

ČESKOSLOVENSKÉ DRUHY RODU OPHIUSA OCHS.

(LEP. PHALAENIDAE)

THE CZECHOSLOVAK SPECIES OF THE GENUS OPHIUSA OCHS.

(LEP. PHALAENIDAE)

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I. Úvod — Introduction

Podnětem k této práci je nález druhu *Ophiusa limosa* Tr. na jiho-východním Slovensku, který potvrdil, že na území Československa žijí všechny střeoevropské druhy tohoto rodu. Při determinaci tohoto druhu bylo třeba srovnati jej se zástupci ostatních druhů rodu *Ophiusa* Och s., kteří se vyznačují individuální variabilitou, i když rod působí celkově homogenním dojmem. To vedlo k tomu, že pro přesnou determinaci druhové příslušnosti jsme přikročili k podrobnějšímu studiu zevně morfologických znaků, hlavně ektodermálních genitálií, na jejichž význam pro systematiku tohoto rodu upozornil u nás už Sterneck (1937), ač úzce analytická metoda vedla u něho k přehlédnutí vývojově důležitých znaků, jako jsou na př. dynamické asymetrie valv a pod. Studovali jsme též jiné otázky, týkající se rodu *Ophiusa* Och s., abychom přispěli ke znalostem o zeměpisném rozšíření, fylogenesi, ekologii a bionomii tohoto rodu, který je významnou skupinou čeledi *Phalaenidae* v naší fauně.

The present paper was prompted by the find of the species *Ophiusa limosa* Tr. in southeastern Slovakia, a find which confirmed the view that all the Central European species of this genus are represented within the territory of Czechoslovakia. For the determination of this species it was necessary to compare it with the representatives of the other species of

the genus *Ophiusa* Och s., which are characterised by an individual variability even though the genus as a whole makes a homogeneous impression. For the accurate determination of the specific inclusion we had thus to proceed to a fairly detailed study of the exterior morphological characters, especially of the ectodermal genitalia. In Czechoslovakia already Sterneck (1937) had drawn attention to their importance for the taxonomy of this genus, though his strictly analytical method led him to overlook such evolutionarily important characters as e. g. the dynamic asymmetries of the valves. As the aim cannot be a mere taxonomic evaluation we studied also the other questions concerning the genus *Ophiusa* Och s. in order to contribute to the knowledge of the geographical distribution, phylogeny, ecology and bionomy of this genus which forms an important group of the family *Phalaenidae* in our fauna.

II. State of the Knowledge of the Faunistics of the Genus *Ophiusa* Och s. in Czechoslovakia

Warren (1914 in Seitz) lists for the palaearctic region a total of twelve members of the genus *Ophiusa* Och s. But this number certainly does not correspond to the real state nor to our present state of knowledge, as is proved indeed by the descriptions of new species also in recent times (Matsumura, Bryk, a. o.).

It is obviously a markedly Eurasian genus as shown by the distribution of the different species, most of which live in the eastern palaearctic region. So far five species have been ascertained in Central Europe (all of them living also in Czechoslovakia); the only apparently endemic species of western Europe is *Ophiusa glycyrrhiza* R m b., known from Andalusia.

O. Nickerl (1897) lists for Bohemia only two species (*O. viciae* H b. and *O. craccae* F.), without giving their accurate locality. For the time before World War I we find remarks in short faunistic reports in the journal *Časopis české společnosti entomologické* (e. g. Menšík 1909, Blatný 1910, and Srdínko 1914, who published valuable observations on the bionomy of the caterpillars). In the same journal we find a number of faunistic reports up to the present time. Vlach (1918) records erroneously the find of *O. pastinum* Tr. as new for Bohemia, as this species was known e. g. to Blatný (l. c.) as early as in 1905 from Nový Knín. Baťa (1922, 1927, 1929) gives a number of characteristic localities from southern Bohemia, and Pokorný (1923) mentions his find of *O. craccae* F. in the vicinity of Poděbrady. A brief remark in the report of the Prague lepidopterists (1937) was followed by the valuable paper of Sterneck (1937), who initiated a further search for representatives of this genus in Bohemia, as proved by a whole number of finds evaluated by Grosse (1938). In addition to the older reports there are also the more recent ones by Vopršal (1940), Herych (1942), Brčák (1948), Levý (1948), and Wichra (1949). When we supplement these faunistic reports by the series of localities given by Sterneck

(1929) in his Prodrömus and by a series of other data obtained by our search of the collections in our museums and in private hands, we get a fairly complete picture of the distribution of the members of the genus *Ophiusa* Och s. in Bohemia.

Skála (1911, 1931—32, 1942) and Wolf (1944) give us the most complete information on the Moravo-Silesian fauna of the genus *Ophiusa* Och s. The latter author dealt, however, mainly with the territory of the Polish part of Silesia. In recent times we find for Moravia only sporadic reports in local faunistic papers (e. g. Jenisch—Ledel 1929, Povolný 1951, a. o.). The Moravian fauna is richer by the monotypical, closely related genus *Eccrita* L d. From Moravia we find the first important report on this noctuid in Staudinger—Rebel (1901), who mention in the distribution of *E. ludicra* H b. also Moravia.*) Besides Skála (l. c.) also Povolný—Gregor (1948) have recently mentioned this species, and also Schwarz caught it again in 1946 in Southern Moravia. In addition to these literary records we know that our lepidopterists have also from Moravia though not a very numerous yet a very important material, which supplements well the zoogeography and faunistics of the genus in this territory.

