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**Przegląd środkowo-europejskich gatunków
z pokrewieństwa *Badister bipustulatus* FABR.
wraz z opisem nowego gatunku
(Coleoptera, Carabidae)**

**Обзор средне-европейских видов из рода
Badister bipustulatus FABR.
вместе с описанием нового вида
(Coleoptera, Carabidae)**

**Revue of Central-European species from the *Badister
bipustulatus* FABR. group with description of a new
species (Coleoptera, Carabidae)**

[Pl. III and 4 text-figures]

It has been reported by Harald LINDBERG in his comprehensive and penetrating paper (6) that *Badister lacertosus* STURM, described in 1815 (13) as a distinct species, and subsequently regarded by the following authors: SCHAUM (11), JEANNEL (4), GANGLBAUER (3), REITTER (10), KULT (5) and others as a synonym or a colouring aberration belonging to the group of *B. bipustulatus* FABR. — was as a matter of fact quite a separate species. Apart from the colouring of scutellum — the sole ground to the previous investigators' assertion — LINDBERG gives a number of additional features, such as: larger measurements, a more or less darkened extremity of the first antennal joint, stronger iridescence of the elytrae, black spot on the elytrae, truncated in front, elytrae short and more rounded, a different structure of the male genitalia, as well as other less distinct characteristics.

The eminent expert in the subject of family *Carabidae*, Carl LINDROTH, in his 3-volume work reports that *Badister lacertosus* sensu LINDBERG occurs also in South-Sweden, and that the characteristics mentioned by LINDBERG are extremely subtle, variable and

often deceiving. Not all the individuals can therefore be determined. Considering these data LINDROTH asserts that *B. lacertosus* sensu LINDBERG can at the most be recognized as a race belonging to *B. bipustulatus* FABR. which occurs in Fennoscandia together with the typical form. Furthermore, LINDBERG points out to the possibility of hybrids of these two forms, which makes their taxonomic differentiation all the more difficult.

The taxonomy of the genus *Badister* CLAIRV., and in particular of species with spotted elytrae, has been the subject of my study for over 20 years. I originally limited my investigations to the material from the neighbourhood of Warsaw, wishing to simplify as much as possible this difficult problem; I have left out, for the time being at least, questions of geographical variability. To that effect I have personally gathered substantial material (over 1000 specimens) and made a number of ecological and biological observations, in relation to the area under study. My observations definitely pointed out, at that time already, to 3 distinct species appearing near Warsaw under the name of *B. bipustulatus* FABR. Unfortunately, the whole material together with my notes taken in the field was burnt down in 1939, at the very beginning of World War II.

My work resumed in post-war time was not confined exclusively to the neighbourhood of Warsaw. I assembled considerable material from the whole of Poland as well as from several European countries. Detailed examination carried out on this material proved that my original conjecture was correct: under the name of *B. bipustulatus* FABR. 3 different species have until now been confused.

Furthermore I have noted that these three species occur not only in Poland but are wide-spread in Europe. It is only in 1948, as has been said before, that LINDBERG recognized *Badister lacertosus* STURM — formerly regarded as a synonym or a colouring aberration of *B. bipustulatus* FABR. — to be a definitely separate species.

The features of this species reported by LINDBERG almost cover the results of my own investigations. I shall discuss the discrepancies of little importance later, when defining the particular species.

Prior to my description of the species, I should like to bring forward a certain characteristic which facilitates a more precise definition of particular species, and which has up till now been disregarded by previous investigators. I mean the micro-sculpture of the elytrae. Hardly visible at a 100-time enlargement, it represents when

enlarged 450 times, in all species of the group of *Badister* discussed here, except the little known Asiatic species *B. fenestratus* SEM., a number of transversal and parallel fissures very tightly disposed over the whole surface of the elytrae. The proprieties of this micro-sculpture are similar to those of a diffraction-net known in physics viz. the faculty of breaking up rays of light; this faculty causes the well known in such species iridescence of the elytrae. A stronger iridescence always follows a closer disposition of fissures, because of greater light diffraction. The fact that the intensiveness of iridescence differs in various individuals prompted me to a more precise study of the micro-sculpture from the quantity point of view; my research was aimed at fixing the number of transversal fissures covering one millimeter of the length of the elytrae, and at possibly applying the results obtained to systematical purposes.

My investigations yielded the following results:

1. The disposition of lines is regular along the whole length of the elytrae in every individual;
2. It is independent of the sex of the individual;
3. It shows in various individuals of the same species a very slight variability, not exceeding 5—10 % of the average number and ranging within the limits of an admissible error in measurement;
4. The number of fissures is not subject to geographical variability, at least within the area of Central Europe taken broadly (Poland, Germany, Austria, Hungary as well as the western part of the Ukrainian S. S. R. etc.).

