©Verlag Ferdinand Berger & Söhne Ges.m.b.H., Horn, Austria, download unter www.biologiezentrum.at

Phyton (Austria)	Vol. 15	Fasc. 1—2	107—121	30. 8. 1973

A study of the species *Hesperis armena* and related species

By

František Dvořák*)

Department of Botany, Brno University, Czechoslovakia

With 1 Figure

1. Introduction

H. armena Boiss., subsuming under *Hesperis* L. subg. *Hesperis*, is a species remarkable by having bracts ± preserved in its inflorescence. It is undoubtedly a very ancestral character. The study of the species has, therefore, a special importance for the investigation of the evolutional relationship of the species subsuming under the above-mentioned subgenus.

2. Material and Method

I used a morphological-geographical method. The specimens are given in abbreviations to Lanjouw & Stafleu 1956. The investigated specimens and references are given at single species. The numbering of the specimens coincides with the numbering in the map (Fig. 1). The specimens Nr. (12)—(15) of *H. armena* Boiss. and the specimens without numbers are not mapped. The numbering of the localities of *H. scabrida* Boiss. was kept the same as in the previous publication of Dvořák 1972: 285.

A note on the transcription of the names of Russian botanists: Tzvelev = Cvelev, Busch = Buš, Woronow = Voronov.

I express my gratitude to the curators of the institutions from which the specimens were borrowed. I also thank Prof. Dr. F. J. Widder from Graz for his kind help in the localization of Dr. Luschan's gathering, Prof. Dr. K. H. Rechinger from Vienna for lending me the newest gatherings (they helped to specify the areas of the two species dealt with in the

*) Dr. F. Dvořák, Institutum Botanicum Universitatis, Kotlářska 2, Brno, ČSSR.

©Verlag Ferdinand Berger & Söhne Ges.m.b.H., Horn, Austria, download unter www.biologiezentrum.at

present study) and Dr. HUBER-MORATH from Basel for his kindly me the specimens of the critical species from his own herbarium.

3. Problems and results of the study

3.1. *H. armena* BOISSIER 1842: 63

Specimens: (1) Olympus Armenus = Keşiş Dağ; AUCHER-ÉLOY Nr. 123 & Nr. 173 (E, G typus, isotypus, K, P). BOISSIER 1842: 63, 1867: 231. FOURNIER 1866: 349. CULLEN 1965a: 455. — (2) „Gebirge südöstlich von Ulaş, am Weg nach Malatya, 47 km südöstlich von Sivas, 1600—1700 m s. m.; 17. 6. 1939; H. REESE & V. SKŘIVÁNEK" (HUBER-MORATH 1943: 192). I have not seen the specimen. — (3) Kuruh Dağ, Amaenus; 18. 4. 1892; MANISSADJIAN Pl. Or. Nr. 765 (BRNM 16006/33 herbarium FREYN). — (4) "... in monte Alidagh 1400 m alta prope Caesaream, ... BAL. Pl. d'Or. n. 1012 ..." (FOURNIER 1866: 349, 350; BOISSIER 1867: 231). I have not seen the specimen. — (5) Près Dukhan de? Kalamut; 23. 4. 1854; ? GEAN Nr. 1131 (JE). — (6) Kars, d. Iğdir, inter Taşlica & Karakillisse; ŠIŠKIN (CULLEN 1965a: 455 pro *H. armena* BOISS.). I have not seen the specimen. — (7) Çoruh, Ardanuç; VORONOV Nr. 586 (CULLEN 1965a: 455 pro *H. armena* BOISS.). The specimen is dealt with in chapter 3.4. — (8a) In rupestribus regionis alpinis montis Ak Dağ Lyciae in monte Ak Dağ = Akdagh; VI. 1860; E. BOURGEAU, Pl. Lyciae 1860 (W 67071/1889 typus: *H. pseudoarmena* DVOŘÁK). FOURNIER 1866: 350. BOISSIER 1867: 231. — (8b) Lycien, Taurus, auf dem Ak Dağ (? Ali Dağ) prope Elmali; VII. 1883; PICHLER (WU). — (9) Am Babadagh = Baba Dağ nach Minor; 21. 4. 1882; LUSCHAN Nr. 659 (WU). — (10) Prov. Burdur, distr. Tefenni, Eldireg Dağ S von Dirmil, Kalkfelsen, 1850—1980 m s. m.; 29. 6. 1948; HUBER-MORATH Nr. 8558 typus: *H. pisidica* HUBER-MORATH (HUBER-MORATH 1965: 295). CULLEN 1965 a: 455. — (11) Caria. Cadmus = Honaz Dağ; VI. 1842; BOISSIER Nr. 46 (B, K, P herb. Al. de BUNGE, W bis, W 310407/1889). BOISSIER 1867: 231. CULLEN 1965a: 455. — (12) "... in regione alpinâ Lydiae in monte Mesogi ..." (BOISSIER 1867: 231). The depository of the specimen is not known. — (13) Moghah Carien; 1833 AUCHER-ÉLOY Orient herb. MONTBRET (W 172286/1889). FOURNIER 1866: 349. — (14) Caria; 1842; PINARD (K, P, W). FOURNIER 1866: 349. — (15) Cappadocia; TCHIHATCHEFF. FOURNIER 1866: 349). I have not seen the specimen.

Characters of the species

(1) Bracts. BOISSIER 1842: 63 wrote in the description of the species: "Pedunculi bracteâ lineari eos superante omnes suffulti ..." Later (BOISSIER 1867: 231) he left out this character from the description. It was, however, kept by other authors (FOURNIER 1866: 349; CULLEN 1965a: 455) even if

©Verlag Ferdinand Berger & Söhne Ges.m.b.H., Horn, Austria, download unter www.biologiezentrum.at

sometimes in a rather changed form (FOURNIER l. c.: "Pedicelli omnes bractea lineari post florem evolutum caduca suffulti, ...").