In the work "Fauna Regni Hungariae" the authors of the lepidopterological part (Aigner—Abafi & Pável & Uhryk 1918) list from Slovakia all the species of the genus *Ophiusa* Och s. with the exception of *O. limosa* Tr., for which species they give Budapest as its northernmost locality. Szent-Ivány (1938) published a report to the effect that the Hungarian Museum in Budapest possesses specimens of this species from various localities, also some labelled Eperjes = Prešov (leg. Dahlström). Of course the author does not give any further details about the occurrence of this species within our territory. The number of localities is, however, relatively small, and also in recent times there are only few new records of localities (V. P. 1948, Patočka 1952). Obviously the state of knowledge of the genus *Ophiusa* Och s. in Slovakia remains far behind reality.

III. Position of the Genus *Ophiusa* Och s. in the System of the Lepidoptera

The genus *Ophiusa* Ochsenheimer 1816 (= *Lygephila* Billberg 1820 = *Toxocampa* Guenée 1841) represents a relatively homogeneous group within the frame of the subfamily designated by the name of *Catocalinae*.***) Some genera of this group have evidently a morphologically and also ecologic-bionomically relatively primitive basis, so that e. g. in the structure of the copulation organs, in the morphology of the head,

*) It is noteworthy that we find in these authors also a number of other important records especially on Pontic species of the *Lepidoptera* of Moravia, whose finds are evidently from the 19th century and seem to derive from German lepidopterists of Brno, though prior to Skála no mention is made of these species in the faunistic literature of Moravia.

**) In recent time Aubert and Boursin (1953) give other names for some groups of *Phalaenidae*.

and in the venation they form in the group of the *Phalaenidae* a complete contrast to the morphologically highly specialised and modern genera as e. g. *Agrotis* O., *Mamestra* H b., *Hadena* S c h r k., *Dianthoecia* B., *Cara-drina* H b., *Polia* O., *Taeniocampa* G u e n., *Orrhodia* H b., *Leucania* H b., a. o.

This relatively little derived morphological state cannot of course be taken to imply that we have here an archaic group, as is shown by their obvious dynamics of evolution. Typical are e. g. the asymmetrical structure of the copulation organs of the males (partly manifesting itself in the genus *Ophiusa* O c h s. under consideration, but especially striking in *Catocala nupta* L., *Euclidia glyphica* L., *Catephia alchymista* S c h i f f.), further in the larval stages a tendency towards a reduction of the abdominal legs, this being a manifestation of obvious specialisation. Evolutionarily it is interesting to note that in contradistinction to the group *Lymantriidae*, to which according to K o ž a n ě í k o v the *Phalaenidae* are affiliated secondarily by the subfamily *Acronyctinae*, the *Phalaenidae* proper are characterised by the distinct evolutionary activity of the imagoes (especially in the genus *Phytometra* H w.), whereas the pupation of the caterpillars in or on the ground in a light web is regarded by the same author as an ecologically primitive state. This fact can be accounted for when one remembers that with the exception of the branch of *Catocala* S c h r k. — which being explicitly thermo-hygrophile is bound to warm and moist flood-plain woods in the regions of a temperate climate, and is in full development especially in the tropical virgin forests representing the very dynamic group of the *Phytometrinae* — other these representatives of these *Phalaenidae* (especially some representatives of the genus *Phytometra* H w.) are a steppe fauna, the genus *Ophiusa* O c h s. a tree-steppe fauna, evidently of Siberian origin. In contradistinction to the representatives of the genus *Phytometra* H w. which adapted themselves even to the quite open and culture steppe, where they often rank as dangerous pests of the monocultures, the members of the genus *Ophiusa* O c h s. are bound more to the original habitat with a dense vegetation of herbs and especially of low shrubs and trees. This ecological character of the genus is the cause of its vast distribution in the whole temperate zone from East Asia till far to the west into Europe. The members of the genus *Ophiusa* O c h s. are distributed in the region of the dry lowland steppes and in the tree-steppe region of the mountains of medium height where the food-plants of the caterpillars grow (*Astragalus*, *Vicia*, etc.). In the areas of southern Moravia, southern and southeastern Slovakia we find the specific, strictly stenoecous species *Eccrita ludicra* H b. and *Ophiusa limosa* T r., not occurring in the western part of Czechoslovakia.

The genus *Ophiusa* O c h s. is thus most probably ecologically and biocenologically bound to the region of the subarctic steppe which has the character of a tree-steppe, and whose vegetation though basically of a steppe character can support greater variations of temperature than that of the Pontic and Mediterranean steppe. The basis of its flora is formed by Eurosiberian and Eurasian species. This vegetation includes also strictly stenoecous Sarmatic and Pontic-Oriental species, i. e. pure

steppe species. From among the group of Eurasian meiothermic forms it is *Vicia tenuifolia* and from among the Eurosiberian species especially the representatives of the genus *Astragalus* and other *Papilionaceae* which are the food-plants of the caterpillars.

It is evident that also the representatives of our members of the genus *Ophiusa* O c h s. represent, with the exception of *O. limosa* Tr. which is stepicol-stenoecous, somewhat more broadly eurythermic forms than we regard as typical steppe forms. As such the genus *Ophiusa* O c h s. is a very typical component of it in our fauna. The species *Eccrita ludicra* H b., *O. limosa* Tr. and also the members of the closely related genus *Apopestes* H b. represent evidently either stenoecous species or directly a more specialised evolutionary branch (*Apopestes* H b.) attaching itself to the genus *Ophiusa* O c h s.