Thanks to these results I was able to divide the species belonging to the group *B. bipustulatus* into four definitely separate groups; namely: Group I — number of fissures per 1 mm. of elytra length, called hereafter for abbreviation purposes the micro-sculpture index, is on the average 254. This group has only one species: *B. bipustulatus* FABR. showing [Pl. III. fig. 6] a very faint iridescence of the elytrae. Group II — the average micro-sculpture index — 368. Here we have *B. lacertosus* STURM as well as another species hitherto not described, whose description is given below: *Badister kineli* sp. n. Owing to a thicker micro-sculpture, the iridescence is much more distinct than in the preceding group¹). Group III — micro-sculp-

¹) Before examining the micro-sculpture and the iridescence of the elytrae it is necessary to remove by means of a small brush dipped in petrol all fat and dust which clings to them.

ture index is on the average 470. This group includes *B. unipustulatus* BON. [Pl. III, fig. 7] as well as some species of the subgenus *Baudia* RAG., — all of which will be the subject of a separate paper. As was to be expected, in that group the iridescence is stronger than in the preceding one. Group IV — the micro-sculpture index is about 150, the fissures, however, are not parallel like in preceding groups, but run in various directions, forming a net-work somewhat elongated transversally [Pl. III, fig. 5]. With such a micro-sculpture there is no phenomenon of light diffraction and the elytrae are totally devoid of iridescence. *B. fenestratus* SEM. belongs to this group.

The results of the measurements are shown in the following table:

TABLE I.

Number of micro-sculpture fissures on the elytrae in certain species belonging to the genus *Badister* CLAIRV., mesured per 0.1 mm. of elytrae length:

Species	Neighbourhood of Warsaw		USSR	Wro- claw	Austria Inns- bruck	Average per 1 mm. of length
	males	females	males	males	females	
<i>B. bipustulatus</i> FABR.	23, 25, 25, 26	25, 28	25, 28		25, 26	254
<i>B. lacertosus</i> STURM	35, 36	38, 39	35, 38	35, 37		366
<i>B. kineli</i> sp. n.	35, 36, 36, 36	36, 38	38, 39			368
<i>B. unipustulatus</i> BON.	46, 46, 47, 48	47, 47	46, 49			470

A rather important role in the exact definition of a particular species is played by the size of the individuals and particularly by their length. The length limits given below with descriptions of particular species are the result of measurements carried out on a large series of specimens of each species, the length of the specimens being understood as the distance between the top of the head and the end of the elytrae, instead of that between the head and the end of the abdomen. It is probably why the figures obtained are sometimes lower than those reported by other research workers. This way of measuring seems more adequate, as the distance between the head and the end of the abdomen depends on whether the abdomen is more or less protruding beyond the tip of the elytrae, in proportion to the amount of food it contains, and in the case of females, of eggs also. The difference in the length of particular individuals when these two methods are applied may go up to 0,8 mm. or more.

I am now proceeding to the description of the species:

***Badister bipustulatus* FABRICIUS.**

[Pl. III, fig. 1, 6 and text fig. 1]

It is clear from the description of FABRICIUS (1) and also from that of STURM (13) that this is the smallest species, with constant dark colouring of the scutellum. The length figure which I obtained after measuring several hundreds of specimens ranges from 4,80 mm. to 5.95 mm.¹⁾, most frequent, however, are individuals measuring 5.20 mm. to 5.80 mm.

Contrary to the species described hereafter, the first antennal joint is bright with not the slightest darkening at the tip. The black spot on each elytra is confined in front by a curved line running to the suture and the sides of the body. [Fig. 1]. In this species the

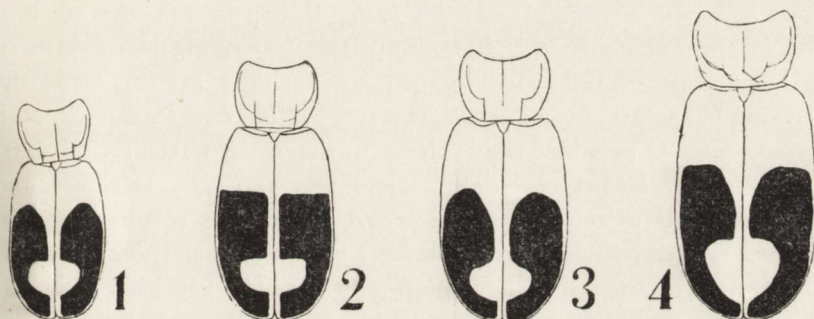


Fig. 1-4: 1. *B. bipustulatus* FABR.; 2. *B. lacertosus* STURM; 3. *B. kineli* sp. n.; 4. *B. unipustulatus* BONN. $\times 6$.

colouring is changeable. Often the black spot on the elytrae is either strongly reduced or it widens, covering the whole apical part of the elytrae, save the suture and the lateral border (ab. *suturalis* STEPH.); sometimes it divides into two separate spots on each elytra. I had no opportunity to examine *B. bipustulatus* var. *meridionalis* (9), described from the Mediterranean coast by PUEL; the description itself, not being comprehensive enough, does not enable me to adopt any attitude towards the taxonomical value of this form. JEANNEL (4), who has studied this variety, takes it for a Mediterranean race of the *B. bipustulatus* FABR., which on account of the structure of the penis

¹⁾ LINDBERG (6) gives 5.5 mm. to 6.4 mm. I suppose that this incompatibility is only apparent and due to the reasons mentioned above.

is identical with the typical form and differs from it only in size (6—7 mm.) and its slightly wider pronotum.

