

JERZY ZIELIŃSKI

Crataegus curvisepala Lindman and *C. microphylla* C. Koch
in Bulgaria

Looking through the herbarium materials of Bulgarian hawthorns in the herbaria of the Institute of Botany of the Bulgarian Academy of Science and of the University of Kliment Ohridsky in Sofia I have found a number of herbarium specimens representing two species which are not mentioned by the recently published "Flora of Bulgaria" (Jordanov, 1973). One of these is *C. curvisepala* Lindman, which as it was found was already reported from three stands in western Bulgaria (Ganchev, 1960). The other species, *C. microphylla* C. Koch has not been reported for Bulgaria before.

1. *CRATAEGUS CURVISEPALA* LINDMAN
Svensk Fanerogamfl. 307, t. 189 (1918)

Syn.: *C. intermedia* Fuss, Fl. Transsilv. excurs. 211 (1866) non Schur; *C. hirsuta* Schur, Enum. pl. Transsilv. 206 (1866); *C. kyrtostyla* auct. an Fingerh.? Linnaea 4: 372 (1829); *C. monogyna* Jacq. subsp. *curvisepala* (Lindman) Jav. et Soó, A Magyar Növényvillág Kézikönyve 1: 250 (1951); *C. monogyna* Jacq. subsp. *intermedia* (Schur) Jav. var. *serromonogyna* Péntzes, Ann. Acad. Horti- et Viticulture, vol. 18, tom 2, 1 (1956); *C. calycina* Peterm. var. *hirsuta* (Schur) Péntzes, l.c.: 125; *C. calycina* Peterm. var. *calycina* f. *hirsuta* (Schur) Buia, Flora Republici Populare Romine 4: 260 (1956); *C. apressidens* Pojark. in Novit. Syst. Pl. Vasc. 164 (1964); *C. calycina* Peterm. subsp. *curvisepala* (Lindman) Franco in Feddes Repert. 79: 39 (1968).

C. curvisepala has the opinion of being one of the most critical species of hawthorns occurring in Europe. It has been first described half a century ago (Lindman, 1918), however still views about its systematic rank and taxonomic position are frequently contradictory. Some authors (Pojarkova, 1939; Browicz, 1972) consider it to be a distinct species, others question its individuality and include it with va-

rious rank into either *C. calycina* Peterm.* (Franco, 1968) or *C. monogyna* Jacq. (eg. Pénczes, 1956) while still others (eg. Soó, 1966) consider all three taxa jointly. In practice *C. curvisepala* is frequently erroneously identified with one or the other of these two species. Below is a list of the most important characters of the discussed species:

<i>C. calycina</i>	<i>C. curvisepala</i>	<i>C. monogyna</i>
Leaves thin more or less concolorous; lobes acuminate or acute; outer margin of lowest lobes serrulate almost to the base.	Leaves thin to subcoriaceous, usually lighter beneath; lobes acute to acuminate; outer margin of lowest lobes serrulate at least for their upper half, near the base usually entire.	Leaves usually more or less coriaceous, discoloured, often pruinose beneath; lobes acute or obtuse, entire or with few teeth near apex.
Stipules inciserrate.	Stipules serrate to inciserrate.	Stipules entire or sparsely toothed.
Fruit oblong-cylindrical, usually light red.	Fruit cylindrical or ellipsoid, rarely subglobose, usually dark red.	Fruit ellipsoid to subglobose, usually dark red or brownish.
Sepals long-acuminate, on ripe fruit more or less erect and often appressed one to another.	Sepals narrowly triangular, deflexed, patent, erecto-patent or some of them erect, divergent.	Sepals triangular, usually not more than twice as long as broad, deflexed.

From the above list three basic conclusions can be drawn:

1. *C. calycina* and *C. monogyna* constitute as it were morphological extrema, the joining of which, even if we assume the existence of transitory forms is difficult to accept.

2. All three species form a single morphological trend in which *C. curvisepala* takes up as it were an intermediate position between *C. calycina* and *C. monogyna*.

3. Definite separation of *C. curvisepala* from the remaining two taxa can only be made on the basis of a combination of characters.