IV. Find of the Species *O. limosa* Tr. in Czechoslovakia

As far as we know from the accessible literature and from the examination of the numerous material in various lepidopterological collections, there exists only one incomplete report on the occurrence of *O. limosa* Tr. within the territory of Czechoslovakia, in the paper of Szent-Ivány (l. c.). As this is a zoogeographically very important find we shall try to give a rough characterisation of the wider region in which the species was caught.

The only specimen from the territory of Czechoslovakia which we have studied is ♀ taken on July 10th, 1950, when studying the fauna of Lepidoptera of the Milíč-Mts. These mountains attain a maximum altitude above sea level of 896 m. in the summit of the Velký Milíč directly on the Slovak-Hungarian frontier. This area is only very little known lepidopterologically and faunistically. In recent years Slabý (1950) ascertained here *Erebia medusa brigobanna* f. *slovakiana* War. and Moucha (1951) *Leptidea morsei major* L o r k.

Though not very extensive this area is zoogeographically and phytocenologically remarkable; recently Suza (1952) studied the lichens of this area.

The Milíč-Mts. form the wooded northern spurs of the Hegyallya-Mts.; to the north they border on the southern part of the Prešov-Mts. — the Dargov. The southern part of the Dargov and especially the Milíč constitute a region with an extensively developed thermophile flora and fauna. During our short preliminary excursion we observed here the occurrence of Lepidoptera and about 3 km. south of the village of Slanec we took at the rim of the forest one ♀ *O. limosa* Tr. The shrubby tree-steppe and the rim of the forests are the main places of the occurrence of members of this genus. At the same locality characterised by a shrubby forest rim bordering on tree-steppe, and nearer to the above-mentioned village on culture steppe, there lives a great number of species of Lepidoptera, so that at the same time we ascertained here the following characteristic species: *Maniola lycaon* Rott., *Issoria lathonia* L., *Plebejus argus* L., *Lycaena phlaeas* L., *Lycaena thersamon* Esp., *Iphiclides podalirius* L.,

Leptidea sinapis L., and *Minoa murinata* S c. To these species must further be added the species which this habitat has in common with the culture steppe. They gather here on flowering forage plants (especially *Trifolium*). From among the predominating species we have to mention *Melanargia galathea* L., *Maniola jurtina* L., *Vanessa cardui* L., *Polygonia c-album* L., *Polyommatus icarus* Rott., *Lycaena tityrus* Poda, *Pieris rapae* L., *Pieris napi* L., *Erynnis tages* L., *Thymelicus sylvestris* Poda, *Ochlodes venatum septentrionale* V r t y, etc.

On the forest road between the villages Slanec and Slanská Huta the species *Neptis hylas aceris* Esp. was absolutely the predominating butterfly in the number of specimens; in Slovakia we ascertained it also on the Plešivec Upland (14th July 1949, 1 specimen). In our locality it occurred on the contrary in masses between the two above-mentioned villages as well as on the southern wooded slopes of the Dargov. The imagoes preferred places much more intensively radiated by the sun (forest roads and cuttings) than those with which *Limenitis camilla* L. is satisfied, which flies also on rather shady roads in old mixed forests (e. g. Karlštejn, July 1953). The related species *Neptis coenobita innominata* Lewis we did not see although it is more widely distributed in Slovakia.

Far fewer species were flying directly in the shady mixed forest; they belonged predominantly to the common species of *Geometridae*, and we regard only *Ennomos quercinaria* Hufn. to be of any greater interest. A remarkable find from here is the ascertaining of the occurrence of *Leptidea morsei major* Lork. This species flies with the much more abundant *Leptidea sinapis* L., which we encounter, however, more frequently in the tree-steppe, culture steppe or at the forest rim. *Pararge aegeria egerides* Stdgr. is not rare here.

The tree-steppe localities at the village of Slanská Huta are lepidopterologically very poor, as they are destroyed by pasturing cattle; we encountered here sporadic specimens of *Maculinea arion* L. and *Iphiclidea podalirius* L.

The forest meadows between Slanská Huta and Izra are much richer, and some of them, situated at lower altitudes, are relatively moist. The character of the butterfly fauna is here not marked, as we find here many of the tree-steppe elements already mentioned, to which come many species which prefer shady forests as well as a moister environment which makes possible the existence of herbs which in the advanced summer are in the steppe localities — as far as they grow also in them — completely withered by the sun. Of Rhopalocera we encountered here *Maculinea teleius* Brgrstr., *Argynnis paphia* L. (also one case of nanism was ascertained: the wing from the basis to the apex measures 25 mm., ♂), and *Araschnia levana* L. Of the genus *Melitaea* Fabr. there live here abundantly members of the specific group *Melitaea athalia* Rott. The family *Zygaenidae* was represented by the species *Zygaena carniolica* Scop., *Procris statice* L., and the rare tree-steppe species *Rhagades globulariae* Hb. The most abundant butterflies were in these meadows *Nemoria porrinata* Z. and *Titanio pollinalis* Schiff., further *Crambus pratellus* L., *Pyrausta cespitalis* Schiff. and *Pyrausta nigrata* Sc.

The Izra Lake, close to the State frontier, is surrounded by mixed forest so that the composition of the butterfly fauna of its banks is not particularly numerous; of species not yet mentioned we found here *Pseudoterpna pruinata* Hufn., *Larentia bicolorata* Hufn., *Deilinia pusaria* L.

As evident already from our preliminary study of the butterflies of this small area we find here many characteristic biotops whose accurate characterisation would require a longer study period. But even now we can surmise that it has an extremely rich and varied fauna. Therefore we welcome the decision of the Board of Schools, Sciences and Arts of Slovakia, at whose order (no. 125322/1950 — V/4) the nature reserve Malý Milíč was established here.