As reported above, the micro-sculpture index is on the average 254. The iridescence of the elytrae is faint, due to the less densely disposed micro-sculpture fissures. The penis [Pl. III, fig. 1] is characterized by its relatively short ending part and a distinct little hook at the end, directed downwards. When looked at from the side, the penis end is considerably convex on its dorsal part, and is moreover provided with a tiny tooth barely framed and directed upwards.

Wings normally developed, fit for flying; I have not, however, had the chance to observe the flight itself. Such observations made by other research workers are of doubtful value, as they may pertain to the two following species, so far not discriminated by the investigators. The imago may be seen the whole year round. Its eclosion from the pupa takes place from July till September; nevertheless, the beetle remains in this instar until the next spring in its earthen cell, and only exceptionally, for instance during a submersion of the terrain, it appears incompletely mature by the end of summer and in autumn. Copulation takes place in the early warm spring days.

Badister bipustulatus FABR. is not very particular as regards the biotope and is therefore the commonest species. Its requirements are limited to a certain degree of dampness of the area and some shadow. It likes staying in warm, low thickets in the neighbourhood of water, though its proximity is not indispensable to the existence of the beetle, contrary to the case of *B. unipustulatus* BON. and *B. kineli* sp. n. It avoids big overshadowing and thick woods. This is the commonest species from all the group. It appears throughout Poland as well as in the Central and Northern Europe. Information pertaining to its occurrence in Southern Europe, in Africa, Asia and America requires verifying with regard to a subsequent discrimination of related species.

Badister lacertosus STURM.

[Pl. III, fig. 2 and text fig. 2]

This species has been described in an excellent manner by LINDBERG (6). The body length ranges from 6.1 to 6.9 mm.¹⁾. Elytrae wider than those of *B. bipustulatus* FABR., with lateral out-

¹⁾ 6.5 to 7.2 mm. according to LINDBERG. The discrepancy is probably due to a different method of measuring the length of the body.

line more distinctly rounded. The colouring of the scutellum red or brown — never black. In contrast with *B. bipustulatus* FABR., the first antennal joint has a more or less accentuated darkening at the end. Black spot on the elytrae is confined in front by a straight transversal line almost reaching the elytra suture [text-fig. 2]. The average micro-sculpture index is 366. On account of a thicker linear pattern the iridescence of the elytrae is stronger than in the preceding species. Penis [Pl. III, fig. 2] similar to that of *B. bipustulatus* FABR., its ending part being, however, distinctly longer and without the swelling at the top; owing to this detail the dorsal line viewed from the side runs straight up to the top. LINDBERG gives another characteristic feature of this species — the light colouring of the tarsi; this characteristic seems, however, strongly labile and not suitable for differentiation from *B. bipustulatus* FABR., whose tarsi, although lighter on the average, are also rather variable in coloration. Wings normally developed. I have not observed the flight of this species. The moment of transformation of the pupa into the imago has not been as yet determined. Considering the number of individuals noted, it is to be assumed that their life cycle develops like in *B. bipustulatus* FABR.

The reported species requires deeper shadows and a substratum rich in moulder but not too damp; it likes best staying in woods, where it can be found in the upper layer of fallen decaying leaves, often accompanied by *Amara brunnea* GYLL. and *Calathus micropterus* DUFT. Contrary to the next two species it is not connected with water, while it also may be noted in the neighbourhood of waters, under the condition that the degree of overshadowing and the type of soil are suitable. It occurs in the whole of Poland, although it is much scarcer than the preceding species.

I have studied specimens of the following localities:

Poland: Szczecin, Koszalin, Gdańsk, Warsaw, Cracow, Kielce, Elk, Wrocław, Przemyśl and others.

Germany: Berlin-Finkenkrug, leg. Hans WAGNER, the specimens being denoted by him as *B. unipustulatus* ab. *teutonoides* PREUDH.; Frankfurt a/O., leg. SCHUKATSCHEK.

Czechoslovakia: Trenčín, leg. ?

Ukrainian S. S. R.: Dvinograd and Sheshava, leg. TENENBAUM.

Byelorussian S. S. R.: Brest-Litovsk, leg. Dr. EICHLER, as well as one specimen labelled „Russia m.“ Outside these countries the

species under discussion occurs in Finnland (LINDBERG) and in Sweden (LINDROTH).

Considering the description and picture I believe *Badister binotatus* FISCH. (2) to be an aberrative form of *B. lacertosus* STURM the latter having the black spot on the elytrae interrupted.

Badister kineli sp. n.

