely hairy, the upper ones narrowly triangular, up to 12 mm long, sparsely hairy, all adnate to the petiole for ca. 3 mm. Leaves 5–22 cm long; petiole 1.5–6(–7) cm long, like the rachis slightly sulcate adaxially, rather densely hairy. Leaflets in 5–14 pairs, elliptic, 3–10 × 2.5 mm, subacute to rounded and minutely acuminate-mucronulate or truncate to shallowly retuse, sparsely to rather densely appressed hairy on upper side, with minute dark reddish dots, somewhat more densely hairy on underside. Peduncles 5–8 cm long, rather densely white hairy, toward the raceme with some black hairs mixed in. Racemes at first rather densely 7–20-flowered, later on elongated and up to 7 cm long in fruit; axis white and black hairy. Bracts whitish or reddish-suffused, narrowly triangular, 2–6 mm long, black ciliate, with few minute, clavate glands at the margins. Pedicels ca. 3 mm long, black hairy. Bracteoles 0.5–1 mm long, whitish, laterally near the base of calyx, with few glands at the margins. Calyx (7–)9–12(–14) mm long, tubular, slightly oblique at the base, obliquely cut at the mouth, loosely covered with black hairs and with few somewhat longer white hairs; teeth narrowly triangular to subulate, if very short also triangular, (1–)2–4 mm long, black hairy on inner side. Petals purplish to mauvish pink. Standard (16–)18–25(–28)

mm long; blade slightly upcurved at the middle, (7–)8–10 mm wide, obovate to ovate, gradually to subabruptly narrowed upward, widely retuse to emarginate, sometimes slightly constricted in lower part, subabruptly narrowed into the short claw. Wings (13–)14–19(22) mm long; blades narrowly oblong, subacute, slightly laterally emarginate to more rarely strongly unequally but shortly bifid, gibbous at the upper edge above the auricle, 6–9(–10) × 2–3 mm; auricle ca. 1 mm, claw (7–)10–12 mm. Keel (11–)12–16(–18) mm long; blades obliquely obovate-upcurved, with widely curved lower edge and sigmoid-concave upper edge, subobtuse, 5–6.5 × 2.5–3 mm; auricle ca. 0.5 mm, claw (7–)9–10(–11) mm. Stamen-tube truncate at the mouth. Ovary with a stipe 1–2 mm long, narrowly ellipsoid, glabrous to white hairy. Legumes sessile, erect, narrowly ovoid to oblong to subclavate and substipitately narrowed at the base, straight or slightly upcurved, 12–20 mm long, 4–5 mm high and 4–8 mm wide, widely flattened with a thick, elevated, pale nerve to scarcely keeled ventrally, widely rounded to flattened and shallowly to distinctly grooved dorsally, abruptly contracted into a straight beak 2–4 mm long, bilocular; valves coriaceous, hard, pale brownish, sometimes darker reddish-suffused or mottled, irregularly rugulose, covered with symmetrically to asymmetrically bifurcate, sometimes flexuous white hairs, partly glabrescent or finally glabrous. Fruit opening at both the ventral and dorsal side beginning from the tip, with ca. 6 seeds in each locule. Flowering time: 3–5. Occurrence: calcareous stony slopes, vine-yards. Distribution: Al, Bu, Gr, Ju (Macedonia), Rm. [Turkey].

99. *Astragalus baldaccii* DEGEN, Österr. Bot.

Z. 46: 415. 1896. [Sect. *Trachycercis* BUNGE]

Plants 3–6 cm tall, acaulescent or nearly so, loosely caespitose, white hairy. Rootstock up to 10 mm thick, divided, with short subterranean blackish branches, in upper part densely covered with remnants of old leaved. Stems, if present, up to 1 cm long, angular-sulcate, densely covered with medifixed, appressed hairs 1–1.5 mm long. Stipules whitish-membranous to greenish at the tip, 4–6(–10) mm long, narrowly triangular, very shortly adnate to the petiole, ciliate at the margins with subbasifixed