I have found out that the number of developed bracts in the inflorescense varies, sometimes in the plants from the same locality as is shown by the following survey: Olympus Armenus; AUCHER-ÉLOY Nr. 123 (P: right-hand plant 17 flowers, mostly without bracts; left-hand plant 15 flowers, including 8 with bracts, 7 without bracts). — Moghah Carien; 1833; AUCHER-ÉLOY (W 172286: 17 flowers, including 25 with bracts, 2 with problematic bracts). — Caria; 1842; PINARD (W: 10 flowers, 8 with bracts, 2 with problematic bracts; P: 6 flowers, 4 with bracts, 2 with problematic bracts). — Caria; Cadmus; 1842; BOISSIER (W 310407/1889: 15 flowers, including 9 with bracts, 6 with problematic bracts); (B: 15 flowers, including 8 with bracts, 5 with non-developed bracts, 2 with problematic bracts); (W: 13 flowers, 12 with bracts, 1 without bract); (P: 16 flowers, 5 with bracts, 11 without bracts). — Ak Dağ; BOURGEAU (W 67071/1889: 12 flowers, mostly without bracts). — Lycien, Taurus; 1883; PICHLER (WU: out of three plants only in one plant the most resistant flower has developed a bract.).

Bracts are usually preserved also on the base of the fruit pedicells, what not corresponds to the results of FOURNIER's investigation. I infer that the existence on one hand, or the absence of bracts in the inflorescence on the other, cannot be used as a differenciating character between two species of this taxon. I distinguish therefore:

var. *armena* (Autonym)

Typo respondet. Pedicelli omnes bracteis suffulti seu pedicelli infimi solum bracteis instructi.

var. *pisidica* (HUBER-MORATH) DVOŘÁK comb. nov. Basionym: *Hesperis pisidica* HUBER-MORATH 1965: 295. Syn.: *H. pseudoarmena* DVOŘÁK 1967: 94.

A varietate *armena* differt pedicellis ebracteatis.

(2) Shape of the middle cauline leaves. It is an important character as was already discerned by BOISSIER 1842: 63: "... foliis radicalibus in petiolum attenuatis oblongo-spathulatis ... caulinis sessilibus lanceolatis ..." By the shape of the middle cauline leaves differs *H. armena* BOISS. from the species *H. cilicica* (SIEHE ex BORNM.) CVELEV, *H. unguicularis* BOISS. subsp. *unguicularis*. These taxa, whose area adjoins that of *H. armena* BOISS., have the base of the middle cauline leaves contracted or even half-cordate and half-amplexicaul.

(3) Indumentum. BOISSIER 1842: 63 wrote "... tota pilis ramosis hirta aspera ... siliquis glanduloso-hirtis ... folia ... omnia pilis stellato-ramosis valdè aspera ... caulis pilis ramosis, elongatis hispidus ... pedunculi hispidi ... calyces pilis albis hispidi ... siliquae juniores ... densè pilis glandulosis brevibus hispidae ..." The indumentum of the plants is

©Verlag Ferdinand Berger & Söhne Ges.m.b.H., Horn, Austria, download unter www.biologiezentrum.at

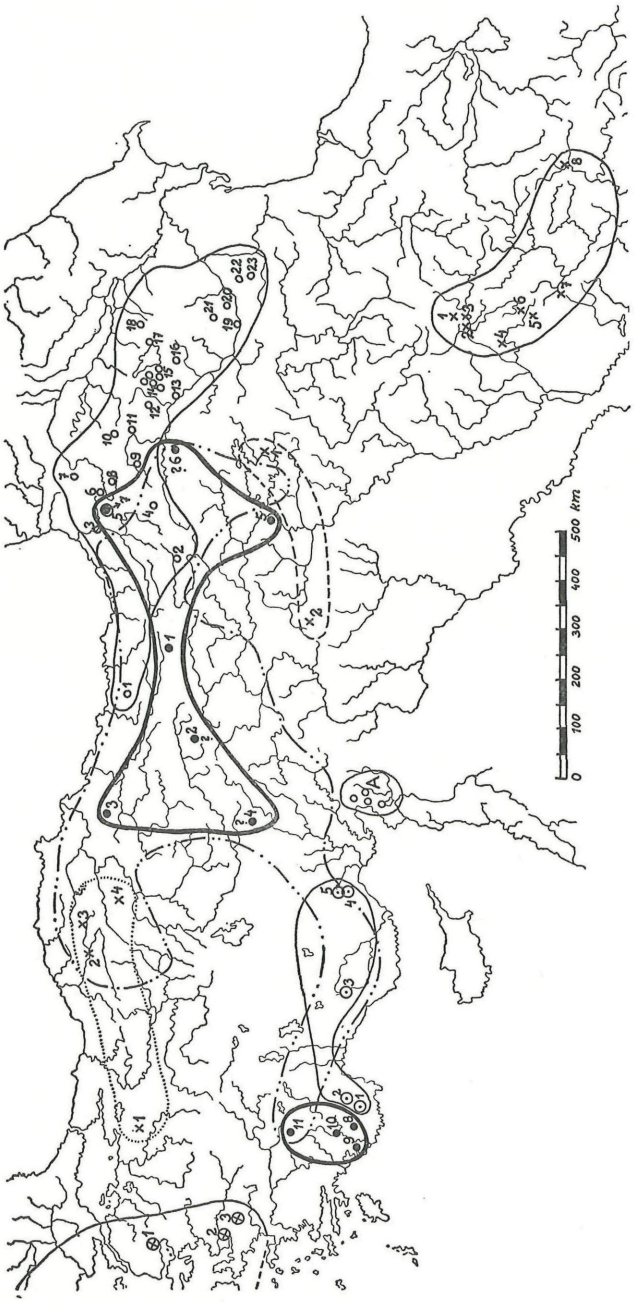


Fig. 1. Distribution of some species subsuming under *Hesperis* L. subg. *Hesperis* .(See opposite page).

©Verlag Ferdinand Berger & Söhne Ges.m.b.H., Horn, Austria, download unter www.biologiezentrum.at

not identical even on the type specimen. In the indumentum there are, as a rule, unequally long hairs: thin pili eramosi simplices subulati, abundant pili ramosi bifurci, the most abundant pili ramosi dichotomi. Also glandular hairs (characteristic for the genus *Hesperis* L. — see DVOŘÁK 1971) form an admixture. BOISSIER's description of the indumentum of the siliquae is not correct: in the indumentum there are squeezed pili eramosi simplices falcati; glandular hairs are scattered.

(4) Length of the flower pedicels. *H. armena* BOISS. has shorter pedicels than is the length of the sepals (BOISSIER 1842: 63, CVELEV 1959: 152). The sepals are on the average (8)—10—(11) mm long; n = 11; the pedicels of fading flowers are (5)—8—(18) mm long; n = 11. There is a difference also in plants from relatively near localities.