[Pl. III, fig. 3 and text fig. 3]

Description of holotype. Male. Length of body 7.0 mm. Length of pronotum along the middle line 1.4 mm. Maximum width of pronotum 2.2 mm. The ratio of the width of pronotum to its length is 0.64. Head, scutellum and body below black. Pronotum and elytrae red, the latter with a characteristic black spot like in *B. bipustulatus* FABR. The first antennal joint red with a marked darkening at the end, like in *B. lacertosus* STURM, the next three ones black, the rest pale brown. Palpi red with the terminal joint dark. Red legs, except the tarsi of the intermediate and posterior legs which are distinctly darkened. General shape very similar to that of *B. bipustulatus* FABR., but the pronotum is shorter and more extended toward the front. The micro-sculpture index is approximately 366. Owing to a denser arrangement of fissures the iridescence of the elytrae is much more accentuated than in *B. bipustulatus* FABR.

Penis [Pl. III, fig. 3] similar to that of *B. bipustulatus* FABR., although, when looked at from the side, with no tooth directed upward at its tip. The penis is distinguished from that of *B. lacertosus* STURM by the short tip part and a marked protuberance on the dorsal side.

The specimen described here was collected by me on March 23rd, 1947, at Gocławek, near Warsaw.

Allotype. Female. Outside the disparity in the structure of the anterior tarsi, normal for the whole genus, there is no difference whatever between the allotype and the holotype.

Paratypes numbering 113 specimens were collected simultaneously with the holotype and the allotype at Gocławek (96 specimens); besides, 17 specimens were gathered in other localities. The holotype, the allotype and the paratypes are kept among the collections of the Polish Museum of Zoology in Warsaw.

Length of body in paratypes ranges from 6.2 to 7.2 mm., with individuals of 6.5 — 7.0 prevailing. The end of the first joint like in holotype is more or less darkened; sometimes this darkening is very faint, yet always perceptible. The scutellum colouring black (in 75 % of individuals approximately) or dark brown (about 25 % of individuals), but never red. The elytrae coloration is more stable, and the front black spot is confined with a curved line subsiding like in *B. bipustulatus* FABR. towards the suture and the lateral margin. The intermediate and the posterior tarsi are always more or less darkened.

The reported paratypes come from the following localities:

Poland. Warsaw, leg. MAKÓLSKI; Szczecin, leg. ?; Gdańsk, leg. KNIEPHOFF; Toruń, leg. BARTOSZYŃSKI; Ełk, leg. BIELAWSKI; Międzyrzec Podlaski, leg. MAKÓLSKI and BURAKOWSKI; Kazimierz Dolny, leg. MROCZKOWSKI; Nowa Sól, leg. ?; Wrocław, leg. POLENTZ.

Ukrainian S. S. R. Babińce and Krzywczę on the Dniester, leg. TOLL.; Dvinograd on the Dniester, leg. TENENBAUM.

Yugoslavia. Zagreb, leg. WEINGARTNER.

Austria. Neusiedlersee, leg. HOFFMAN.

Biology. *Badister kineli* sp. n. is ecologically connected with water. It lives near water in open areas, with preference for wet meadows flooded in springtime. The imago appears late in June and in July. As breeding places on account of great humidity and spring floods are not always fit for winter stay, a part only of the population remains on the spot till springtime, the rest of it taking the air in search of drier grounds suitable for hibernation. Such migration takes place in the second part of summer and autumn, and it is at this period that the specimens of the species are attracted by light in the evening. Late in autumn and in winter I used to spot them in their places of hibernation concealed under the moss at forest borders, accompanied by the shore fauna of the family Carabidae, such as *Bembidion velox* L., *B. striatum* FAB., *Blethisa multipunctata* L. and others, as well as by the water fauna of the family Dytiscidae: *Colymbetes striatus* L., *Ilybius ater* DEG., *Hydaticus stagnalis* FAB., *Rhantus* sp. and others. All these species also are but seasonal visitors of the biotope described above. Early in spring there takes place a reversed migration towards the breeding grounds. It is much faster and therefore harder to be observed. The copulation in *B. kineli* sp. n. takes place as soon as the first warm spring days have

come. The larval and pupal instars last till late in June, whereupon follows the appearance of the imago, occurring at different times in various individuals and lasting up till the summer end, on account of females laying eggs not simultaneously.

Badister unipustulatus BONELLI

[Pl. III, fig. 4, 7 and text fig. 4]

This species is easily discernible from other species of this group owing to its size (6.9 — 8.2 mm.) as well as to the following characteristic: considerably larger head, pronotum broader with a more accentuated narrowing caudad, constant red colour of the scutellum and of the episterna mesothoracis, strongly developed end part of penis [Pl. III, fig. 4]. The micro-sculpture index of about 470 considerably exceeds that of the remaining species, thanks to which detail the iridescence of the elytrae is more distinct.