to basifixed hairs 0.5–1 mm long. Leaves 2–4 cm long; petiole 0.5–1 cm long, like the rachis rather densely to densely covered with ± medifixed, appressed to subappressed hairs 0.8–1 mm long. Leaflets in (4–)6–9(–10) pairs, narrowly elliptic, 3–7(–11) × 1–2 mm, obtuse to sometimes slightly emarginate, on both sides rather densely to densely covered with ± medifixed, appressed hairs 1–1.5 mm long, mostly partly folded. Racemes subsessile, 1–3-flowered. Bracts membranous, linear-subulate, 5–9 mm long, sparsely ciliate at the margins with basifixed hairs. Calyx 9–10 mm long, tubular, slightly inflated, obliquely cut at the mouth, whitish, loosely to rather densely covered with medifixed, appressed hairs 1–1.5 mm long; teeth narrowly triangular, 1.5–2.5 mm long, sparsely hairy on inner side. Petals sulfur yellow or pale pink lilac. Standard 22–27 mm long; blade 6–7 mm wide, narrowly oblong, emarginate, below the middle slightly constricted, obtuse-angularly passing into the claw. Wings 20–22 mm long; blades narrowly oblong, obtuse, 9 × 2.5 mm; auricle ca. 1 mm, claw 12–13 mm. Keel 18–19 mm long; blades obovate-curved, with widely, nearly rectangular-curved lower edge and concave upper edge, subobtuse, ca. 6 × 3 mm; auricle ca. 0.5 mm, claw 12–13 mm. Stamen-tube truncate at the mouth. Ovary sessile, densely hairy; style glabrous. Legumes sessile, erect, ovoid, 10–12 mm long, keeled ventrally, grooved dorsally; valves pale brownish, densely covered with extremely asymmetrically bifurcate to subbasifixed, spreading hairs up to 3 mm long. Flowering time: 6. Distribution: Albania, Macedonia. Al, Ju (Macedonia).

100. *Astragalus dolichophyllus* PALL., Sp.

Astragal.: 84. 1802. [Sect. *Trachycercis* BUNGE]

Plants 6–15(–20) cm tall, acaulescent or nearly so, caespitose, covered with stiff, white hairs. Legumes up to 6 mm thick, with a pluricipital root-crown, branches short. Stems, if rarely present, up to 1 cm long. Stipules membranous, often with greenish tip, 6–14 mm long, linear-acute, adnate to the petiole for 1–2 mm, loosely to rather densely covered with asymmetrically to strongly asymmetrically bifurcate, at the margins also subbasifixed,

nearly spreading hairs 1–2 mm long. Leaves (5–)7–12(–20) cm long; petiole 1.5–5(–6) cm long, like the rachis rather densely covered with symmetrically to asymmetrically bifurcate ascending to spreading hairs ca. 1.5 mm long. Leaflets in 8–12(–14) pairs, narrowly ovate to narrowly elliptic, 5–15(–17) × 1.5–4(–5) mm, subobtuse to acute, on both sides rather densely hairy like the rachis. Racemes several, sessile, few-flowered, crowded at the base of leaves. Bracts 5–6 mm long, hairy like the stipules. Pedicels very short, hairy. Calyx 10–14(–17) mm long, tubular, densely covered with asymmetrically to strongly asymmetrically bifurcate, nearly spreading, stiff hairs, 1–2.2 mm long; teeth subulate, 5–7(–10) mm long. Petals pale yellowish. Standard 18–25(–30) mm long; blade oblong-panduriform, emarginate, slightly constricted in lower third, angularly passing into the rather short claw. Wings 15–19(–25) mm long; blades narrowly oblong, obliquely retuse, 7 × 2 mm; auricle ca. 1 mm, claw 9–11 mm. Keel 14–16(–20) mm long; blades obliquely elliptic, with widely curved lower edge and nearly straight upper edge, subacute, 5 × 2.5 mm; auricle short, claw 9–11 mm. Stamen-tube truncate at the mouth. Ovary sessile, densely hairy; style glabrous. Legumes sessile, narrowly ellipsoid, 7–11 mm long, 4–5 mm high, keeled ventrally, rounded dorsally, with a subulate, curved beak ca. 3 mm long, incompletely to completely bilocular; valves thinly coriaceous, densely covered with ascending hairs. Flowering time: 5. Occurrence: steppes and semidesert, on sand. Distribution: Rm. [Moldavia, Ukraine, Russia, Kazakhstan].

101. *Astragalus gracaninii* MICEVSKI, God. Zhurn. Biol. 23: 129. 1971. [Sect. *Trachycercis* BUNGE]

Plants 5–10 cm tall, acaulescent, loosely caespitose, white hairy. Stipules adnate to the petiole for 1–2 mm, the lower ones up to 5 mm long, ovate-obtuse, ciliate at the margins, the upper ones narrowly triangular-acute, 8–10 mm long, loosely covered with asymmetrically bifurcate, ± appressed hairs. Leaves 4–8 cm long; petiole 2–3 cm long, like the rachis rather densely covered with ± medifixed, appressed to slightly ascending hairs ca. 1 mm