(5) Length of the filaments of the stamens of the inner whorl. *H. armena* BOISS.: 7,5—9,0 mm lg.; *H. aspera* FOURN.: ca 6 mm lg.

Area: *H. armena* BOISS. has a disjunctive area (Fig. 1). One part is situated in the south-western part of the Asia Minor Peninsula. The other part with the type locality in the northeastern part of this peninsula. Both

---

Fig. 1. Distribution of some species subsuming under *Hesperis* L. subg. *Hesperis*.

——— ● Area of the species *H. armena* BOISS.: 1 — Olympus Armenus (= Keşiş Dağ); 2 — Ulaş; 3 — Kuruh Dağ; 4 — in monte Alidağ prope Caesaream; 5 — Dukhan; 6 — Taşlica; 7 — Çoruh, Ardanuç; — 8 — Ak Dağ; 9 — Baba Dağ; 10 — Eldireg Dağ; 11 — Honaz Dağ.

——— ⊙ Area of the species *H. cilicica* (SIEHE ex BORNM.) CVELEV: 1 — Avlan Gölü; 2 — Kuhu Dağ; 3 — Geyik Dağ; 4 — Gözne; 5 — Mersin — Namrun (Çam Yaylasi).

– – – – – – – – × Area of the species *H. Boissieriana* BORNM.: 1 — Inter Van et Ischri; 2 — Karacadağ.

——— ○ Area of *H. unguicularis* BOISS. subsp. *unguicularis*. The numbering of the localities coincides with the numbering in the chapter 3.5.

. . . . . × Area of the species *H. aspera* FOURN.: 1 — „Olymp im Brussa"; 2 — Safranbolü; 3 — Aradsch; 4 — Karkun in Elmalu Dağ.

——— × Area of the species *H. scabrida* BOISS. The numbering of the localities was kept the same as in the previous publication (DVOŘÁK 1972: 285).

——— ⊗ Area of *H. Theophrasti* BORB.: 1 — M. Ida; 2 — Yamanlar Dağ prope Izmir; 3 — Lydien: Çiplak Dağ.

——— ○ A Localities from the "Amanus" mountain range (see DVOŘÁK 1972: 232).

— . . — . . — — Area of the species *H. bicuspidata* (WILLD.) POIR. Drawn by F. DVOŘÁK.

©Verlag Ferdinand Berger & Söhne Ges.m.b.H., Horn, Austria, download unter www.biologiezentrum.at

parts of the area have, according to morphological characters, distinct relations to other species subsuming under *Hesperis* L. subg. *Hesperis* (see Fig. 1):

a) the south-western part to the species *H. cilicica* (SIEHE ex BORNM.) CVELEV and *H. Theophrasti* BORB.;

b) the north-eastern part to the taxon *H. unguicularis* BOISS. subsp. *unguicularis*, to the species *H. Boissieriana* BORNM., *H. scabrida* BOISS. (see DVOŘÁK 1965 a, 1972);

c) to the species *H. bicuspidata* (WILLD.) POIR.

The relationship of *H. armena* BOISS. to the so far problematic species *H. aspera* FOURN. deserves a special investigation.

3.2. *H. cilicica* (SIEHE ex BORNM.) CVELEV 1959: 116

Syn.: *H. sylvestris* CRANTZ subsp. *cilicica* (SIEHE ex BORNM.) BORNMÜLLER 1936: 37. — *H. matronalis* L. subsp. *cilicica* (SIEHE ex BORNM.) CULLEN 1965 a: 457 et 1965 b: 192. — *H. cilicica* SIEHE in schedis.

Specimens: (1) Antalya. SW of Avlan Gölü, 1150 m, Iter Leydenense 1959: 740. (CULLEN 1965 a: 457). — (2) Antalya: Strasse von S des Avlan Gölü zur Waldgrenze am Kuhu Dağ (Üç Oluglu), ober dem Avlan Gölü; 22. 4. 1970; I. BOZAKMAN & K. FITZ Nr. 244 (W 03581/1972). — (3) Turkey, Vilajet Antalya, Han boğaz forest near Geyik Dağ, ca 1700 m s. m. Abietum; 30. 1. 1947; DAVIS Nr. 14697 (K). — (4) Cilicischer Taurus, Vilajet Adana, U. von Josna, in Wäldern, ca 800 m s. m.; SIEHE Nr. 127 (B, JE, LE bis, W 1912/25486, WU). — (5) Içel: Mersin-Namrun (Çam Yaylasi), 37 km von Mersin, 920 m s. m.; 9. 5. 1970; I. BOZAKMAN & K. FITZ Nr. 564. (W 1972/03580, specimen ad *H. bicuspidatam* (WILLD.) POIR. vergens).

Typus: "Flora Orientalis. Nr. 127. *Hesperis cilicica* SIEHE n. sp. Deirmen Dere in N. von Josna in Wäldern. 800 m. Mai 1912. Cilicischer Taurus. Vilajet Adana. Bezirk Merzina" (JE). Josna = Giosna = Gözne. DVOŘÁK 1966: 194.

Note: I consider the specimen coming from JE to be a type for the following reasons: (1) Besides the label mentioned above there is another record on the specimen: „Siliquis papillari-glandulosis ab omnibus formis *H. silv.* (= *H. runcinata*) diversa. Determ. C. HAUSSKNECHT". We can read the words in the description of the taxon. — (2) BORNMÜLLER 1936: 38 wrote: „Wurzelblätter fehlen, trockene vorjährige Stengel vorhanden". The characters are on the specimen coming from JE. The specimen coming from B has partly developed basal leaves, having not preserved, however, the stem from the preceding year. — (3) The specimen coming from JE has the following words on its label: „*Hesperis cilicica* SIEHE n. sp."

Area: Southern part of the Asia Minor Peninsula (Fig. 1). The localities adjoin the eastern border of the south-western part of the area of the species *H. armena* BOISS.

©Verlag Ferdinand Berger & Söhne Ges.m.b.H., Horn, Austria, download unter www.biologiezentrum.at

Evolutional relationship: According to morphological characters (see table Nr. 1) and according to its area is *H. cilicica* (SIEHE ex BORNM.) CVELEV related to *H. armena* BOISS. and *H. bicuspidata* (WILLD.) POIR. According to a total absence of bracts it is an evolutionally younger species.