I have based my studies on material coming from the following localities:

Poland. The neighbourhood of Warsaw (Gocławek, Zegrze, Bielany, Pilawa, Morysinek, Pomiechówek and other localities, leg. MAKÓLSKI); Gdańsk, leg. KNIÉPHOF; Koszalin, leg. LÜLLWITZ; Wrocław, leg. POLENTZ; Przemyśl, leg. TRELLA; Szczecin, leg. ?

Germany. Neighbourhood of Berlin (Finkenkrug and Briese-lang); Ulm, leg. ?

Austria. Neusiedlersee, leg. ?

Southern France, leg. ?

Ukrainian S. S. R. Zaleszczyki, Dvinogrod, Mielnica, Wołczków, leg. TOLL and TENENBAUM.

Byelorussian S. S. R. Brest Litovsk, leg. EICHLER.

Biology. *Badister unipustulatus* BONELLI lives in the neighbourhood of water in shadowed grounds. Likes best forest swamps rich in moulder and vegetation. Its yearly life-cycle is similar to that of *B. kineli* sp. n. Occurs the whole year round. Young individuals make their appearance from mid-June till the end of summer and hibernate. Some of them leave, by the end of summer, their breeding places unsuitable for winter stay and disperse in search of more adequate, drier spots for hibernation. During this period the species may be noted in various biotopes; this is, however, only a temporary stay, as in early spring a migration starts in the opposite direction towards breeding places. On their way these beetles are attracted by evening lights.

***Badister fenestratus* SEMENOV**

[Pl. III, fig. 5]

This little known species was described in 1906 by A. SEMENOV (12) on the basis of three specimens from Central Asia (Alatau-Przewalsk). According to his assertion, the species is the closest relation of *B. bipustulatus* FABR., from which it differs by its less convex eyes, broader pronotum more rounded at the sides, as well as by the enlarged spot on the elytrae. The main distinguishing feature reported by SEMENOV is a complete lack of iridescence of the elytrae. He gives the body length as being 5–6 mm. The only female specimen from Central Asia (Aksut — Thianshan, ex coll. LGOCKI) I had at my disposal totally answers SEMONOV's description. The complete lack of iridescence observed in the specimen reported here is due to a different micro-sculpture of the elytrae; contrary to what appears in the European species, it bears the character of a net-work somewhat elongated transversally, nearly isodiametric [Pl. III, fig. 5]; the number of meshes per 1 mm. of elytra length is approximately 150. The biology of the reported species is unknown.

Key to the species from the group***Badister bipustulatus* FABR.**

1. Micro-sculpture of the elytra bears the character of a net-work somewhat elongated transversally [Pl. III, fig. 5]. Complete lack of iridescence of the elytrae; Asiatic species. Size 5–6 mm. . . *B. fenestratus* SEMENOV
- Micro-sculpture of the elytra consists of very tightly disposed transversal lines; the elytrae have a more or less intensive iridescence. . . . 2.
2. Episterna mesothoracis and scutellum red; head large, penis strongly developed at the tip [Pl. III, fig. 4]; length of body 6.9–8.2 mm. Micro-sculpture index about 470 [Pl. III, fig. 7] . . . *B. unipustulatus* BON.
- Episterna mesothoracis dark. Scutellum with variable coloration. Size of head normal. The tip of penis provided with a small hook directed downwards. Body length 4.8–7.2 mm. 3.
3. Length of body 4.8–5.95 mm. Scutellum always dark. First antennal joint red with no darkening at the end. Faint iridescence of the elytrae. Micro-sculpture index 254 [Pl. III, fig. 6]. Penis tip, in addition to the small hook on the ventral side, has on the dorsal side a small tooth directed upwards [Pl. III, fig. 1] *B. bipustulatus* FABR.
- Length of body 6.1–7.2 mm. Scutellum of variable coloration. First joint of antennae red, with a more or less distinct darkening at the end. Stronger iridescence of the elytrae. Micro-sculpture index about 370. No tooth on the dorsal side of the penis tip 4.

4. Scutellum red or brown, never black. Slightly broader elytrae, with sides faintly rounded. Black spot on the elytrae confined ahead by a straight line [text fig. 2.] Tip of penis longer [Pl. III, fig. 2] *B. lacertosus* STURM
- Scutellum of variable colouring, red or brown. Elytrae elongated with rather parallel sides. Black spot on the elytrae is confined in the front by a curved line running towards the lateral border and suture [text fig. 3]
- *B. kineli* sp. n.

In this key I have not taken into consideration *Badister ancora* MÉNÉTRIÉS from the Caucasus, unknown to me and described on the basis of one specimen by MÉNÉTRIÉS (18). As far as the short and inaccurate description goes, I agree with SCHAUUM's (11) assertion that it is probably a small specimen of *B. bipustulatus* FABR.

The name of the new species described in this paper is intended to honour the memory of the late Dr. Jan KINEL, the founder of the Polish Entomological Society and for many years the editor of the „Bulletin Entomologique de la Pologne“.