On the southern slopes of the Dargov we observed the association of Lepidoptera northeast of the village of Slančík. We find here roughly only the fauna of shady forests, the fauna of isolated forest cuttings and roads. The association of the tree-steppe is not so richly developed as at Slanec, as the culture steppe reaches here almost to the very rim of the mixed forest. On the whole there are here few untilled areas, and the life of the Lepidoptera visiting flowering thistles, in the evening also *Silenes*, etc., concentrates here. Of species not yet listed we have to mention *Cupido decoloratus* St d gr., *Lycaena dispar rutila* W r n b., *Pyrgus malvae* L., *Emmelia trabealis* Sc., *Lythria purpuraria* L., *Crambus selasellus* H b., *Crambus tristellus* f. *aquilellus* H b., *Nemotois metallicus* P o d a, etc. On flowering *Silenaceae* and in individual collecting in the evening we found also *Apamea testacea* H b., *Prothymnia viridaria* Sc., *Scoliopteryx libatrix* L., *Thyatira batis* L., *Acidalia incanata* L., *Acidalia ornata* Sc., *Abraxas adustata* Schiff., *Lithosia deplana* f. *luteola* H b., *Sylepta ruralis* Sc., *Alucita pentadactyla* L., and *Scoparia* sp.

V. Characterisation of the Genus *Ophiusa* s. l. (incl. *Eccrita* L d., *Apopestes* H b.)

Phalaenidae of medium size, robust body and broad wings. Basic coloration ash-gray with drawing typical for the family *Phalaenidae* (wavy lines and spots). Proboscis well developed, palpi strong, second segment strong and densely squamose, terminal (third) segment strobiliform. The head carries a well developed frontal tuft, patagia as a rule characteristically brown. Antennae long and thin, in the males with numerous characteristic sensillae (minute thorns and tufts of hair).

The genus *Ophiusa* Och s. is very interesting also with regard to the structure of the copulation organs. The male copulation organs are characterised by simple, little differentiated valvae. The sacculus is always well developed, the accessory organs (clasper, ampulla) are only slightly formed, the distal part of the valva is not differentiated. Some species show a tendency to an asymmetry of the valvae. The uncus is simple, the tegumen not grown together, composed of two branches. The saccus is also simple, sporadically rounded.

The structure of the copulation organs of this genus makes it easily possible to characterise it generically, and similarly its relation to the closely related group of the *Phytometrinae* is well visible where we have with the same morphological basis a pointed saccus and especially strongly armoured valvae.

The closely genus *Catocala* Schrk. is much more specialised, with a strongly differentiated valve (*C. fraxini* L.), a powerful saccus adnate to the saccus, and a developed gnathosis.

The female copulation organs are also relatively simple, the sharp tergite and the anal valvule are almost uniform, the ductus bursae is in various stages of chitination, the connective tissue is without a more striking structure.

It is evident that *O. viciae* Hb. and *O. cracca* F. stand evolutionarily rather close to each other, morphologically as well as ecologic-bionomically. *O. lusoria* L. and *O. pastinum* Tr. are more isolated types, and especially *O. lusoria* L. is a more specialised type. *O. limosa* Tr. and *E. ludicra* Hb. may represent two opposite evolutionary directions in the whole group, without it being possible to judge the degree of specialisation. *A. spectrum* Esp. represents a much more differentiated, generically distinguished group, but with distinct affinities to the genus *Ophiusa* Och.

VI. Key and Faunistic Remarks on our Members of the Genus *Ophiusa* s. l.

- (1) Reniform spot intensively brownish black, without lighter border and undisturbed by venation 2
- Reniform spot less marked, indistinct, lighter bordered, or at least divided by lighter dusted veins 3
- (2) Inferior margin of the reniform spot lengthened in an outward direction so that the spot is of "L" shape; outer wavy line of the anterior wing fairly marked; a row of small spots in the border of the wings. Wings relatively broad, length of the anterior wings (from the basis to the apex) about 19—22 mm. *O. lusoria* Linnaeus 1758

Characterisation of the copulation organs:

- ♂: valves shovel-shaped, narrow, the left rounded at the apex, the right more pointed. Transtillae slightly chitinated. Uncus distally strikingly thickened. Tegumen slightly chitinated. Vinculum broad. Aedeagus strong and apically thickened, strongly chitinated. Vesica of the aedeagus richly differentiated with flat toothed cornute.
- ♀: ductus bursae very broad, slightly chitinous, margin of the ostium indented. In the aperture into the bursa copulatrix the ductus suddenly narrows and passes into the slightly chitinated narrowing of the bursa.

This species is of eastern origin with a distribution from Central Asia via Turkey, southern Russia and the southern part of Central Europe to Switzerland. In Czechoslovakia it lives in typical steppe habitats (Karlštejn, Pavlovské kopce, Kováčovské kopce, etc.), obviously very locally and demanding a primary habitat. The imagoes fly at the typical localities

in the dark around the flowers of *Silene*, *Campion*, and other flowering low plants, similarly as do the members of the genus *Phytometra* Hw. From the Czechoslovak finds it can be seen that the imagoes occur from the end of May till July, apparently in one generation (in view of the fact that the literature writes of two generations, this question should be clarified). The food plants of the caterpillars are *Vicia* and *Astragalus*. Description of the caterpillar by Warren (1914).

Bohemia: Karlštejn (Grosse 1938, Vopršal 1940), Srbsko (Grosse l. c., Wichra 1949, Vávra 1953, in litt.), Loutí (Grosse l. c.).