Table 1

	H. armena BOISS.	*H. cilicica* (SIEHE ex BORNM.) CVELEV
Bracteae	pedicelli bracteis ± suffulti	bracteae desunt
Folia caulina media	anguste lanceolata, basi contracta sessilia	ovato-lanceolata, basi subcordata subamplexicaulique sessilia
Pedicellorum vestimentum	pili ramosi bifurci dichotomique ac pili eramosi simplices aequabiles (glanduliferi) dispersi	pili eramosi simplices phragmigeri aequabiles (glanduliferi) copiosi; pili ramosi bifurci nulli usque rarissimi
Filamenta:		
staminum exteriorum	4—6 mm	3—4 mm
staminum interiorum	7,5—9 mm	5—6 mm

3.3. Relationship of *H. armena* BOISS. to *H. Boissieriana* BORNM.

"Près Dukhan" is a locality of the species *H. armena* BOISS. situated farthest to the south-east. The flower pedicels are 5—9 mm long. In the indumentum of the lower part of the stem there is a greater number added of glandular hairs than in other plants of this species. In the indumentum of leaves there are simple eglandular hairs and dichotomous hairs 1,5—2,0 mn long and squeezed glandular hairs. Sepals: 12 mm long; petalorum unguis: 14 mm; petalorum lamina: 9×4 mm.

According to the length of sepals, length of flower pedicels and according to the shape of the middle cauline leaves (folia lanceolata usque anguste lanceolata) I subsume the plant under the species *H. armena* BOISS.

The locality "près Dukhan" borders upon the area of the species *H. Boissieriana* BORNM. (syn.: *H. glabra* BOISS. & NOE in BOISS. 1856: 22). See Fig. 1. The plant from the locality is related to this species by the indumentum of the flower pedicels; their indumentum being scattered, the hairs are as short as in the species *H. Boissieriana* BORNM. It differs, however, by the length of the pedicels, by the length of the sepals and by the shape

©Verlag Ferdinand Berger & Söhne Ges.m.b.H., Horn, Austria, download unter www.biologiezentrum.at

of the middle cauline leaves. Despite these differenciating characters a mutual close evolutional relationship may be inferred. The species *H. Boissieriana* Bornm. and farther south-eastward growing *H. scabrida* Boiss. (see Dvořák 1972) represent a phyletic line proceeding from the species *H. armena* Boiss.

3.4. *H. aspera* Fournier 1866: 352

Syn.: *H. matronalis* β *inodora* Koch 1847: 52, non Linnaeus 1753. — *H. steveniana* Boiss. 1867: 233 p. p. ac Cullen in Davis & al. 1965: 456, non Candolle de 1821. — *H. armena* Buš 1910: 654 p. p. et Buš 1939: 244 p. p. et Bornmüller 1936: 35 p. p., non Boissier 1842. — *H. buschiana* Cvelev 1959: 151 p. p. ac Cullen in Davis & al. 1965: 456 p. p. — *H. lanceolata* Koch in schedis.

Specimens: (1) Herbarium Koch Nr. 1356. Olymp. *H. matronalis* β *inodora* L. Nr. 8. (B). — (2, 3) Ex herbario horti Petropolitani, Anatolia, Ad Safranbol (= Safranbolü = Safranbolu) et Aradsch (= Aratsch); Wiedemann sub *H. steveniana* DC. (teste Boiss.) (K). — (4) Tossia, Karkun in Elmalu Dağ (= Elmaludagh = Elmaly dagh); 24. 5. 1892; Sintenis Nr. 3867 (JE). — (4) Paphlagonia: Vilajet Kastambuli (= Kastamonu), Tossia (= Tosya) in fruticetis ad Karkun (= Karakun); 24. 5. 1892; Sintenis Nr. 3867 (BRNM 16005/33, BRNU, JE, K, PR 197623—197625, PRC, W, 21276/1961, WU). Bornmüller 1936: 35 determined *H. armena* Boiss. Cvelev 1959: 152 and Cullen 1965a: 456 determined *H. buschiana* Cvelev.

Typus: "Herbier de Mr. Benj. Delessert ... Nr. 109 Aucher. *Hesperis aspera* Fourn." (G).

Fournier's description of the type does not fully express the variability. In addition it is not accurate as was also stated by Cullen 1965a: 459: "Based on part of Aucher 109, with inadequate description".

In the bag on the type specimen there is a broken off part of a leaf and nearly ripe siliquae. In their indumentum there are squeezed pili eramosi simplices phragmigeri aequabiles (glanduliferi) and pili ramosi bifurci. Fournier 1866: 352 wrote, however: "Siliquae ..." from which it can be deduced that the valvoids do not belong to the type. The indumentum of the fruits is, however, closely resembling that of the flower pedicels: pili ramosi bifurci, pili ramosi dichotomi; an addition of pili eramosi simplices phragmigeri aequabiles (glanduliferi). That is why I give a specified description of the species *H. aspera* Fourn. It also included the variability of this species according to the study of the specimens.

Planta biennis, satis dense pilis tecta. Caulis erectus, simplex seu ramosus, (22)—40—(48) cm altus, basi dense pilis albis eramosis simplicibus subulatis ac pilis ramosis bifurcis trifurcisque intermixtis (pili 2—3 mm longi) tectus; caulis superne dense pilis praecipue bifurcis, ca. 0,5 mm

©Verlag Ferdinand Berger & Söhne Ges.m.b.H., Horn, Austria, download unter www.biologiezentrum.at

longis obsitus; pili eramosi subulati solum intermixti; interdum etiam pili eramosi simplices phragmigeri aequabiles (glanduliferi) dispersi. Folia caulina inferiora oblonga usque anguste elliptica, basi in petiolum (ca. 4 mm longum) attenuata, apice acuto, margine dentata, basi grosse remote dentata, interdum pinnatipartita usque pinnatisecta; folia caulina media superioraque anguste lanceolata, basi contracta sessilia, apice acuminato, margine denticulata; folia omnia dense pilis ramosis bifurcis trifurcisque rarissime intermixtis, ca. 1 mm longis tecta. Racemi ebracteati. Pedicelli erecti, graciles, pilis ramosis bifurcis ac dichotomis, interdum etiam pilis eramosis simplicibus subulatis intermixtis atque pilis glanduliferis supra descriptis dispersis tecti, 8—28 mm longi. Sepala pedicellis breviora, erecta, margine albo membranacea, apice acuto, pilis bifurcis, interdum etiam pilis glanduliferis intermixtis tecta, 8—12 mm longa. Petala purpureo-violacea; unguis 9—13 mm longus: lamina obovata usque anguste obovata, apice rotundato seu paulo emarginato, 3—8 mm lata et 8—14 mm longa. Stamina breviora 3—4 mm longa, longiora ca. 6 mm longa; antherae 3—4 mm longae. Stigma bilobum, lobis coniventibus. Siliquae glabrae seu tenerae aequalibus pilis ut in pedicellis tectae.