One of the main reasons for the contradictory views mentioned above is the undefined so far range of variability of *C. curvisepala*. Additional details are particularly needed concerning such character as the form of the sepals. Contrary to the opinion of the majority of authors who assign *C. curvisepala* only sepals of the "deflexed" form, into this species also forms should be included with patent or erecto-patent sepals as well as individuals having all these three forms of sepals (Fig. 1). Their frequency of occurrence and the fact that they are met also far beyond the range of *C. calycina* (eg. in Bulgaria, in Turkey) appear to contradict the common view that these are exclusively hybrid forms between *C. curvisepala* and *C. calycina* or between *C. calycina* and *C. monogyna*. This character was apparently for the first time appropriately discussed

* For this species Hrabětova-Uhrova (1968) proposes a different specific name *C. lindmanii* Hrabět.-Uhr.

by Gostyńska-Jakuszevska (1973). Recently *C. curvisepala* was the subject of a detailed study by Franco (l.c.). This author has reduced *C. curvisepala* to the rank of subspecies within *C. calycina*, justifying the new combination by the great similarity of vegetative or-



Fig. 1. *C. calycina* — 1, *C. curvisepala* — 2, *C. monogyna* — 3, *C. microphylla* — 4

gans in both taxa, and the existence of numerous intermediate forms making it difficult to distinguish between them, as well as by the existence of some differences in the ranges.

While between *C. calycina* and *C. curvisepala* there indeed occur the relationships described by Franco, it is not possible to accept his view

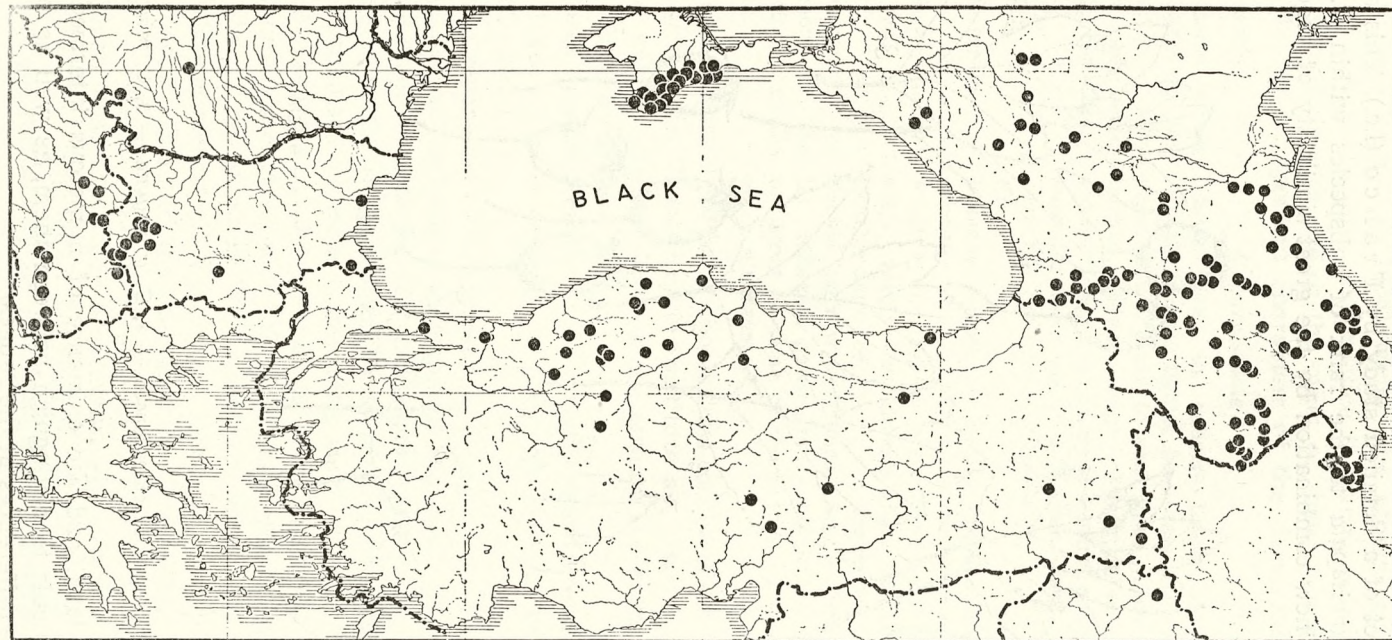
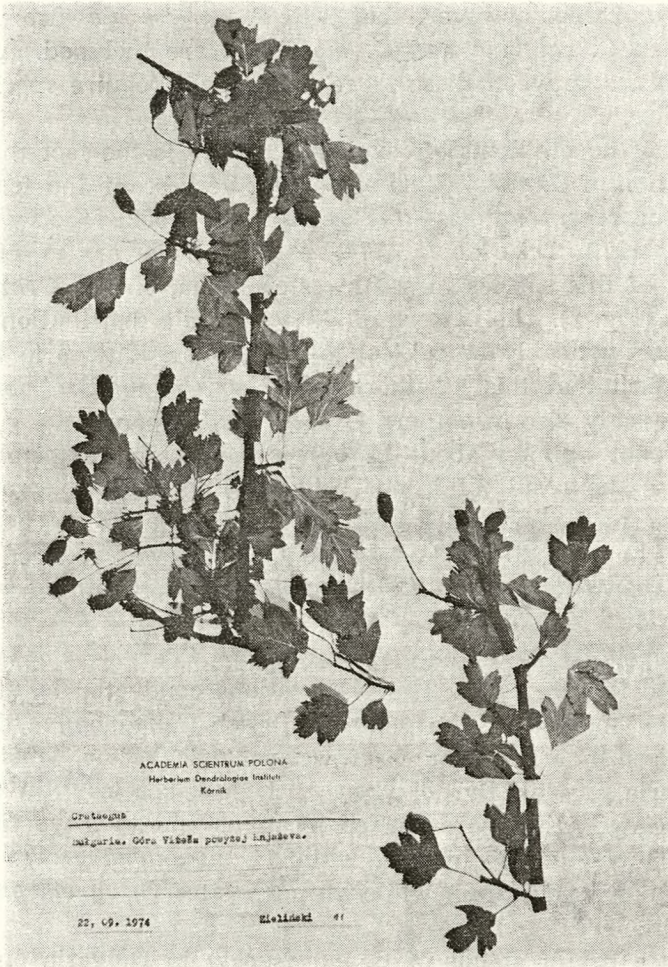