Moravia: Tavíkovice (Skala 1931—32), Klentnice (7. VI. 47. ♂, leg. Povolný, VII. 48. leg. Schwarz), Pavlovské kopce (leg. J. Svoboda), Mikulov (Skala 1911).

Slovakia: Kováčovské kopce (13. VII. 48. leg. I. Novák), Prešov (Aigner-Abafi etc. 1918), Oravský Podzámok (Aigner-Abafi l. c.).

- Reniform spot irregularly crescent-shaped, inferior margin only moderately lengthened outwards and ending in two usually well distinct spots. Outer wavy line rather narrow, sometimes indistinct. Length of the anterior wing about 18.5—20 mm. *O. pastinum* Treitschke 1826.

Characterisation of the copulation organs:

- ♂: valves asymmetrical, roundedly pointed, with awl-shaped formation (clasper) at the apex. Aedeagus with two cornutes with whole margins and with two bands of crust-like formations in the vesica.
- ♀: ductus bursae bent, gradually widening and in the direction towards the ostium more slightly chitinised. Bursa copulatrix membranaceous-connective tissuish.

Species with a wide geographical distribution, so to say in the whole temperate zone of the palaearctic region (from western Europe via England, Scandinavia and Central Europe to East Asia). In Czechoslovakia it lives in the broad region of the Central European tree-steppe and is known from a whole number of localities. It has thus obviously a much wider ecological valence than e. g. *O. limosa* Tr., as confirmed also by the considerable vertical distribution (e. g. Sarajevo-Trebevic 1100 m., 26. VI. 38., coll. Mus. Brno). In Czechoslovakia *O. pastinum* Tr. occurs in June and July. The question of a second generation in Czechoslovakia (September) is not yet solved.

Bohemia: Koda (Komárek - Týkač 1951), Zbečno (10. VII. 46., ♂, leg. Moucha), Mšec (18. VII. 44., 2. VII. 46., leg. Moucha), Nový Knín (Blatný 1910), Chýnov (Group of Prague lep. 1937), Planá n. Luž. (4.—17. VII. 1939., 14. VII. 42., leg. Šmelhaus), Plzeň (Vlach 1918), Plzeň Basin: České údolí, Koterov, Kačerov, Nýřany, Stříbro,

Manětín (Tykač 1953, in litt.), Písek (Levý 1948), Sušice (Levý l. c.), Klet (Baťa 1929), Dvůr Králové (Hrubý), further Sterneck (1929) records it from Karlštejn, Kolečovice, Konstantinovy Lázně, Frýdlant, Č. Líba, K. Vary, Planá near Mar. Lázně, Mariánské Lázně, Cheb.

Moravia: Tavíkovice (Skala 1931—32), Těšín (Skala 1942), Mor. Třebová (Skala 1911, Jenisch-Ledel 1929), Luhačovice (Srdínko 1914).

Slovakia: Gbely (l. VI. 36, leg. Schwarz), Bratislava, Velké Leváre, Prešov (Aigner-Abafi 1918, etc.).

- (3) Anterior wings distinctly narrower than the posterior wings; outer margin sometimes strongly convex 4
- Anterior wings corresponding approximately to the posterior ones in width . . . 5
- (4) Reniform spot marked; its outer part of a lighter tinge, the inferior margin divided by a light brown veinlet. Wavy lines differing more markedly from the basic tint of the anterior wings, whose length varies around 19—21 mm. *E. ludicra* Hübner 1791.

Characterisation of the copulation organs:

- ♂: valves large, pointed, clasper moderately bent in s-shape, apex rounded. Tegumen moderately chitinated. Caecum penis narrowed, vesical membran chitinated with well visible rich structure.
- ♀: ductus bursae relatively short, in the direction towards the bursa copulatrix strongly chitinated, regularly infundibuliform. The walls of the bursa have an irregularly reticulate structure.

By its distribution it reaches from Central Europe to East Asia. In Czechoslovakia few localities are known, mainly from the South Slovak steppes, where it occurs, however, on the whole not abundantly. It lives in one generation in June and in July. The food plant of the caterpillar is *Vicia*.

Moravia: Brno-Hády, Klentnice, Mikulov (Skala 1911), Pavlovské kopce (Schwarz), Větrníky near Vyškov (Povolný-Gregor 1948).

Slovakia: Rožňava, Prešov (Aigner-Abafi etc. 1918).

- Anterior wings deep dark brown, costal margin dark; reniform spot rather indicated by a dark line. The lighter line usually darkly distinguished from the deep basic colour. Length of the anterior wing 16.5—17.5 mm. *O. limosa* Treitschke 1826.

Characterisation of the copulation organs:

- ♂: valves apically shovel-like widened, clasper well visible, of thumb-shape. Juxta and transtillae slightly chitinous, vinculum broad. Vesica of the aedeagus carrying the beak-shaped cornutus.
- ♀: bursa copulatrix ovoid, slightly chitinated, anterior to its opening into the ductus more strongly chitinated and with a rough cushion. Ductus fairly broad and caudally gradually widening.

O. limosa Tr. is in its distribution bound to the warmest regions of Central and Southeastern Europe, but it is known also from Turkestan (Bureš-Tuleškov 1935). In Czechoslovakia ascertained up till now only at Slanec and in the vicinity of Prešov in southeastern Slovakia. *O. limosa* Tr. is a strictly stenoeccous species, strongly demanding primariness of habitat; it forms part of the Caspian fauna. From Dalmatia we know two generations; the imagoes of the first generation live from the end of April (Jablanica, 28. IV. 35, coll. Mus. Brno), those of the second in September (Koševo, 16. IX. 36, coll. dtto). Warren (1914) lists as food plants of the caterpillar *Coronilla*, *Vicia*, and *Colutea*.