long. Leaflets in (3–)5–6(–7) pairs, narrowly elliptic to elliptic, 4–11 × 2–3(–4) mm, obtuse to subacute, on both sides covered with ± medifixed, appressed to subappressed hairs 1–1.5 mm long. Racemes subsessile, 2–7-flowered. Bracts membranous to slightly greenish, narrowly triangular, 5–8 mm long, sparsely hairy. Calyx 10–12 mm long, tubular, obliquely cut at the mouth, whitish with greenish teeth, rather densely covered with asymmetrically to strongly asymmetrically bifurcate, ascending hairs 1–1.8 mm long, at the teeth and sometimes also at the tube with some black hairs mixed in, at the teeth also with basifixed hairs; teeth subulate, 2.5–4 mm long, sparsely hairy on inner side. Petals violet pink. Standard 18–25 mm long; blade 5–7 mm wide, narrowly obovate, slightly emarginate to rounded, slightly angularly passing into the claw. Wings 17–23 mm long; blades narrowly oblong, laterally emarginate at the tip, 8–11 × 2 mm; auricle 0.6–1.2 mm, claw 9–14 mm. Keel 13–18 mm long; blades oblong-curved, with widely curved lower edge and concave upper edge, subacute, 5–6 × 2–2.5 mm; auricle ca. 0.3 mm, claw 9–12 mm. Stamen-tube truncate at the mouth. Ovary sessile, hairy; style glabrous. Legumes erect, 7–8 mm long, acute, densely white hairy. Distribution: Ju (Macedonia).

102. *Astragalus lacteus* HELDR. & SART., in BOISSIER, *Diagn. pl. orient.*, ser. 2, 2: 31. 1856. [Sect. *Trachycercis* BUNGE]

Plants 6–15 cm tall, acaulescent, loosely caespitose. Rootstock repeatedly divided, with blackish, subterranean branches. Stipules greenish, 8–12 mm long, linear-acute to narrowly triangular, adnate to the petiole for ca. 1 mm, covered with strongly asymmetrically bifurcate to subbasifixed, nearly spreading hairs 1–1.5 mm long. Leaves (3–)4–15 cm long; petiole (1–)2–6 cm long, like the rachis rather densely covered with mostly asymmetrically bifurcate, ascending hairs up to 1.5 mm long. Leaflets in 4–10 pairs, narrowly elliptic to elliptic, 3–15 × 1–3.5 mm, rounded or obtuse to subacute, on both sides loosely to densely covered with symmetrically to asymmetrically bifurcate, appressed hairs 1–1.8 mm long. Racemes sessile, 2–4-flowered. Bracts greenish, 10–12 mm long, linear-acute, with

subbasifixed to basifixed, spreading hairs 1–1.5 mm long. Pedicels ca. 1 mm long, hairy. Calyx 11–17 mm long, tubular, obliquely cut at the mouth, rather densely covered with strongly asymmetrically bifurcate to subbasifixed hairs (1–)1.5–2 mm long; teeth subulate, (3–)5–6 mm long. Petals whitish. Standard (17–)20–25(–32) mm long; blade (5–)7–9(–11) mm wide, narrowly obovate-panduriform to narrowly oblong-panduriform, slightly to widely emarginate, below the middle slightly to distinctly constricted, slightly to distinctly angularly passing into the short claw. Wings (14–)22–23(–28) mm long; blades narrowly oblong, slightly to distinctly obliquely emarginate, (7–)9–11(–13) × 2–3 mm; auricle ca. 1 mm, claw (6–)9–12(–15) mm. Keel 13–19(–25) mm long; blades obliquely elliptic, with widely curved lower edge and slightly sigmoid to slightly concave upper edge, obtuse to subacute, (5–)6.5–9 × (2–)2.5–3.5 mm; auricle ca. 0.5 mm, claw (7–)12–16 mm. Stamen-tube truncate at the mouth. Ovary sessile, hairy; style glabrous. Legumes sessile, ellipsoid, ca. 12 mm long, 6 mm high and 3 mm wide, keeled ventrally, grooved dorsally, with an oblique, curved beak ca. 5 mm long, incompletely bilocular (septum ca. 1/2 of the fruit's height); valves thin, rather densely covered with subbasifixed, spreading hairs up to 2.5 mm long, sitting on little tubercles. Flowering time: 4–6. Occurrence: grazed meadows, *Pinus*-forests, on rocks, limestone, 1,000–1,900 m. Distribution: S. Greece. Gr.

103. *Astragalus wilmottianus* STOJ., Izv. Bulg. Bot. Druzh. 1: 73. 1926. [*A. testiculatus* PALL. var. *wilmottianus* (STOJ.) STOJ. & STEF.]. [Sect. *Trachycercis* BUNGE]

Plants acaulescent. Rootstock with a pluricipital root-crown, branched. Stipules white-membranous, acute, villous. Leaves with petiole and rachis covered with supappressed, bifurcate or simple soft hairs. Leaflets in 4–6 pairs, elliptic to obovate, acute to shortly acuminate, appressed hairy. Racemes sessile. Bracts linear-subulate, as long as the calyx tube, villous. Calyx shortly tubular, softly hairy, at the base white hairy, at the subulate teeth mostly red-brownish hairy, in fruit inflated; teeth 1/2 as long as the tube. Petals purple. Standard ca. 20 mm long; blade ob-

long, slightly emarginate, below the middle slightly constricted. Wings shorter than the standard, narrowly oblong, obliquely emarginate. Keel shorter than the wings. Legumes ovoid, as long as calyx, bilocular, glabrous or rarely at the tip sparsely hairy. Distribution: Bulgaria. Bu.