Fig. 2. Southeastern part of the range of *C. curvisepala*



Phot. K. Jakusz

Fig. 3. A herbarium specimen of *C. curvisepala* collected in Bulgaria (Institute of Dendrology of Polish Academy of Sciences, Kórnik)

that the morphological distinctiveness of *C. curvisepala* from *C. monogyna* is beyond doubt. It is true that extreme forms of *C. curvisepala* and *C. monogyna* differ substantially from each other, however a strict definition of the differences between these taxa is not less troublesome than between *C. curvisepala* and *C. calycina*.

Undoubtedly the relation of *C. curvisepala* both with *C. calycina* and *C. monogyna* leads to the suggestion that this taxon could be an interspecific hybrid. However its enormous range, extending well beyond the ranges of the supposed parental forms (particularly that of *C. calycina*) would seem to suggest that it is an old and established hybrid.

It is quite probable, however, that into *C. curvisepala* also recent hybrids between *C. calycina* and *C. monogyna* are included. A clarification of affinities between these three taxa would require special experimental studies.

Related to the problems of taxonomic nature is the fact that data on the distribution of *C. curvisepala* are as yet very scant and fragmentary. A number of recent studies (Grossheim, 1952; Kosych, 1967; Browicz, 1972; Džekov, 1974) permit, however, to present the distribution of this species in southwestern Asia, on the Crimea and in the Balkans (Fig. 2). The pattern of *C. curvisepala* distribution presented here will most probably be subject to numerous additions in the future. One can expect that this hawthorn will also be found in northwestern Iran, and possibly also in northern Greece* and Albania.

The current opinion about *C. curvisepala* being extremely rare in Bulgaria was the result of it not being distinguished in practice from *C. monogyna*. In the consecutive "Floras of Bulgaria" (Stojanov, Stefanov, Kitinov, 1966; Jordanov, l.c.) it was reduced to an insignificant aberration within *C. monogyna* having nothing to do with *C. curvisepala* Lindman.