Slovakia: 10. VII. 1950 Slanec (leg. Moucha), Prešov (Szent-Ivány 1938).

- (5) Anterior wings in the direction towards the root with an ash-gray dusting (especially in fresh specimens), and at the coastal margin with marked spots. Reniform spot relatively narrow, at the root yellowish with a darker tinged outer margin. Length of the anterior wing about 19–21 mm. *O. cracca* Fabricius 1787.

Characterisation of the copulation organs:

♂: general habitus of the genital very close to the species *O. viciae* Hb. so that we can infer a common phylogenetic basis of the two species. Also the asymmetry of the valvae is distinct, though less marked than in *O. viciae* Hb. Both valves are pointed and without a pin-formation there is a further trapezoid formation in the apex. The island of the cornutus in the aedeagus is much more distinctly developed.

♀: almost the whole ductus is infundibuliformly widened, and only its posterior third is more strongly chitinised. Bursa copulatrix ampuliform, of connective tissue.

The distribution of this species is similar as in *O. pastinum* Tr. and *O. viciae* Hb., i. s. Eurasian. Bergmann (1951) regards both species (*O. cracca* F. and *O. viciae* Hb.) as guide elements of the Middle German tree-steppe. Also in Czechoslovakia both species often live together in biotops of a tree-steppe character. For *O. cracca* F. two generations are proved. The imagoes of the first generation occur in May and in June, those of the second generation in August till September (the eggs laid hibernate). The food plants of the caterpillar are *Vicia* and *Astragalus*.

Opiusa cracca F. is known from a number of localities in Czechoslovakia.

- Anterior wings light brown, of slightly violet tints. Wavy lines and drawings (especially in the males) olive brown and relatively pronounced. Reniform spot often indistinct or only indicated; when present, it is divided by light veinlets into a group of smaller spots. Posterior wings olive brown with a little pronounced shading at the outer margin. Length of the anterior wing 16.5–18.5 mm. *O. viciae* Hübner 1809–1813.

Characterisation of the copulation organs:

♂: male genitalia striking by the asymmetry of the valves, which are

of regular shovel-shape, but the right one is apically distinctly broader than the left one. The rather large sacculus forms the anterior margin of the valve; it runs out into a strongly chitinated pin-formation. Vinculum large, saccus only indicated. Uncus thorn-shaped, circumanal area slightly chitinated. Annelus and iuxta distinct. Aedeagus rod-shaped, vesica at the apex of semolina-like structure, and in half the length two slight tufts of the cornuti.

♀: the ductus bursae is dorsally more strongly chitinated, in its whole length rather narrow, and anterior to its opening into the ostium it widens in funnel-shape. Bursa copulatrix only slightly chitinated, at the transition into the ductus is a more strongly chitinated ring.

Eurasian species, in Czechoslovakia in dry habitats in the lowlands and hills. The imagoes fly from the end of May till July. The mature caterpillar pupates still in autumn. The food plants of the caterpillar are *Vicia*, *Astragalus*, and *Coronilla*.

Ophiusa viciae Hb. is also known from a number of localities in Czechoslovakia.

Supplement: An occurrence of *Apopestes spectrum* E s p. in the southernmost primary steppe habitats cannot be excluded in Czechoslovakia, and therefore we give a brief characterisation of the copulation organs of this species. *A. spectrum* E s p. is in size and coloration very different from all species given in the key. ♂: General character of the genitalia approaching generically the genus *Ophiusa* Och s., but also generically specific. The large sacculus of the valve passes apically into a strong, thumb-shaped formation homologous to the similar but smaller formations in the genus *Ophiusa* Och s. The vinculum forms a small saccus. Aedeagus large, with three cornutes of which the upper one carries two strong thorns. The vesica forms in the apex a tuft of thorns. ♀: The female genitalia are striking by the strong specialisation of the seventh sternite, which is at the place of the ostium bursae strongly indented and chitinated. The caudal part of the ostium bursae is of connective tissue and passes in the direction towards the bursa into a trough-like, strongly chitinated formation which above the opening into the bursa copulatrix is strikingly widened, strongly chitinated, whereas the distal part forms an elongated connective tissue sack.

Содержание

Первая часть работы состоит из краткого введения и обзора данных в литературе о роду *Ophiusa* Och.s. s. l. в Чехословакии. Дальнейшая статья содержит экологическо-биономическую и морфологическую характеристику рода и из ней вытекающие выводы филогенетические. Определитель составлен по габитуальным знакам, дополнен короткой характеристикой гениталий и суммарными данными о отдельных видах с точки зрения их распространения по Чехословакии. Следует глава о характеристике биотопа вида *O. limosa* Tr., который является самым интересным видом для фауны ЧСР (местонахождение: Сланец в горах Милица, юговосточная Словакия).

Главные выводы:

Род *Ophiusa* Och.s. связывает сравнительно однородную группу субфамилии *Catocalinae* resp. *Phytometrinae*, некоторые роды которой имеют морфологическо-экологический и биономический, более примитивное основание чем специализованные фамилии *Phalaenidae* (субфамилии *Agrotinae* и *Mamestrinae*). Все же это касается группы динамического развития и форм неустойчивых, как показывают ассиметрии валв ряда видов и у личинок редукция брюшных ножек. Обращает внимание экологическая активность зрелых стадей, типическая для всей группы степных форм. Из них многие виды находят в культурной степи наилучшие условия жизни. В экологии личиночной стадия мы находим примитивное состояние (свободные куколки на земле).