104. *Astragalus angustifolius* LAM., Encycl. Méth. Bot. 1: 321. 1783. (*A. taygeteus* PERSS. & STRID). [Sect. *Tragacantha* DC.]

Plants 6–20 cm tall, spiny shrublets, densely branched, cushion shaped. Stems in older parts covered with blackish remnants of old leaves; parts of the current year 2–3 cm long, angular-sulcate, rather densely to densely covered with appressed, ± medifixed white hairs 0.4–0.5 mm long, glabrescent in the following years. Stipules membranous, 4–5 mm long, triangular to mostly narrowly triangular, adnate to the petiole for ca. 1 mm, sparsely shortly white ciliate at the margins. Leaves 2–6 cm long, paripinnate; petiole 0.5–1.5 cm long, with the rachis rigid, rather densely to densely hairy like the stem, glabrescent with age, persistent, spiny. Leaflets in (5–)7–12 pairs, narrowly elliptic to narrowly obovate, 2–7 × 0.5–2 mm, subacute to more rarely slightly retuse, on both sides densely covered with ± medifixed to asymmetrically bifurcate, subappressed, tangled, white hairs 0.3–0.5 mm long, often folded. Peduncles 0.5–3 cm long, densely covered with appressed, medifixed white hairs ca. 0.3 mm long and often with fewer, ascending, asymmetrically bifurcate hairs up to 1 mm long, often with black hairs mixed in, glabrescent with age. Racemes short, 3–14-flowered. Bracts whitish-membranous, 2–4 mm long, narrowly ovate, acuminate, white hairy, at the margins with partly subbasifixed hairs and with minute glands, sometimes with some black hairs mixed in. Pedicels ca. 2 mm long, with white or predominantly black hairs. Bracteoles subulate to narrowly ovate, 1.5–2 mm long, at the base of calyx. Calyx 6–9 mm long, campanulate-tubular, loosely to densely covered with appressed to subappressed, ± medifixed white and black hairs 0.2–0.5 mm long and with asymmetrically bifurcate, ascending white hairs up to 1 mm long in different relations, sometimes with only white or predominantly white short hairs, with or with-

out longer hairs, sometimes with predominantly black hairs; teeth narrowly triangular, 0.5–2 mm long, densely white hairy on inner side, rarely subglabrous. Petals whitish to pale yellowish or pinkish purple. Standard (12–)15–16(–18) mm long; blade 5–7.5 mm wide, obovate, retuse to emarginate, gradually narrowed at the base. Wings (10–)13–14 mm long; blades narrowly oblong, rounded, (5–)7–8 × 2 mm; auricle 1–1.5 mm, claw 5–6 mm. Keel (9–)11–13 mm long; blades narrowly elliptic, nearly straight, with slightly curved lower and nearly straight upper edge, rounded, (4–)5–6 × 3 mm; auricle minute, claw 5–6 mm. Stamen-tube truncate at the mouth. Ovary subsessile to shortly stipitate, densely white hairy; style glabrous. Legumes sessile, narrowly ellipsoid to narrowly ovoid, 7–10(–12) mm long, 2.5–3 mm high, ca. 2.5 mm wide, obtusely keeled ventrally, flattened dorsally, with a 1–1.5 mm long beak, bilocular; valves straw-coloured, densely covered with subappressed to ascending, medifixed to strongly asymmetrically bifurcate, flexuose white hairs 0.2–1 mm long, sometimes with few black hairs mixed in. Seeds few. In Europe only subsp. *angustifolius*. Flowering time: 5–7. Occurrence: 900–2,500 m. Distribution: Al, Bu, Cr, Gr, Ju (Croatia, Bosnia, Serbia, Macedonia). [Turkey, Near East].

**105. *Astragalus balearicus* CHATER, Feddes
Repert. 79: 51. 1968. [Sect. *Tragacantha*
DC.]**

Plants shrubby, forming loose to dense spiny cushions 4–15(–25) cm tall and up to 30 cm in diameter, with medifixed appressed white, at the calyx also black hairs 0.3–0.5 mm long. Stems ± strongly branched, the parts of the current year very short, white hairy, densely covered by stipules and rachides. Stipules ca. 4 mm long, yellowish, hyalin at the margin, nearly completely adnate to the widened petiole, glabrous, the free tips up to 1(–2) mm long, membranous, narrowly triangular to triangular, ciliate. Leaves 1–3 cm long; petiole 0.3–1.2 cm long, like the rachis obliquely erect, stout, spiny, very sharp, green at first, yellow brownish with age, sparsely hairy, the terminal spine much longer than the uppermost leaflets. Leaflets in 3–5 pairs, remote, thickish, grey green, elliptic or ovate to narrowly