It is my pleasant duty to acknowledge most gratefully the invaluable help on the part of the Polish Museum of Zoology assistants, Mr. Ryszard BIELAWSKI and Mr. Maciej MROCZKOWSKI, who, notwithstanding the hardships and time involved, assisted me in performing microscopic slides and drawings.

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EXPLANATION OF FIGURES

Plate III

- Fig. 1. *Badister bipustulatus* FABR., penis, $\times 45$.
„ 2. *Badister lacertosus* STURM, penis, $\times 45$.
„ 3. *Badister kineli* sp. n., penis, $\times 45$.
„ 4. *Badister unipustulatus* BON., penis $\times 45$.
„ 5. *Badister fenestratus* SEM., fragment of the elytrae micro-sculpture, $\times 450$.
„ 6. *Badister bipustulatus* FABR., fragment of the elytrae micro-sculpture, $\times 450$.
„ 7. *Badister unipustulatus* BON., fragment of the elytrae micro-sculpture, $\times 450$.

STRESZCZENIE.

Na podstawie bardzo dużego materiału chrząszczy z pokrewieństwa *Badister bipustulatus* FABR., zebranego w okresie przedwojennym w okolicach Warszawy i dokonanych na tym terenie spostrzeżeń biologiczno-ekologicznych, autor doszedł do przekonania, że pod nazwą *Badister bipustulatus* FABR. kryją się trzy nie odróżniane dotąd gatunki. Rozpoczęte wówczas badania nad rozmieszczeniem tych gatunków na terenie Europy zostały przerwane w roku 1939 z powodu wybuchu wojny i utraty wskutek pożaru całego materiału i notatek poczynionych w terenie.

Po wojnie autor kontynuował dalej swą pracę, opierając się na materiałach zebranych na nowo oraz na materiałach, znajdujących się w zbiorach Państwowego Muzeum Zoologicznego w Warszawie. Badania te potwierdziły słuszność pierwotnego przypuszczenia oraz stwierdziły, że te trzy gatunki są szerzej rozmieszczone w Europie, lecz przez badaczy łączone pod wspólną nazwą *B. bipustulatus* FABR.

Dopiero w roku 1948 fiński entomolog Harald LINDBERG (6) stwierdził odrębność gatunkową *Badister lacertosus* STURM, który uważany był przedtem za synonim, względnie aberację barwną *B. bipustulatus* FABR. Stanowisko LINDBERGA zostało jednak zakwestionowane przez szwedzkiego entomologa C. LINDROTH'a (7), który twierdzi, że *B. lacertosus* STURM sensu LINDBERG jest tylko słabo zróżniczkowaną rasą *B. bipustulatus* FABR., występującą w Fennoskandii razem z formą typową.

Badania przeprowadzone przez autora potwierdziły słuszność stanowiska LINDBERGA co do odrębności gatunkowej *B. lacertosus* STURM i doprowadziły do zdefiniowania trzeciego gatunku, który autor opisuje w niniejszej pracy pod nazwą *Badister kineli* sp. n.

W pracy swej autor opierał się głównie na różnicach w budowie aparatów kopulacyjnych samców, oraz na charakterze mikrorzeźby pokryw. Ta ostatnia przy powiększeniu 450 - krotnym, przedstawia się u gatunków europejskich w postaci poprzecznych, mniej lub więcej równoległych kresek, o różnej gęstości u poszczególnych form. Kreskowanie tego rodzaju posiada właściwości znanej w fizyce siatki dyfrakcyjnej, tj. zdolność rozszczepiania promieni świetlnych, co powoduje znany u gatunków tego rodzaju tęczyowy połysk pokryw. Przy gęstszym kreskowaniu, rozszczepienie promieni świetlnych jest pełniejsze, a co za tym idzie i połysk tęczyowy silniejszy. Fakt, że intensywność połysku tęczyowego jest u różnych osobników różna, skłonił autora do zbadania ilościowego mikrorzeźby pokryw i wprowadzenia pojęcia wskaźnika mikrorzeźby, pod którym autor rozumie liczbę, odpowiadającą ilości kresek mikrorzeźby na jednym milimetrze długości pokryw. Na podstawie otrzymanych rezultatów autor dzieli gatunki z podrodzaju *Badister* sensu stricto na cztery wyraźnie oddzielające się grupy, co w dużej mierze ułatwia następnie sprecyzowanie tych gatunków.

W dalszym ciągu autor daje definicje poszczególnych gatunków, oraz opisuje nowy gatunek pod nazwą *B. kineli* sp. n. na podstawie holotypu zebranego przez niego w Gocławku pod Warszawą, który łącznie z allotypem i paratypami w ilości 113 okazów znajduje się w Państwowym Muzeum Zoologicznym w Warszawie.

Przy opisach autor podaje szczegóły, dotyczące biologii i ekologii poszczególnych gatunków oraz stwierdza, że wszystkie one należą do wiosennego typu fenologicznego, charakteryzującego się tym, że aktywność płciowa i kopulacja mają miejsce natychmiast po nastaniu pierwszych ciepłych dni wiosennych, stan larwalny i poczwarkowy trwa mniej więcej do połowy czerwca, poczem następuje pojaw imago, które jednak nie wykazuje żadnej aktywności życiowej aż do wiosny następnego roku i przeważnie pozostaje w swej kolebce lęgowej pod ziemią.