Род *Ophiusa* Och.s. связан с областями субарктической лесостепи, вегетация которой степного характера, все же в сравнении со степью понтической и медитеранской перенесёт высшие колебания теплот, при чем ядро её флоры состоит из форм евросибирских и евроазиатских, хотя содержит и формы сарматские и понтическо-ориентальные, т. е. строго стеноэчные. Питательные растения гусениц рода *Ophiusa* Och.s. (*Vicia* и *Astragalus*) евроазиатические и евросибирские мезотермного характера. Большинство наших видов рода *Ophiusa* Och.s. формы несколько шире евритермные, чем принято требовать у форм ясно степных. Все же требовательнее к характеру места, в особенности к оригинальности, чем ряд евриэчных представителей группы *Phytometrinae*, живущих в открытой степи. Особенно имаго требует густую растительность с низкими кустами. В Чехословакии живут пять видов рода *Ophiusa* Och.s. и дальнейший вид из родственного рода *Eccrita* Ld.

Самая интересная находка *O. limosa* Tr. с точки зрения фаунистики была на кустарниковой лесостепи юговосточной Словакии. Этот вид строго стеноэчный, восточного происхождения, расширенный от Туркестана к низовьям Дуная и к Далмации. Бабочки, найденные вместе с этим видом показывают на требовательность его на биотоп (напр. *Lycaena thersamon* Esp., *Neptis hylas aceris* Esp., *Rhagades globulariae* Hb.).

Иным стеноэчным видом *Eccrita ludicra* Hb., известная в особен-

ности из ряда степных югоморавских локалит, где редкая и живет одну генерацию (июнь, июль).

Остальные виды рода *Ophiusa* Ochs. расширены в широкой области средней Европы как формы евроазиатские. Из них более редкой *O. lusoria* L., которая живет локально на оригинальных степных местах средней Чехии (напр. Карлштейн), югоморавских (Павловские холмы) и югословацких (Ковачовские холмы). Имаго летает вечером вокруг цветущих растений (напр. *Silenaceae*).

Остальные три виды (*O. pastinum* Tr., *O. cracca* F. et *O. viciae* Hb.) живут в Чехословакии на сухих лесостепных местах в низменности и на холмах и могут быть означены, согласно Бергманну (1951), как ведущая часть лесостепной фауны средоевропейской. Виды *O. cracca* F. и *O. viciae* Hb. распространены на очень многих местах в ЧСР, *O. pastinum* Tr. сравнительно реже.

*

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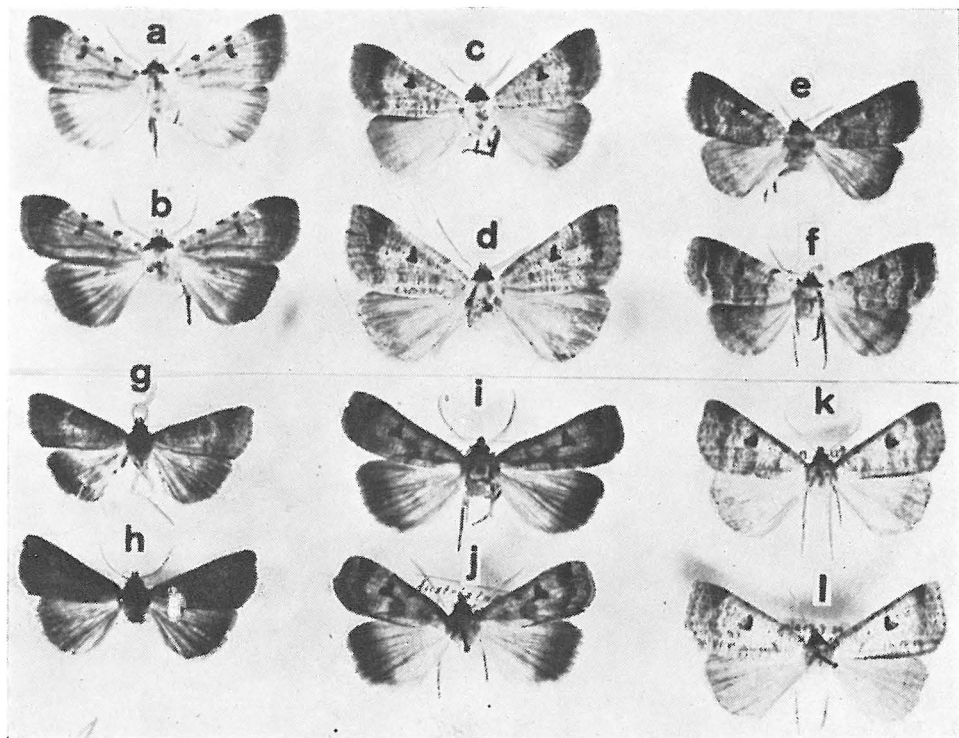


Plate I: The Czechoslovak species of the genus *Ophiusa* O c h s.

- O. cracca* F.: a) ♂ Bohemia — Karlštejn, 5. VII. 1929, e. l., leg. Silbernagel;
b) ♀ dtto, 11. VII. 1929, e. l., leg. Silbernagel.
- O. lusoria* L.: c) ♂ Bohemia — Karlštejn, 21. VI. 1936, leg. Silbernagel;
d) ♀ dtto, 21. VII. 1928, leg. Silbernagel.
- O. viciae* H b.: e) ♂ Bohemia — Karlštejn, 12. VI. 1939, leg. Silbernagel;
f) ♀ Bohemia — Nová Huť, 16. VI. 1909, leg. Grosse.
- O. limosa* T r.: g) ♀ Slovakia — Slanec, 10. VII. 1950, leg. Moucha;
h) ♂ Dalmatia — Budva, 22. V. 1935, leg. Silbernagel.
- E. ludicra* H b.: i) ♂ Austria, VII. 1926, leg. Doleschall;
j) ♀ Austria — W. Neustadt, VII. 1927, leg. ? (coll. Mus. Pragae).
- O. pastinum* T r.: k) ♂ Bohemia — Planá n. Luž., 7. VII. 1939, leg. Šmelhaus;
l) ♀ dtto.