elliptic, acute to subobtusate, the lower ones 2–4 × 0.5–2 mm, the upper ones smaller, on upper side glabrous, on underside sparsely hairy, soon caducous. Racemes nearly sessile or with a hairy peduncle 1–5 mm long, 1–3(–5)-flowered. Bracts 1–3(–4) mm long, membranous with greenish tip, ovate, acuminate, ciliate. Bracteoles minute, in upper part of the pedicel. Pedicels 1.5–3 mm long, thick, hairy. Calyx 4–5 mm long, turbinate-tubular, loosely to rather densely covered with white, more rarely also with black hairs; teeth subulate, 1–2 mm long. Petals white, glabrous. Standard 11–12 mm long; blade elliptic, 4–4.5 mm wide, rounded to very slightly emarginate, at the base very shortly narrowed. Wings 11–12 mm long; blades narrowly oblong, rounded, 5.5–6 × ca. 1.2 mm; auricle 1 mm, claw 5.5–6 mm. Keel 9.5–10 mm long; blades obliquely elliptic with widely curved lower edge and slightly convex upper edge, subacute, 5 × 2 mm; auricle minute, claw 4.5–5 mm. Stamen-tube truncate at the mouth. Ovary sessile, hairy; style long, glabrous. Legumes sessile, obliquely ellipsoid to obliquely oblong-ellipsoid, 5–9 mm long, ca. 2.5 mm high and wide, rounded with a prominent nerve ventrally, rounded dorsally, with a short, straight beak, incompletely bilocular, with a septum up to the middle of the fruit; valves pale brown, glabrous. Flowering time: 3–5. Occurrence: garigue, rocky soil, limestone and schists; 25–1,200 m. Distribution: endemic on the Balearic Islands. Bl.

**106. *Astragalus genargenteus* MORIS, Stirp. sard.
elench. 1: 11. 1827. [*A. sirinicus* subsp.
genargenteus (MORIS) ARCANG.]. [Sect.
Tragacantha DC.]**

Plants 10–30 cm tall, shrublets forming compact, spiny cushions. Stems densely branched, in older parts with persistent remnants of old stipules and rachides. Stipules chartaceous, straw coloured, uninerved, 6–7 mm long, narrowly triangular, acute, adnate to the petiole for 3–3.5 mm, sparsely furnished at the margins with hairs 0.2–0.3 mm long. Leaves 3–5 cm long; petiole 1–1.5 cm long, like the rachis sparsely covered with subappressed to ascending white hairs 0.5–0.6 mm long, glabrescent with age. Leaflets in (5–)8–11 pairs, 2–6 × 1.5–3 mm, rounded, on both sides loosely to

rather densely covered with appressed hairs 0.4–0.5 mm long. Racemes with a peduncle 1–2 cm long, (2–)3–5-flowered. Bracts hyaline, 2.5–3.5 mm long, narrowly triangular, acuminate, densely hairy. Pedicels ca. 2 mm long, hairy. Bracteoles narrowly ovate, acute, 1.5–2 mm long, densely hairy, inserted in the pedicel. Calyx campanulate-tubular, (7–)9–10 mm long, densely covered with medifixed white hairs 0.5–1 mm long and with black hairs 0.2–0.5 mm long; teeth linear-triangular, the lower ones 2.5–2.8 mm, the upper ones 2–2.2 mm long. Petals white yellowish. Standard 16–20 mm long; blade elliptic, 8–9 mm wide, emarginate, gradually narrowed at the base. Wings 15–18 mm long; blades narrowly oblong to slightly dilated toward the rounded tip. Keel 13–15 mm long. Stamen-tube obliquely cut at the mouth. Ovary hairy; style glabrous with minutely papillose stigma. Legumes sessile, narrowly ellipsoid, 12–15 mm long, 3–4 mm high, with a beak ca. 2 mm long; valves subglabrous to sparsely hairy. Flowering time: 5–6. Occurrence: siliceous rocks, 1,200–1,800 m. Distribution: Italy (Central Sardegna). Sa.

107. *Astragalus gennarii* BACCHETTA & BRULLO, Willdenowia 31: 160. 2006. [Sect. *Tragacantha* DC.]