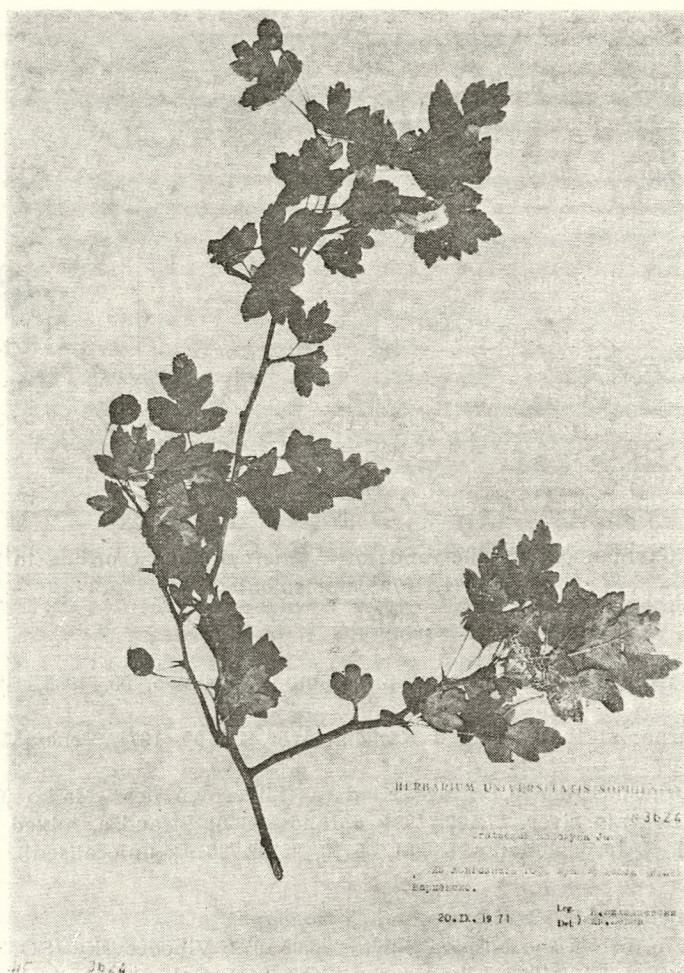
Equally little as about the distribution of *C. curvisepala* do we know about its site requirements. The observations conducted by the present author appear to indicate that compared with *C. monogyna* this species is characterized by a somewhat narrower ecological scale. Thus for example in Bulgaria, on Golo Byrdo, where both these species grow *C. curvisepala* is associated with more shaded locations and thus we find it only in valleys, among dense thickets, while *C. monogyna* grows there also on dry sun scorched slopes, while on such sites *C. curvisepala* is altogether absent.

Below is a list of stands of *C. curvisepala* in Bulgaria on the basis of the herbarium materials of the Institute of Botany of the Bulgarian Academy of Sciences, of the University of Kliment Ohridsky in Sofia and of the Institute of Dendrology of the Polish Academy of Sciences in Kórnik.

Distr. Kjustendil: Osegovska Planina, 1440 m, stony slope above Srebrno Kolo, 6.10.1968, Jordanov, Vihodcevsky, Ančev (SO 36234); Osegovska Planina, above village Granica, 26. 09. 1974, Zieliński (KOR).

Distr. Pernik: Konjavaska Planina, near village Zemen, 25. 05. 1958, Jordanov, Janev (SO 36251, 36252); Golo Byrdo, below the hospice Slavej, 26. 08. 1972, Vihodcevsky (SO 36368); Golo Byrdo, Kralevo Dol, 26. 08. 1972, Vihodcevsky (SO 36211); Golo Byrdo, on the road from Pernik to the hospice Slavej, 6. 10. 1974, Zieliński (KOR); Golo Byrdo, on the road from Belite Kladnice to the gorge of Ostrica and Kolonica rivers, 6. 10. 1974, Zieliński (KOR).

* Recently found (Byatt I. Condollea 31: 283 - 301, 1976).



Phot. K. Jakusz

Fig. 4. A herbarium specimen of *C. microphylla* collected in Bulgaria (University „Kliment Ohridsky”, Sofia)