Notes: (1) According to the morphological characters the species *H. aspera* FOURN. belongs to the vicinity of the species *H. armena* BOISS. The shape of the middle cauline leaves is not different. Both species may be distinguished by means of the length of the sepals and flower pedicels. *H. aspera* FOURN. (typus): pedunculi (8)—11—(12) mm lg.; sepala ca. 8 mm lg. Even if we use this character it is necessary to be careful, as a similar size of the flower pedicells and sepals can also be found in some specimens of the species *H. armena* BOISS. For inst.: „Caria, Cadmus, 1842 BOISSIER" — pedicelli 10 mm, sepala 10 mm; „Ak Dağ, 1860 BOURGEAU" (W 67071/1889) — pedicelli 12—18 mm, sepala 10 mm. *H. armena* BOISS. has a greater addition of glandular hairs in the indumentum of the flower pedicels. In *H. aspera* FOURN. is this kind of hairs, as a rule, only scattered.

The species *H. aspera* FOURN. has been subsumed already by the author among biennial species of the genus.

(2) A number of specimens denominated „AUCHER Nr. 109" subsume under the species *H. microcalyx* FOURN. and perhaps under other species (see FOURNIER 1866: 352). The localities of the species *H. microcalyx* FOURN. are situated in the northeastern part of the Asia Minor Peninsula. Probably from the same territory there also comes *H. aspera* FOURN. (FOURNIER 1866: 352: „Crescit in Armenia ...").

(3) CVELEV 1959: 151 described as a new species from the Turkish part of Armenia *H. buschiana* CVELEV. The isotypes are deposited also at WU: „Ex herbario Horti Botanici Tiflisiensis. Distr. Artwin. Angustiae Ardanutsch-Su infra Eli-Rabat; 17. 5. 1907; VORONOV." (WU bis, sub *H. armena* BOISS.). The isotypes have in the indumentum of the lower part of the stem mostly 2—3 mm long pili eramosi simplices subulati; pili ramosi bifurci form ad addition. The situation being inverse in the indumentum of the upper part of the stem. In the indumentum there are also very rare pili eramosi simplices phragmigeri

©Verlag Ferdinand Berger & Söhne Ges.m.b.H., Horn, Austria, download unter www.biologiezentrum.at

aequabiles (glanduliferi). Lower cauline leaves are lyrate, middle and upper cauline leaves by a half-cordate and half-amplexical base sessile. According to the admixture of glandular indumentum, according to the shape and way of attachment of middle cauline leaves, I infer that the plants from the type locality of *H. buschiana* CVELEV form an intermediate degree between *H. armena* BOISS. and *H. unguicularis* BOISSIER 1856: 21 ac 1867: 232 (syn.: *H. transcaucasica* CVELEV 1959: 130 — see DVOŘÁK 1965a). It can be only experimentally found out whether they are hybrids or intermediate types.

CULLEN 1965a: 455, 456 subsumed the plants from the locality partly under *H. buschiana* CVELEV, partly under the species *H. armena* BOISS.: CULLEN 1965a: 455 — *H. armena* BOISS. — „Çoruh: Ardanuç, WORONOW 586"; CULLEN 1965a: 456 — *H. buschiana* CVELEV — „... Çoruh, Artvin, in faucibus Ardanucz-Su infra pag. Eli-Rabat, ad margines silvarum, 17. V. 1907, WORONOW ..." At the same time BUŠ 1910: 654 mentions from the locality „S. A.-O. Batumsk. obl. Artvinsk. okr., uščelje Ardanuč-su, niže Eli-Rabata, opuška dubovago lesa; 17. V. 07 fl. fr. jun.; VORON.! n° 586" the only specimen.

(4) The specimen „Ex herbario horti Petropolitani. *H. steveniana* DC. (teste BOISS.) Anatolia ad Safranbol et Aradsch. WIEDEMANN". Deposited: (K). A biennial, 51 cm high, at the top branched, plant, having lyrate lower cauline leaves. Middle cauline leaves are lanceolate or even narrow lanceolate (see also BUŠ 1910: 665), by a constricted base sessile. The leaves have in their indumentum not-dense white, as much as 2 mm long eglandular pili bifurci. The flower pedicels are thin, as much as 17 mm long, sepala 8 mm long, petalorum unguis 10 mm long, petalorum lamina mauve, their size 9×4 mm. The siliquae are glabrous (see also BUŠ 1910: 665). The plant subsumes under the species *H. aspera* FOURN.

I point out that already BUŠ 1910: 665 wrote: „*H. steveniana* DC. ... Etot vid prichoditsja priznatv endemičnym dlja Krymsko-Kavkazskago kraja, tak kak ekzempljar iz Maloj Aziji s etiketkoj „Safranbol und Aradsch Dr. WIEDEMANN" ... okazalsja nĕ prinadležaščim etomu vidu ..." I confirm the correctness of this conclusion. *H. steveniana* DC. does not grow on the territory of Asia Minor. WIEDEMANN's specimen does not belong to the species *H. armena* BOISS. or *H. steveniana* DC. but is *H. aspera* FOURN. Equally the specimen from the neighbourhood of the town of Marash (BORNMÜLLER 1917: 9) is not *H. steveniana* DC.

(5) KOCH's herbarium. On the specimen — B — there are two labels: „KOCH Nr. 1356, Olymp, *H. matronalis* L. β *inodora* L. Nr. 8". In the bag there is another text: „*H. lanceolata* KOCH. Pilis hispidis bi- trifurcatis patentissimis dense obsita; caulis simplex; folia inferiora oblonga in petiolum attenuata ex margine inferiora repando-dentata; caulina sessilia, lanceolata, subintegra aut inferiore dentata; calyx tomentoso-hispidus; petala lamina oblonga instructa, magis erecta".