Plants 20–50(–70) cm tall, shrublets forming dense, compact spiny cushions. Stems strongly branched, in old parts covered with remnants of old stipules and rachides. Stipules chartaceous to membranous, straw coloured, triangular, 5–6 mm long, adnate to the petiole for 2.5–3 mm, densely all over covered with medifixed hairs 0.4–0.7 mm long. Leaves 3–5 cm long, imparipinnate but with soon falling terminal leaflet; petiole ca. 0.8–1.5 cm long, like the rachis furnished with scattered hairs in the youth. Leaflets in 6–11 pairs, narrowly elliptic to elliptic, 2–6 × 1–2.2 mm, obtuse, covered on upper side loosely, on underside more densely with appressed, medifixed hairs ca. 0.3 mm long. Racemes with a peduncle 0.2–1 cm long, 2–4-flowered. Bracts narrowly triangular, acuminate, 1.5–3 mm long, densely hairy. Pedicels 1.5–2 mm long. Bracteoles narrowly triangular, 0.5–1.5 mm long, densely hairy, inserted in the pedicel. Calyx campanulate-tubular, 6–7 mm long, densely covered

with medifixed white and black hairs 0.1–0.5 mm long; teeth triangular, the upper ones 1.2–1.5 mm long, the lower ones slightly shorter. Petals white yellowish, tinged with violet, mainly the keel. Standard 15–18 mm long; blade elliptic, 7–8 mm wide, emarginate, gradually narrowed at the base. Wings 13–15 mm long; blades ± narrowly elliptic, rounded. Keel 12–5 mm long. Stamen-tube slightly obliquely cut at the mouth. Ovary hairy; style glabrous. Legumes sessile, narrowly ellipsoid, 11–13 mm long, 3–3.2 mm high, with a beak 1.5–1.8 mm long; valves densely covered with white hairs 0.1–0.7 mm long. Flowering time: 5–6. Occurrence: on limestone, 800–1,055 m. Distribution: Italy (Sardegna). Sa.

108. *Astragalus greuteri* BACCHETTA & BRULLO, Willdenowia 31: 162. 2006. [Sect. *Tragacantha* DC.]

Plants 10–30 cm tall, shrublets forming loose, spiny cushions. Stems strongly branched, in old parts covered with remnants of persistent remnants of old stipules and rachides. Stipules chartaceous, straw coloured, narrowly triangular, acuminate, 6.5–8.5 mm long, adnate to the petiole for 3–4 mm, densely hairy at the margins, otherwise glabrous. Leaves 3.5–6 cm long, imparipinnate but with soon falling terminal leaflet; petiole 1–2 cm long, like the rachis furnished sparsely to loosely covered with appressed, symmetrically to asymmetrically bifurcate hairs 0.6–0.8 mm long; terminal spine ca. twice longer than the uppermost leaflets. Leaflets in 9–11 pairs, narrowly elliptic, rounded to obtuse, 2–6 × 1.5–2.5 mm, covered on upper side sparsely to loosely, on underside more densely with medifixed appressed hairs 0.5–0.8 mm long. Racemes with a peduncle 1–3 cm long, 3–5-flowered. Bracts hyaline, narrowly triangular, acuminate, 5–6 mm long, densely hairy. Pedicels 1–2 mm long, hairy. Bracteoles linear-acute, 2–3 mm long, inserted in the pedicel. Calyx campanulate-tubular, 9–10 mm long, densely covered with medifixed, ± appressed white and black hairs 0.3–1.2 mm long; teeth narrowly triangular, the upper ones (2.5–)3–4 mm long, the lower ones slightly shorter. Petals white to white violet. Standard 20–23 mm long, blade elliptic, 8–9.5 mm wide, emarginate, gradually narrow-

ed at the base. Wings 15–16 mm long; blades narrowly oblong to slightly dilated toward the rounded tip. Keel 15–16 mm long. Stamen-tube slightly obliquely cut at the mouth. Ovary hairy; style glabrous. Legumes narrowly ellipsoid, 11–12 mm long, 3–4 mm high, with a beak ca. 1.5 mm long; valves sparsely covered with white hairs 1–2 mm long. Flowering time: 4–7. Occurrence: on siliceous soils, (600–)800–2,100(–2,300) m. Distribution: France (Corsica). Co.

109. *Astragalus sirinicus* TEN., Prodr. Fl. Nap. App. V: 25. 1826. (*A. tymphresteus* BOISS. & SPRUNER). [Sect. *Tragacantha* DC.]