Opisany powyżej nowy gatunek autor poświęca pamięci zmarłego w roku 1951 docenta doktora Jana KINELA, założyciela Polskiego Związku Entomologicznego i wieloletniego redaktora Polskiego Pisma Entomologicznego.

Kończąc, autor wyraża szczerze podziękowanie asystentom Państwowego Muzeum Zoologicznego mgr. Ryszardowi BIELAWSKIEMU i mgr. Maciejowi MROCZKOWSKIEMU za życzliwą pomoc okazaną mu przy sporządzaniu preparatów mikroskopowych i rysunków.

Klucz do oznaczania gatunków z pokrewieństwa
Badister bipustulatus FABR.

1. Mikrorzeźba pokryw ma charakter siatki słabo poprzecznie wydłużonej; (rys. 5). Zupełny brak tęczowego połysku na pokrywach; gatunek azjatycki, Wielkość 5—6 mm. *B. fenestratus* SEMENOV.
- Mikrorzeźba pokryw składa się z bardzo gęstych, poprzecznych kresek. Pokrywy posiadają mniej lub więcej intensywny połysk tęczowy . . . 2.
2. Episterna mesothoracis i tarczka czerwone. Głowa duża, penis silnie rozbudowany na wierzchołku (rys. 4). Długość ciała 6,9—8,2 mm. Wskaźnik mikrorzeźby około 470 (rys. 7). *B. unipustulatus* BON.
- Episterna mesothoracis ciemna. Tarczka o zmiennym ubarwieniu, Głowa normalnej wielkości. Wierzchołek penisa z małym haczykiem skierowanym ku dołowi. Długość ciała 4,8—7,2 mm. 3.
3. Długość ciała 4,8—5,95 mm. Tarczka zawsze ciemna. 1-szy człon czułków czerwony bez przyciemnienia na wierzchołku. Połysk tęczowy pokryw słaby. Wskaźnik mikrorzeźby około 254 (rys. 6). Wierzchołek penisa, prócz małego haczyka na stronie brzusznej, posiada niewielki ząbek na stronie grzbietowej, skierowany ku górze (rys. 1). *B. bipustulatus* FABR.
- Długość ciała 6,1—7,2 mm. Tarczka o zmiennym ubarwieniu. Pierwszy człon czułków czerwony z mniej lub więcej wyraźnym przyciemnieniem na wierzchołku. Połysk tęczowy na pokrywach silniejszy. Wskaźnik mikrorzeźby około 370. Na stronie grzbietowej wierzchołka penisa brak ząbka. 4.
4. Tarczka czerwona lub brunatna, nigdy czarna. Czarna plama na pokrywach odgraniczona z przodu linią prostą (rys. 2 w tekście). Wierzchołek penisa dłuższy (rys. 2). *B. lacertosus* STURM
- Tarczka o ubarwieniu zmiennym, czarnym lub brunatnym. Pokrywy wydłużone, o bokach więcej równoległych. Czarna plama na pokrywach z przodu odgraniczona jest linią krzywą, opadającą w kierunku brzegu bocznego i szwu (rys. 3 w tekście). Wierzchołek penisa krótszy (rys. 3) . . . *B. kineli* sp. n.

W powyższym kluczu nie uwzględniono opisanego na podstawie jednego okazu przez MÉNÉTRIES'a (8) *Badister ancora* z Kaukazu, nieznanego mi w naturze. Sądząc z krótkiego i niedokładnego opisu, zgadzam się ze stanowiskiem SCHAUM'a (11) że jest on najprawdopodobniej małym okazem *B. bipustulatus* FABR.

РЕЗЮМЕ.

На основании большого материала жуков из рода *Badister bipustulatus* FABR., собранного перед войной в окрестностях Варшавы и на основании сделанных биологическо-экологических наблюдений автор утверждает, что под названием *Badister bipustulatus* FABR. кроются три неотличаемых до сих пор вида.

Начатые автором исследования над распространением этих видов в Европе были прерваны в 1939 году войной и утратой целого материала, а также сделанных записок.

После войны автор продолжал дальше свою работу на основании вновь собранных материалов и на материалах находящихся в коллекциях Государственного Зоологического Музея в Варшаве. Эти исследования подтвердили первоначальное мнение автора и доказали, что эти три вида шире распространены в Европе, но они были соединяемы под общим названием *Badister bipustulatus* FABR.

Лишь только в 1948 году финляндский энтомолог Harald LINDBERG (6) доказал видовую самостоятельность *Badister lacertosus* STURM, которого до него считали синонимом или цветной аберрацией *B. bipustulatus* FABR.