The plant conforms with *H. aspera* FOURN. in the indumentum of leaves, in the indumentum of flower pedicels (only the admixture of glandular hairs have I not found in KOCH's specimen), in the shape and the way of attachment of the middle and upper cauline leaves, in the sepals being shorter than are the flower pedicels. KOCH wrote about their relationship (in schedis): „Steht der *H. bicuspidata* (WILLD.) POIR. ... am nächstens, unterscheidet sich aber durch

©Verlag Ferdinand Berger & Söhne Ges.m.b.H., Horn, Austria, download unter www.biologiezentrum.at

die weichere Behaarung ..." I confirm a close relationship of *H. aspera* FOURN to the species *H. bicuspidata* (WILLD.) POIR.

The gather was published by KOCH 1847: 52 under the name „*H. matronalis* L. ß *inodora* L. Nr. 8". They are the same plants collected by Dr. THIRKE „... am Fusse des bithynischen Olymp im Brussa". KOCH 1847, see also KOCH 1848. The specimen evidently corresponds to CVELEV's 1959: 152 „Asia minor, Pontus Euxini, THIRKE".

(6) BORNMÜLLER 1936: 35 joined under the name *H. armena* BOISS. the species: *H. aspera* FOURN. (exsiccatum: SINTENIS Nr. 3876) and *H. bicuspidata* (WILLD.) POIR. (specimen: „Amasia, in reg. subalpina montis Abaci-dagh ... B. nr. 1916"). Out of these specimens only the first was subsumed under *H. buschiana* CVELEV by CVELEV 1959: 152. CULLEN 1965a: 456 subsumed both BORNMÜLLER's specimens under *H. buschiana* CVELEV.

Area: *H. aspera* FOURN. grows in the northern part of the Asia Minor Peninsula. According to the area as well as according to the absence of bracts in the inflorescence it is evolutionally linked with the ancestral species *H. armena* BOISS. The western part of the area of *H. aspera* FOURN. is linked with the Asia Minor part of the area of the species *H. Theophrasti* BORB.

3.5. Distribution of *H. unguicularis* BOISS. subsp. *unguicularis*

Specimens: (1) "Giresun. Yedigözü near Tamdere. 1730 m s. m.; HUBER-MORATH Nr. 12883." (CULLEN 1965a: 457). — (2) Erzeroum; M. ZORAB Nr. 371 et Nr. 369 (K; O. E. SCHULZ det. Nr. 371: "*H. bicuspidata* (WILLD.) POIR. Specimens ad subsp. *voronovii* vergens"). — (2) Plantes d'Arménie, Environs d'Erzeroum; (JE, Typus: *H. unguicularis* BOISSIER 1856: 22, see DVOŘÁK 1965a). — (3) Turkey, Prov. Çoruh (Artvin), Mountain above Artvin, 1700 m s. m., Edge of *Picea* forest; 19. 6. 1957; DAVIS & HEDGE Nr. 29766 (E, K). — (4) Turkey, Prov. Kars, Karaurgan, 1900 m s. m. Grassy banks; 13. 6. 1957; DAVIS & HEDGE Nr. 29470 (E, K). — (5) Turkey, prov. Kars, Yalnizçam Dağ inter Yalnizçam et Ardanuç, 2250 m s. m., Rocky volcanic slopes; 16. 6. 1957; DAVIS & HEDGE Nr. 29675 (K). — (6) Turkey, prov. Kars, Yalnizçam Dağlari above Yalnizçam, 2100—2300 m s. m., Rocky igneous slope; 19. 8. 1958; DAVIS & HEDGE Nr. 32508 (K). — (7) Achalciche, ad lacum Chosapin, herb. TRAUTVETTER (LE, Typus: *H. matronalis* L. var. *elata* TRAUTV.). — (8) Bliz goroda Aleksandropol (= Leninakan); 15. 6. 1906; E. BORDZILOVSKIJ (CVELEV 1959: 131). — (9) Turkey, Prov. Kars, Kars to Susuz, 1750 m s. m., Edge of fields; 15. 6. 1957; DAVIS & HEDGE Nr. 29575 (E, K). — (10) Gukasjanskij rajon, lev. bort. ušč. reky Achurjan v okr. s. Pokr Senasar; 18. 7. 1957; MULKIDŽAŇAN & AVETISJAN Nr. 69204 (ERE). — (11) Nor-Bajazetskij rajon, gora Guzal-Dara; 21. 8. 1928; ZEDELMEJER & GEJDEMAN (CVELEV 1959: 130). — Lori, Daračičag Alibek; 19. 7. 1928; ARARATᵛAN Nr. 8301 (ERE). — (12) In Armenia prope Aštarak; V. et VII. 1837; KOCH (B). —

©Verlag Ferdinand Berger & Söhne Ges.m.b.H., Horn, Austria, download unter www.biologiezentrum.at