Plants 10–30 cm tall, shrublets forming dense, spiny cushions, with \pm medifixed white, in the inflorescence also black hairs. Stems slightly branched, with erect or upcurved branches, in lower part mostly without remnants of old rachides, parts of the year very densely leafy, loosely, very shortly hairy, soon glabrescent. Stipules 7–9 mm long, adnate to the petiole in the lower third, the free tips narrowly triangular, ciliate at the margin, \pm densely covered at the margins and in the centre of other surface with hairs 0.7–2 mm long. Leaves 3–5 cm long, imparipinnate, but with soon falling terminal leaflet; petiole 0.5–1.3 cm long, like the rachis at first slender and often curved, later on indurated and spiny, loosely appressed hairy, soon glabrescent. Leaflets in 7–10(–12) pairs, 2.5–7 \times 1.5–2.7 mm, narrowly elliptic, acute, on both sides loosely to rather densely hairy, soon falling. Racemes nearly sessile or with a loosely hairy peduncle up to 1–3 cm long, (3–)8–15-flowered. Bracts 4–6 mm long, narrowly ovate, acute, mostly black-ciliate. Pedicels ca. 2 mm long, black hairy. Bracteoles 0.8–1.3 mm long, inserted at the base of calyx. Calyx 7.5–8 mm long, campanulate-tubular, densely covered with appressed white and black hairs 0.3–1 mm long; teeth triangular, 2–2.5 mm long. Petals yellowish white, sometimes the keel violet-tipped. Standard 17–18 mm long; blade elliptic, 7–7.5 mm wide, deeply emarginate, gradually narrowed into the wide claw. Wings 14–14.5 mm long; blades narrowly oblong, rounded. Keel 12.5–13 mm long. Stamen-tube nearly truncate at the mouth. Ovary sessile, densely hairy; style glabrous. Legumes ses-

sile, narrowly ellipsoid, 10–12 mm long, 4–5 mm high and wide, widely rounded ventrally with slightly prominent nerv, widely flattened to widely and shallowly grooved dorsally, with a beak 2.5–3 mm long, bilocular; valves firm, straw-coloured, covered with very short, appressed black hairs and with thin, curled, often spreading white hairs up to 1.5 mm long, glabrescent with age. Distribution: Italy; Balkan peninsula. Gr, It, Ju (Serbia, Macedonia).

110. *Astragalus terraciano* VALSECCHI, Webbia 49: 34. 1994. [Sect. *Tragacantha* DC.]

Plants shrubby, spiny, cushion-like, 20–30 tall. Stems branched at or sometimes also above the base, erect, sulcate, rather densely covered with asymmetrically bifurcate white hairs 0.5–1 mm long, somewhat glabrescent with age, covered in lower part with remnants of old stipules and rachides. Stipules firm, yellowish, 4–6 mm (of lower leaves) to 10 mm (of upper leaves) long, adnate to the petiole high up, the free tips greenish, often very short, triangular, loosely hairy. Leaves 4–5 cm long; petiole 1–1.5 cm long, like the rachis firm, obliquely erect, pungent, covered with white hairs 0.5–0.6 mm long, the terminal tip 4–6 mm long. Leaflets in 5–10 pairs, elliptic to obovate, 2–6 \times 1–2.5 mm, subobtusate to subacute, grey green, with prominent midrib on underside, on both sides loosely to rather densely sericeous with appressed hairs, often boat-shaped folded. Peduncles 1–3 cm long, covered with appressed to spreading, strongly to extremely asymmetrically bifurcate white hairs. Racemes densely 3–6-flowered. Bracts 2–3 mm long, narrowly triangular, yellowish with prominent midrib, at the margins white hairy. Pedicels 1–2 mm long, white hairy. Bracteoles 0.5–1 mm long, laterally at the base of the calyx. Calyx (5–)6–7 mm long, tubular, rather densely covered with \pm asymmetrically bifurcate white hairs 0.3–0.8 mm long and with much fewer, very short, nearly medifixed black hairs 0.1–0.2 mm long; teeth 0.5–1 mm long, unequal, the upper two triangular, the lower three subulate. Petals white, glabrous. Standard 11–13 mm long; blade widely obovate, ca. 5 mm wide, slightly emarginate, gradually narrowed into the wide, cuneate claw. Wings 10–12 mm long; blades narrowly oblong, 7–8 \times 3 mm; auricle round-

ed, ca. 1 mm, claw 3–4 mm. Keel 10 mm long; blades slightly obliquely elliptic, 7 × 3 mm; auricle minute, claw 3–4 mm. Stamen-tube truncate at the mouth. Ovary sessile; style glabrous. Flowering sessile, 8–9 mm long, keeled ventrally, rounded to slightly flattened dorsally, subtriangular in cross-section; valves shortly appressed white hairy. Flowering time: 3–4. Occurrence: near the coast. Distribution: France (S. Corsica); Italy (N. Sardinia). Co, Sa.

111. *Astragalus thermensis* VALSECCHI, Webbia 49: 32. 1994. [Sect. *Tragacantha* DC.]