Мнение Линдберга однако не было принято шведским энтомологом Линдротом (C. LINDROTH, 7), который утверждает, что *B. lacertosus* STURM sensu LINDBERG является только слабо сдифференцированным подвидом *B. bipustulatus* FABR., выступающим в Фенноскандии вместе с основной формой.

Сделанные автором исследования подтвердили однако правильность точки зрения Линдберга, касающейся видовой самостоятельности *B. lacertosus* STURM и довели к открытию третьего вида описываемого автором под названием *Badister kineli* sp. n.

В своих выводах автор ссылается главным образом на строение генитальных органов самцов, а также на разницы в микро скульптуре надкрыльев.

Эта микро скульптура, при 450-кратном увеличении, представляется у европейских форм в виде поперечной, более или менее параллельной штриховки, густота которой зависит от вида. Такая штриховка, подобно известной в физике дифракционной сетке, обладает свойством разлагать световые лучи, что вызывает радужный отблеск надкрыльев. При более густой штриховке разложение лучей как и радужный отблеск выступают сильнее.

Обстоятельство, что насилие радужного отблеска у различных видов является иное, заставило автора количественно исследовать штриховку и ввести понятие указателя микро скульптуры надкрыльев, под которым автор понимает число штрихов на одном миллиметре длины надкрыльев.

На основании полученных результатов автор разделяет виды подрода *Badister* sensu stricto на четыре ясно выделяющиеся группы, что в большой степени облегчает точное определение видов.

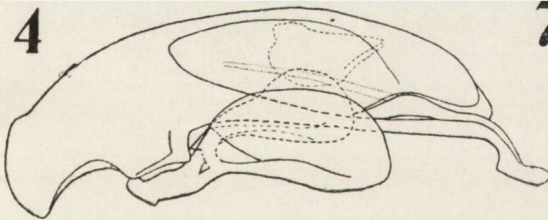
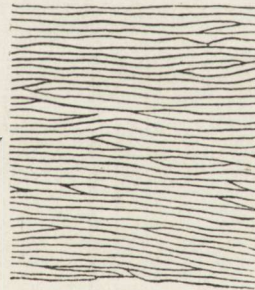
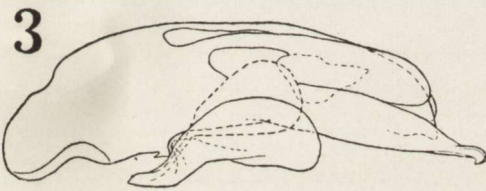
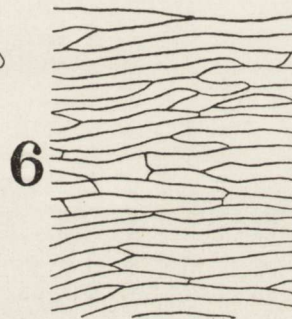
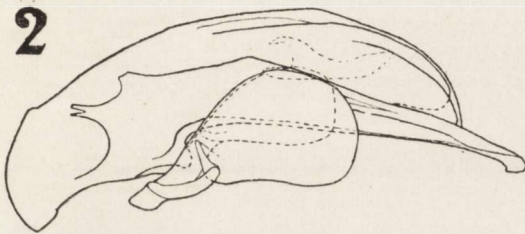
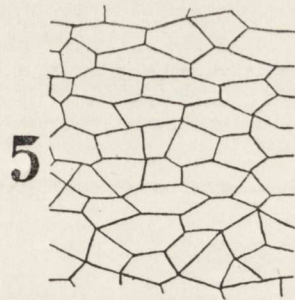
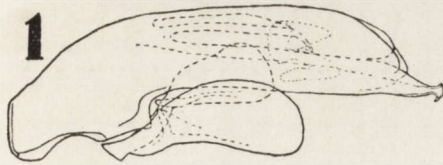
В дальнейшем автор подает дефиницию отдельных видов

и описывает новый вид под названием *B. kineli* sp. n. на основании типического экземпляра (holotypus) собранного им в Гоцлавке под Варшавой, который вместе с паратипами в количестве 113 экз. находится в Государственном Зоологическом Музее в Варшаве.

При описаниях автор дает подробности касающиеся биологии и экологии отдельных видов и утверждает, что все они принадлежат к весеннему фенологическому типу характеризующемуся тем, что половая активность и копуляция наступают сейчас же в первые весенние дни. Стадии личинки и куколки продолжают развиваться приблизительно до половины июня, затем начинается развитие имаго, которое однако не оказывает никакой жизненной активности до весны следующего года, оставаясь преимущественно в земле.

Описанный новый вид автор посвящает памяти скончавшегося в 1951 году доцента доктора Яна КИНЕЛЯ основателя Польского Энтомологического Общества и многолетнего редактора Польского Энтомологического Журнала.

В заключении автор выражает благодарность ассистентам Гос. Зоологического Музея в Варшаве, Ришарду Белявскому и Мацею Мрочковскому за доброжелательную помощь при подготовке микроскопических препаратов и рисунков.



M. Mroczkowski del.
J. Makólski