(13) Artašatskij rajon, g. Ilandag; 27. 5. 1959; TACHTADŽJAN, MULKIDŽAŇAN & GABRIJELJAN Nr. 69193 et Nr. 69193/2 (ERE). — Gegamskij rajon, In cacumine montis vulcanici Ketan Dağ, solo graminoso; 18. 6. 1940; FEDOROV Nr. 28114 (ERE). — (14) Kotajkskij rajon, okr. s. Kjankan, sev. sklon otroga g. Gadis, gornyj lug; 14. 6. 1960; MULKIDŽAŇAN Nr. 69227 et Nr. 69228 (ERE). — (14) Kotajkskij rajon, Elar čingily, vostočnyj sklon; 14. 6. 1960; MULKIDŽAŇAN Nr. 69222 (ERE). — (14) Kotajkskij rajon, levyj bort r. Azat; 3. 7. 1961; AVETISJAN Nr. 69225 (ERE). — (15) Garni, ušč. r. Azat; 19. 5. 1957; GABRIJELJAN Nr. 69223 (ERE). — (15) In silvis ad ripas Garni fl.; 17. 5. 1940; FEDOROV Nr. 2815 (ERE). — (16) Martuninskij rajon, g. Janych, na senokosach; 2. 7. 1939; NARIŇAN. Nr. 27882 (ERE). — (17) Sev.-vostočnyj bereg ozera Sevan, ušč. Tak-Agač, na skalach; 21. 5. 1930; POLJANSKAJA (LE sub *H. armena* BOISS.; CVELEV rev.: *H. transcaucasica* CVELEV). — (18) Azerbajdžanskaja SSR: na lesnych opuškach gory Sarjal Dağ v rajone Jelizabetpolja (= Kirovobad); 8. 6. 1902; KRONENBURG. (CVELEV 1959: 131). — (19) Nachičevanskaja ASSR, District of Ordubad; 18. 6. 1956; JEGOROV, CVELEV & ČEREPANOV Nr. 948 (LE). — Nachičevan Kipčak; 7. 6. 1934; TER-MINASJAN Nr. 69285 (ERE). — Nachičevanskaja ASSR: mestnostv Anabad na massive Karagut, na severnych travjanistych sklonach; 9. 6. 1947; GROSSGEJM, ILJINSKAJA & KIRPIČNIKOV (CVELEV 1959: 131). — (20) Armenia, distr. Megri, in carpineto-quercetis in declivitate faucium fl. Vagravar-czaj supra pag. Vagravar; 1. 7. 1956; JEGOROVA, CVELEV & ČEREPANOV Nr. 1634. (Typus: *H. transcaucasica* CVELEV 1959: 130). — (21) Jugo-zap. Zangezur; Bass. r. Megraget, meždu s. Bagravar i s. Karčevan v rusle Karčevanskogo kanala; 25. 5. 1947; s. Bagravar i s. Karčevan v rusle Karčevanskogo kanala; 25. 5. 1947; AŠLAŇAN Nr. 37846 (ERE). — (21) Persia. Prov. Azerbaijan orient.: Montes Qareh Dagh, ad viam 20—25 km ab Ahar versus Kaleybar, 1600—1700 m s. m.; 18. 7. 1971; LAMOND sine Nr. & TERMÉ. (K. H. RECHINGER: Iter Iranicum VII, 1971, Nr. 44317). W 1972/948. — (22) Persia, Prov. Azerbaijan orient.: Montes Qareh Dagh, in declivibus saxosis prope Aliabad, 20 km SW Kaleybar, 2300—2500 m s. m.; 20. 7. 1971; LAMOND Nr. 4895 & TERMÉ. (K. H. RECHINGER: Iter Iranicum VII, 1971, sine Nr.), W 1972/947.

Notes: I mention references only at the specimens which have not seen and which I am sure, subsume under this taxon.

3.6. *H. Theophrasti* BORBÁS 1902: 377

References: BORBÁS 1902—1903. HAYEK 1925: 415. BALL 1964: 276. DVOŘÁK 1965b, 1966.

H. Theophrasti BORB. is a variable Balkan-West-Asia Minor species. I distinguish 3 subspecies:

©Verlag Ferdinand Berger & Söhne Ges.m.b.H., Horn, Austria, download unter www.biologiezentrum.at

I. subsp. *Theophrasti*

Syn.: *H. macedonica* Adamović 1904: 124 (see Dvořák 1965b).

Pedicelli pilis eramosis simplicibus phragmigeris (glanduliferis) ac pilis eramosis simplicibus subulatis pilisque ramosis bifurcis intermixtis tecti.

Typus: „P. Sintenis: Iter thessalicum 1896. Nr. 221. *H. matronalis*, Pindus Tymphaeus. In silva ad monaster Witomo." (BPU 110036)

Area: South-eastern part of the Balkan Peninsula.

II. subsp. *graeca* (Dvořák) Dvořák comb. nova

Bas.: *Hesperis graeca* Dvořák 1964: 269.

Pedicelli pilis ramosis bifurcis dichotomisque intermixtis tecti.

Typus: "K. H. Rechinger: Iter aegaeum VII. 1955, Nr. 17215, Insula Euboea meridionalis: Montes Ocha in querceto-castaneis versus Kallianou, ca 600 m s. m.; 21.—24. V.;" W 1959/3893.

Specimens: K. Bauer et F. Spitzenberger 1967. Pflanzen aus der Türkei, Thrakien, 3 km NE Yeniceköy, vil. Kirklareli; 6. 5.—5. 6. Nr. 550 (W 1968/2245, W 1968/2246). — Turquie d'Europe; 1884; Thirke (JE sub *H. matronalis* L. var. *runcinata* W. & Kit.).

III. subsp. *sintenisii* Dvořák 1966: 94

Syn.: *Hesperis armena* Huber-Morath 1943: 192 p. p., non Boissier 1842: 63. — *H. buschiana* Cullen 1965a: 456 p. p., non Cvelev 1959: 151.

Pedicelli praecipue pilis glanduliferis supra descriptis vestiti. Etiam siliquae pilis obductae.

Typus: (1) "P. Sintenis: Iter trojanum 1883, Nr. 590, M. Ida: in saxosis marmor. prope Kareikos. 25. 7." (WU, Isotypus: K).

Specimens: (1) v. supra. — (2) Yamanlar Dagh prope Izmir, 900 m s. m.; 26. 5. 1935; E. Wall. Huber-Morath 1953: 192 determined: *H. armena* Boiss. Cullen 1965a: 456 determined: *H. buschiana* Cvelev. — (3) Lydien: Çiplak Dağ ob Armudlu, 600—700 m; 22. 5. 1935; H. Reese & E. Wall. Herb. Huber-Morath. Huber-Morath 1943: 192 determined: *H. armena* Boiss.

Note: I have not yet seen the "Yamanlar Dagh prope Izmir" specimen. Huber-Mirath wrote, however, about it (in a letter): „Ich nehme an, daß die Art vom Yamanlar Dağ mit dem hier beigelegten Beleg vom Çiplak Dağ identisch ist. Die beiden Berge sind nicht weit von einander entfernt."

Area: Western part of the Asia Minor Peninsula.

4. Summary

(1) *H. armena* Boiss. — the only species of *Hesperis* L. subg. *Hesperis* with ancestral bracts in its inflorescence — has a disjunctive area: one part being in the south-western part of the Asia Minor Peninsula, the other in the north-eastern part of that peninsula.

©Verlag Ferdinand Berger & Söhne Ges.m.b.H., Horn, Austria, download unter www.biologiezentrum.at

(2) The south-western part of the area of *H. armena* Boiss. adjoins in the eastern direction the area of the species *H. cilicica* (Siehe ex Bornm.) Cvelev and in the western direction the area of the species *H. Theophrasti* Borb.

(3) The north-eastern part of the area of *H. armena* Boiss. overlaps in the east that of the species *H. unguicularis* Boiss. From that territory *H. buschiana* Cvelev was described as a new species. It requires further investigation.