Distr. Sofia: From forest on the top of Ljulin, 22. 06. 1919, Achtarov (SOM 36799); M. Ljulin, in silvis supra l. d. Černi Koss, 1. 09. 1967, Vihodcevsky (SO 36216); M. Ljulin, in declivibus supra pagum Banja, 11. 09. 1968, Vihodcevsky (SO 36215); Vitoša, 10. 06. 1928, Achtarov (SOM 100606); M. Vitoša, in pratis montanis, ca 1200 m, 5. 06. 1951, Efremov (SOM 93743); Vitoša, near the hospice Planinec, 1350 m, 29. 05. 1952, 19. 09. 1952, Kitanov (SO 36185); Mountain Vitoša near Sofia, 8. 05. 1958, Browicz (KOR); Vitoša, outskirts of village Železnica, 3. 06. 1960, Kitanov (SO 36191, 36194); Vitoša near Sofia, 1966, Białobok (KOR); Mountain Vitoša above Knjaževo, 22. 09. 1974, Zieliński (KOR); Common in forest near the monast. Sv. German on Lozenska Planina, 11. 05. 1961, Tošev (SOM 271); Lozenska Planina, near village Sv. German, 12. 05. 1968, Vihodcevsky (SO 36217); Lozenska Planina, near monastery above village Dolni Lozen, 16. 09. 1973, Vihodcevsky (SO 44966); Lozenska Planina, in forest at the foot of Lalina Mogiła above village Gorni Lozen, 9. 09. 1973, Vihodcevsky (SO 44942); In silvaticis mt Verila, 850 m, 22. 05. 1910, Davidoff (SOM 36805).

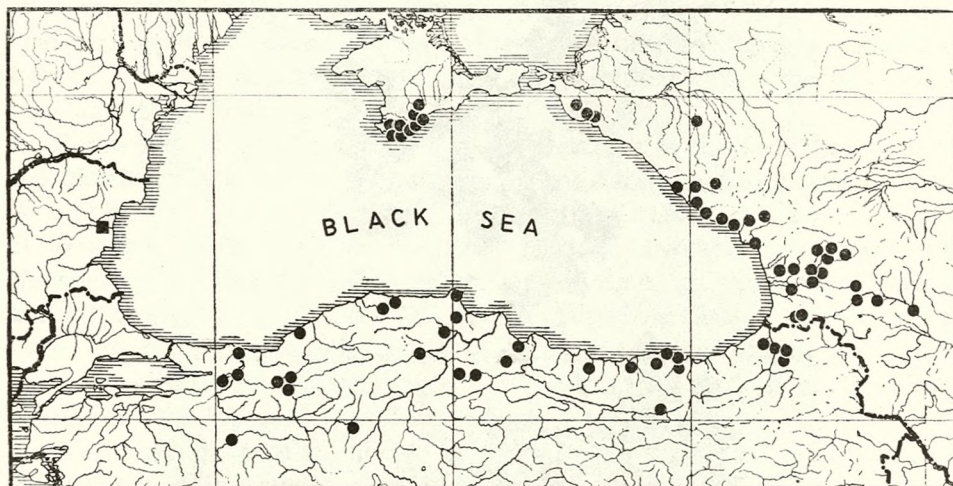


Fig. 5. The Euxynian part of the range of *C. microphylla* (according to Browicz, 1971, 1972, supplemented)

Distr. Plovdiv: M. Rodope — supra pagum Markowo, 05. 1905, Stříbrny (SO 36220).

Distr. Varna: at the mouth of Kamčia river, 17. 09. 1971, Penev, Vihodcevsky (SO 36237).

Distr. Burgas: Strandža, village Kladara (Slivarovo) near Malko Tyrnovo, on the bank of Rezvaja river, 17. 07. 1934, Joranov (SO); Strandža, mixed forest near Koprache Kioj, V. 1925, Stefanov (SOM, 36790, 36792, 36793, unlocalised!).

Hybrids between *C. curvisepala* and *C. monogyna*

Golo Byrdo, below the hospice Slavej, 26.08.1972, Vihodcevsky (SO 36263); Golo Byrdo, Krelev Dol, 26.08.1972, Vihodcevsky (SO 36247); Golo Byrdo, on the road from Pernik to the hospice Slavej, 6.10.1974, Zieliński (KOR); Ljulin Planina, in declivibus montanis inter l. d. Karleža et Černi Koss, 30.09.1973, Vihodcevsky (SO 46381); On the slope of Kamenica above village Cergilovci, Trnsko, 6.09.1972, Vihodcevsky (SO 36259).

2. CRATAEGUS MICROPHYLLA C. KOCH

In Verh. Ver. Beförd Gartenb. Preuss. nov. ser. 1: 288 (1853)

Syn.: *C. lagenaria* Fisch. et Mey. in Hohen. Enum, Talysch 131 (1836) nomen nudum; *C. orthosepala* (Hausskn. et Bornm.) Bornm. in Bull. Herb. Boiss. 2 ser. 6, 8: 607 (1906).