Foto M. Štěpánek.



Plate II:

A. spectrum Esp.: Turcia — Therapia env. Istanbul, 30. VII., leg. Pronin (coll. Zool. Inst. Karlovy university).

Foto M. Štěpánek.

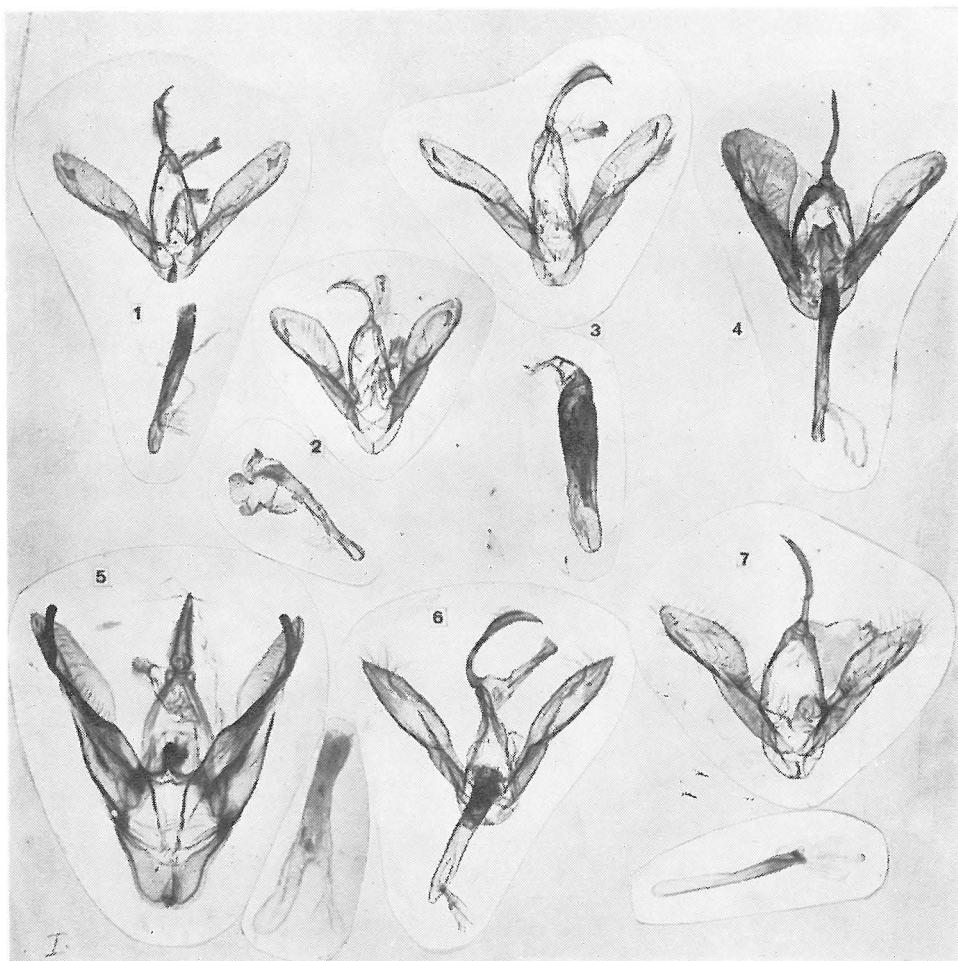


Plate III: The male genitalia

1. *O. pastinum* T r.: Bohemia — Planá n. Luž., 7. VII. 1939, leg. Šmelhaus.
2. *O. limosa* T r.: Dalmatia — Budva, 22. V. 1935, leg. Silbernagel.
3. *O. lusoria* L.: Bohemia — Karlštejn, 21. VI. 1936, leg. Silbernagel.
4. *O. viciae* H b.: Bohemia — Klučenice, 7. VI. 1939, leg. Levý.
5. *A. spectrum* E s p.: Turcia — Therapia env. Istanbul, 30. VII., leg. Pronin.
6. *E. ludicra* H b.: Austria — W. Neustadt, VII. 1927, (coll. Mus. Pragae).
7. *O. cracca* F.: Bohemia — Nová Huť, 19. VIII. 1929, leg. Grosse.

Foto Prof. Fiala



Plate IV: The female genitalia

1. *O. limosa* Tr.: Slovakia — Slanec, 10. VII. 1950, leg. Moucha.
2. *O. spectrum* Esp.: Turcia — Therapia env. Istanbul, 30. VII., leg. Pron'n.
3. *O. lusoria* L.: Bohemia — Karlštejn, 21. VII. 1928, leg. Silbernagel.
4. *A. spectrum* Esp.: Turcia (see No. 2).
5. *O. cracca* F.: Bohemia — Praha, 27. VIII. 1939, leg. Hazuka.
6. *E. ludicra* Hb.: Austria — W. Neustadt, VII. 1927, (coll. Mus. Pragae).
7. *O. pastinum* Tr.: German'a — Berlin, VI. 1929 el., leg. Ragnow.
8. *O. viciae* Hb.: Bohemia — Nová Huť, 16. VI. 1909, leg. Grosse.

Foto Prof. Fiala.