(4) In the south-eastern direction there separated from the area of *H. armena* Boiss. the areas of the species *H. Boissieriana* Bornm. and that of *H. scabrida* Boiss.

(5) The area of *H. aspera* Fourn., situated in the northern part of the Asia Minor Peninsula, is linked in the west with the area of a Asia Minor-Balkan species *H. Theophrasti* Borb.

5. Zusammenfassung

(1) *Hesperis armena* Boiss., die einzige Art von *Hesperis* L. subg. *Hesperis* mit dem Vorfahrenmerkmal von Hochblättern im Blütenstand, besitzt ein disjunktes Areal; ein Teil liegt im südwestlichen, der zweite im nordöstlichen Gebiet der kleinasiatischen Halbinsel.

(2) An das südwestliche Teilareal von *H. armena* Boiss. schließt sich das gegen Osten verlaufende Areal von *H. cilicica* (Siehe ex Bornm.) Cvelev an und das im Westen liegende Areal von *H. Theophrasti* Borb.

(3) Das nordöstliche Teilareal von *H. armena* Boiss. deckt sich im Osten zum Teil mit dem Areal von *H. unguicularis* Boiss. Aus diesem Gebiet wurde *H. buschiana* Cvelev als neue Art beschrieben, die allerdings noch näheres Studium erfordert.

(4) Gegen Südosten haben sich von diesem Teilareal die Areale von *H. Boissieriana* Bornm. und *H. scabrida* Boiss. abgelöst.

(5) An das im Norden Kleinasiens liegende Areal von *H. aspera* Fourn. schließt sich im Westen die kleinasiatisch-balkanische *H. Theophrasti* Borb. an.

References

Adamović L. 1904. Beiträge zur Flora von Macedonien und Altserbien. — Denkschr. Akad. Wiss. Wien, math.-naturw. Kl. 74: 116—150.

Ball P. W. 1964. 20. *Hesperis* L. — In Tutin T. G. & al., Flora europaea, 1: 275—277. — Cambridge.

Boissier P. E. 1842. Plantae Aucherianae orientales enumeratae, cum novarum specierum descriptione. — Ann. Sci. nat. ser. 2, 17: 45—91.

— 1856. Diagnoses plantarum novarum ... 3 (5). — Lipsiae.

— 1867. Flora orientalis. 1. — Basileae et Genevae.

©Verlag Ferdinand Berger & Söhne Ges.m.b.H., Horn, Austria, download unter www.biologiezentrum.at

Borbás V. 1902—1903. Hazánk meg a Balkán *Hesperis*-egyesíntendö. — Magyar bot. Lap. 1: 161—167, 196—204, 229—237, 261—272, 304—313, 344—348, 369—380; 2: 12—23.

Bornmüller J. 1910. Collectiones Straussianae novae. Weitere Beiträge zur Kenntnis der Flora West-Persiens. — Beih. bot. Cbl. 27 (2): 288—347.

— 1917. Zur Flora des nördlichen Syriens. — Not. bot. Gart. Berlin 7 (63): 1—44.

— 1936. Symbolae ad floram anatolicam. — Repert. Spec. nov., Beiheft 89 (1) 1—64.

Buš N. A. 1910. *Cruciferae.* — In Kuznĕcov N. I. & al. Flora caucasica critica. Matĕrialy dlja flory Kavkaza, listy 35—50. —Jurjev.

— 1939. Rod 608. Večernica — *Hesperis* L. — In Komarov V. L. (red.) Flora USSR, 8: 242—251. — Moskva et Leningrad.

Candolle A. P. de. 1821. Regni vegetabilis systema naturale. 1. — Parisiis.

Cullen J. 1965 a. *Hesperis* L. — In Davis P. H. & al., 1965, Flora of Turkey and the East Aegean Islands, 1: 452—460. — Edinburgh.

— 1965b. *Hesperis.* — In Davis P. H. & al., Materials for a flora of Turkey: X. — Notes Roy. bot. Gard. Edinburgh 26 (2): 192.

Cvelev N. N. 1959. Rod *Hesperis* L. v SSSR. Genus *Hesperis* L. in USSR. — Not. syst. Leningrad 19: 114—155.

Davis P. H., Cullen J. & Coode M. J. E. 1965. Flora of Turkey and the East Aegean Islands. 1. — Edinburgh.

Dvořák F. 1964. *Hesperis graeca* sp. nova. — Österr. bot. Z. 111: 269—272.

— 1965 a. Two Notes on the species *Hesperis unguicularis* Boiss. — Österr. bot. Z. 112: 416—420.

— 1965b. What is *Hesperis macedonica* Adamov. ? Co je *Hesperis macedonica* Adamov. ? — Preslia 37: 35—41.

— 1966. A contribution to the study of the evolution on *Hesperis* series *Matronales* Cvel. emend. Dvořák. — Repert. Spec. nov. 73: 94—99.

— 1967. *Hesperis pseudoarmena* sp. nova. — Preslia 39: 94—95.

— 1971. A Study of the species *Arabis glandulosa* Kar. & Kir. — Repert. Spec. nov. 82: 421—432.

— 1972. Problems of the species *Hesperis scabrida* Boiss. — Phyton 14 (3—4): 281—287.

Fournier M. E. 1866. Monographie du genre *Hesperis.* — Bull. Soc. bot. France 13: 326—362.

Hayek A. 1925. Prodromus florae peninsulae balcanicae 1 (2). — Berlin.

Huber-Morath A. 1943. Ein Beitrag zur Kenntnis der anatolischen Flora I. — Repert. Spec. nov. 52: 179—229.

— 1965. Novitiae Florae anatolicae. VII. — Bauhinia 2 (3): 295—330.

Koch K. 1847. Beiträge zur Flora des nördlichen Küstenlandes von Kleinasien. — Linnaea 19: 1—66.

— 1848. Beiträge zu einer Flora des Orientes. — Linnaea 21: 289—526, 609—736.

Lanjouw J. & Stafleu F. A. 1956. Index herbariorum. Part 1. The herbaria of the world. — Regn. veg. 6, ed. 3.-Utrecht.

Linnaeus C. 1753. Species plantarum, ed. 1. — Holmiae.

ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: Phyton, Annales Rei Botanicae, Horn

Jahr/Year: 1973

Band/Volume: 15_1_2

Autor(en)/Author(s): Dvorak Frantisek

Artikel/Article: A study of the species Hesperis armena and related species. 107-121