C. microphylla is a classical representative of the Euxyno-Hyrcania-na floristic element. It occurs in northern Iran (Gorgan, Mazandaran, Ghilan), in Talysh, on the Caucasus, in southern regions of the Crimea and in northern Turkey where along the coast of the Black sea it reach-

es as far westwards as the vicinity of Sapanca (Browicz, 1971, 1972). In Bulgaria it has been found so far in only one stand. It is at the same time the most westerly stand of this species (Fig. 5).

Distr. Varna: from longos forest, outskirts of village Dolen Čiflik, 20. 09. 1971, Vihodcevsky, Penev (SO 36240, 36239 p.p.).

Institute of Dendrology
Kórnik nr. Poznań

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JERZY ZIELIŃSKI

Crataegus curvisepala Lindman i *C. microphylla* C. Koch w Bułgarii

Streszczenie

W trakcie rewizji materiałów zielnikowych bułgarskich głogów autor zwrócił uwagę na dwa gatunki, których nie wymienia ostatnio wydana „Flora na NR Bułgarija”. Jednym z nich jest *C. curvisepala* Lindman, który znany był w Bułgarii zaledwie z trzech stanowisk, natomiast drugi gatunek to nie notowany dotychczas w tym kraju *C. microphylla* C. Koch.

Autor omawia problemy taksonomiczne związane z *C. curvisepala*. Ranga oraz pozycja systematyczna tego taksonu jest po dziś dzień przedmiotem skrajnie rozbieżnych opinii. *C. curvisepala* bywa rozpatrywany jako wewnątrzgatunkowy takson bądź to w obrębie *C. monogyna* Jacq., bądź to w obrębie *C. calycina* Peterm. Z przedstawionego przez autora zestawienia cech diagnostycznych tej grupy gatunków wynika, że *C. curvisepala* zajmuje pod względem morfologicznym pozycję pośrednią pomiędzy *C. calycina* i *C. monogyna*. Zdaniem autora *C. curvisepala* jest przypuszczalnie starym, utrwalonym międzygatunkowym mieszańcem. W praktyce do *C. curvisepala* zaliczane są prawdopodobnie również współczesne mieszańce *C. calycina* × *C. monogyna*. Autor podaje kilkanaście nowych stanowisk *C. curvisepala* w Bułgarii.

Nowym gatunkiem dla Bułgarii jest *C. microphylla* C. Koch. Został on znaleziony dotychczas tylko na jednym stanowisku w okolicach Warny. Jest to najdalej na zachód wysunięte stanowisko tego euksyńsko-hyrkańskiego gatunku.

ЕЖИ ЗЕЛИНЬСКИ

Crataegus curvisepala Lindman u *C. microphylla* C. Koch в Болгарии

Резюме

В ходе ревизии гербарных материалов, относящихся к болгарским боярышникам, автор обратил внимание на два вида, не упоминаемые в недавно вышедшей „Флора на НР България”. Один из них *C. curvisepala* Lindman был известен в Болгарии только с трех местонахождений, другой же вид *C. microphylla* C. Koch до сих пор для этой страны не указывался.

Автор обсуждает таксономические вопросы, связанные с трактовкой *C. curvisepala*. Ранг этого таксона и его систематическое положение до сих пор вызывают серьезные разногласия. Его рассматривают иногда как внутривидовой таксон, относимый то к *C. calycina* Peterm., то к *C. monogyna* Jacq. Из проведенного автором сопоставления диагностических признаков этой группы видов следует, что *C. curvisepala* в морфологическом отношении занимает промежуточное положение между *C. calycina* и *C. monogyna*. По его мнению, *C. curvisepala*, вероятно является старым константным междувидовым гибридом. В практике к *C. curvisepala*, относят, вероятно, также современные гибриды *C. calycina*, *C. monogyna*. Автор указывает несколько новых местонахождений *C. curvisepala* в Болгарии.

Новым видом для Болгарии является *C. microphylla* C. Koch. Он обнаружен только на одном местонахождении в окрестностях Варны. Это наиболее выдвинутое на запад местонахождение этого евксино-гирканского вида.