Plants shrubby, spiny, 30–50 cm tall, covered in vegetative parts with white, in the inflorescence also black hairs. Stems branched, furnished with ± medifixed hairs up to 1.5 mm long, in the lower part covered with remnants of old stipules and grey brown rachides, in the axil of upper leaves often with short brachyblasts. Stipules firm, yellowish, 5–6 mm (of the lower leaves) to 10 mm (of the upper leaves) long, adnate to the petiole high up, with triangular to narrowly triangular free tips, hairy. Leaves at first 2–3 cm long, paripinnate, obliquely erect; petiole ca. 0.5 cm long, like the rachis rather densely covered with appressed to ascending hairs ca. 0.5 mm long, soon glabrescent, later on strongly elongated and becoming spiny, then 3–6 cm long. Leaflets in 10–12 pairs, elliptic, 2.5–4 × 1–2 mm, rounded, on both sides covered with asymmetrically bifurcate, ascending hairs up to 1 mm long and distinctly shorter, ± medifixed, nearly appressed hairs. Leaves of the brachyblasts only 1–2 cm long, imparipinnate, with a short petiole, with slender, often curved rachis, with 3–6 pairs of small leaflets often only up to 1 mm long, not becoming spiny. Racemes with a hairy peduncle up to 1 cm long, 2–6(–12)-flowered. Bracts 1–2 mm long. Pedicels 1–2 mm long. Bracteoles linear, ca. 1 mm long, laterally at the base of calyx. Calyx ca. 6 mm long, tubular, covered with appressed to ascending, asymmetrically bifurcate, often wavy white hairs 0.4–1 mm long and mostly fewer black hairs only 0.1–0.5 mm long; teeth 0.5–1 mm long, somewhat unequal, the upper two triangular, the lower 3 narrower. Petals? colour. Standard (12–)16 mm long; blade obovate, ca. 5 mm wide, widely rounded and dis-

tinctly emarginate, at the base long cuneately narrowed. Wings 14 mm long; blades narrowly oblong, subobtuse, 7 × 2 mm; auricle rounded, ca. 1 mm, claw ca. 7 mm. Keel 12 mm long; blades obliquely elliptic-curved, with widely curved lower edge and slightly curved upper edge, rounded, 5 × 3 mm; auricle short, acute, claw ca. 7 mm. Stamen-tube truncate at the mouth. Ovary sessile, densely white hairy; style glabrous. Legumes sessile, narrowly ellipsoid, ca. 10 mm long, 3 mm high and wide, rounded ventrally and dorsally, bilocular; valves with ascending white hairs. Flowering time: 3–4. Occurrence: on rocks, in sands near the seashore. Distribution: Italy (Sardinia). Sa.

112. *Astragalus tragacantha* L., Sp. Pl.: 762. 1773. [*A. massiliensis* (MILL.) LAM.]. [Sect. *Tragacantha* DC.]

Plants up to 30 cm tall, shrubby, forming loose, spiny cushions, with ± medifixed, appressed, white, in the inflorescence also black hairs. Stems up to 30 cm long, branched from the base, old parts covered with remnants of old rachides; parts of the current year 3–6 cm long, ± densely hairy, glabrescent with age. Stipules 6–8 mm long, adnate to the petiole high up, free tips triangular to narrowly triangular, hairy predominantly at the base, margins and tips. Leaves 3.5–5 cm long, obliquely erect, paripinnate, rarely with a terminal leaflet; petiole 1–2 cm long, like the rachis slender, often curved, indurating with age and becoming spiny, rather densely hairy, soon glabrescent. Leaflets in 5–10(–12) pairs, narrowly obovate to obovate, 2–6 × 1–3 mm, rounded, sometimes minutely mucronulate, on both sides very densely sericeously hairy, soon falling. Racemes 3–8-flowered, subsessile or with a short peduncle rather densely covered with appressed to nearly spreading, tangled hairs. Bracts 3–4 mm long, narrowly ovate, flat to nearly boat-shaped, white or white and black ciliate. Pedicels ca. 2 mm long, densely hairy. Bracteoles ca. 1 mm long, at the base of calyx. Calyx ca. 6 mm long, campanulate-tubular, loosely black or white and black hairy; teeth narrowly triangular, 1–2 mm long. Petals whitish. Standard 17–19 × 6–8 mm, narrowly elliptic to narrowly obovate, slightly emarginate, gradually narrowed at the base

without distinct claw. Wings 16–18 mm long; blades narrowly oblong, 9–11.5 × 1.5–2 mm, rounded; auricle 1.2–1.6 mm, claw 6–8 mm. Keel 13–15 mm long; blades narrowly elliptic to elliptic, nearly straight, 6–7 × 2–3.5 mm, subobtusely; auricle short, claw 6–8 mm. Stamen-tube truncate at the mouth. Ovary sessile, hairy; style glabrous. Legumes sessile, narrowly ellipsoid, 7–13 mm long, 2.5–4 mm high and wide, widely rounded with elevated mid-nerve ventrally, flat to very shallowly widely impressed dorsally, with a beak 1–1.5 mm long, bilocular; valves coriaceous, straw-coloured, rather densely hairy. Flowering time: 2–5. Occurrence: on calcareous and siliceous rocks, on sands, only near the seashore, up to 100 m. Distribution: France; Portugal; Spain. Ga, Hs, Lu.

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