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Review of the Polish Species of the Genus *Chrysozona* MEIGEN
(Diptera, Tabanidae)

Przegląd krajowych gatunków rodzaju *Chrysozona* MEIGEN (Diptera,
Tabanidae)

Обзор представителей рода *Chrysozona* MEIGEN (Diptera, *Tabanidae*)
встречающихся в Польше

[With two tables and 41 text-figures]

INTRODUCTION

This paper is a review of six species of the genus *Chrysozona* MEIGEN occurring in Poland. They are: *Ch. pluvialis* (L.), *Ch. hispanica* (SZIL.), *Ch. crassicornis* (WAHLB.), *Ch. italica* (MEIG.), *Ch. variegata* (FABR.), and *Ch. bigoti monspellensis* (VILL.). It is probable that two more species occur in the south-eastern part of Poland, which have not as yet been found in this country: *Ch. grandis* (MACQ.), recorded from Moravia (MOUCHA and CHVÁLA 1956) and from the Ukraine (OLSOUFIEV 1937), and *Ch. pallens* (LOEW) from the Ukraine and the Polesie in Byelorussia (BOŠKO 1953).

I carried out my studies at the Dipterological Laboratory of the Institute of Zoology, Polish Academy of Sciences, Warszawa, under the guidance of Professor Dr. T. JACZEWSKI and Dr. P. TROJAN. I was also able to take advantage of the hospitality afforded me by the Field Station of the Institute of Ecology, Polish Academy of Sciences, at Dziekanów Leśny, during my field work, and it is my pleasant duty to take this opportunity of thanking all these persons and institutions for their help and advice.

The "human bait" and SKUFIN's trap methods were used for collecting the female insects, whereas the males were obtained chiefly by using a sweep net. I also investigated the distribution within the area, and the activity of *Ch. pluvialis* (L.) and *Ch. hispanica* (SZIL.), using SKUFIN's trap for quantita-

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tive samples and employing both the „area cross-section” method and the „time-collecting” one (TROJAN 1956).

The greater part of my material came from the collection of the Institute of Zoology, Polish Academy of Sciences; further material was collected in the Kampinos Forest near Warsaw in the areas adjoining the Station of the Institute of Ecology of the Polish Academy of Sciences. Various biotopes were chosen for investigations including both swamps with alders and osiers, and zones at higher levels, such as dunes either not wooded or covered by mixed forest, pine woods, or plantations of young pine trees. The area in question is intersected by numerous roads and forest paths, of which that most frequented by humans and domestic animals is the so-called green tourist route. This route is the site of intensive penetration by the *Tabanidae*.

The following material served as the basis of the morphological analysis:

Ch. italica (MEIG.): 1 male (vicinity of Szczecin); 86 females (Kampinos Forest, Skierniewice and other localities near Warsaw; Pomerania; Białowieża Forest; Kielce district; Lublin district; Pieniny Mts.).

Ch. variegata (FABR.): 8 females (Liguria, Italy).

Ch. crassicornis (WAHLB.): 5 males (Latvia); 14 females (various localities in Poland and Latvia).

Ch. pluvialis (L.): 12 males (Kampinos Forest; Szklarska Poręba; Western Pomerania, especially the vicinity of Szczecin); over 600 females (various regions in Poland).

Ch. hispanica (SZIL.): 3 males (Kampinos Forest; Lublin region), about 100 females (various regions in Poland).

Ch. bigoti monspellensis (VILL.): 4 females (Międzywodzie, Wolin I.).

This material is kept in the collections of the Institute of Zoology, Polish Academy of Sciences, Warszawa.

The genus *Chrysozona* MEIGEN, like *Tabanus* L., is one of the evolutionally youngest genera of the *Tabanidae* (OLSOUFIEV 1937). This may afford some explanation of a certain „fluidity” of the systematic features, and in consequence, of the different views held by specialists as to the dividing lines between the various species. *Ch. pluvialis* (L.) and *Ch. hispanica* (SZIL.) are regarded by some authors (SZILADY 1923, OLSOUFIEV 1937, MOUCHA and CHVÁLA 1956) as distinct species, other authors (KRÖBER 1925, LECLERQ 1956) declare that these forms are not of taxonomically equivalent rank, and treat *Ch. hispanica* (SZIL.) as a subspecies or a variety of *Ch. pluvialis* (L.). KRÖBER (1925) in his description uses the subspecific name “*pluvialis hispanica* SZIL.”, and in the key preceding the description, the infrasubspecific one: “... var. *hispanica* SZIL.”. LECLERQ (1955, 1956) does the same with regard to *Ch. nigricornis* GOBERT, treating it as a subspecies (*Ch. italica nigricornis* GOBERT), and elsewhere he adds the abbreviation: “var.” SÉGUY (1926), on the other hand, does not recognise the existence of *Ch. hispanica* (SZIL.) even as a “varietas”. Of course there is also the question of different interpretations of the idea

of a species, subspecies and varietas. Although the systematic position of species in the *Ch. italica* (MEIG.)-group occurring in Poland does not in general arouse any doubts, numerous discrepancies are encountered in the *Ch. pluvialis* (L.)-group. KRÖBER (1925) and LECLERQ (1956), for example, consider *Ch. variegata* (FABR.) as a subspecies of *Ch. italica* (MEIG.). On account of these differing views, I consider it useful to investigate the variability in the characters of all six species of the genus *Chrysozona* MEIGEN found in Poland, in particular those of *Ch. pluvialis* (L.) and *Ch. hispanica* (SZIL.).

VARIABILITY OF TAXONOMIC FEATURES IN THE EXTERNAL MORPHOLOGY OF FEMALES OF *CH. PLUVIALIS* (L.) AND *CH. HISPANICA* (SZIL.)

Analysis was made of females only, as the author had only female specimens in a larger number. It is normally difficult to obtain a sufficient number of male individuals. They appear to exhibit an intraspecific variability in morphological features, especially in the shape and dusting of the antennae, but the small amount of material available made it impossible to obtain a more accurate knowledge in this question.

Antennae. The shape of antennae, their dusting and colour are usually used as taxonomic characters. In the case of *Ch. pluvialis* (L.) and *Ch. hispanica* (SZIL.) variability occur in the dusting of the first joint and in the colour of the third joint of the antennae, but not to the same extent as in the shape, which differs considerably in different specimens. This is of very real significance, since in all works dealing with this subject the shape of the antennae is regarded as a character of primary importance. In the material of *Ch. hispanica* (SZIL.) I examined, the number of specimens with the shape of antennae supposed to be typical for this species [fig. 1] was rather small (approximately 20 %). There are specimens with antennae clearly typical of *Ch. pluvialis* (L.) but with all other characters belonging to *Ch. hispanica* (SZIL.). The shape of antennae closest to that typical of *Ch. pluvialis* (L.) is more common, i. e. more specimens resembling *Ch. hispanica* (SZIL.) in general appearance have the antennae similar in shape to those of *Ch. pluvialis* (L.) than vice versa. It is possible to trace the transition from one form to another, through intermediate forms, without any clearly defined dividing lines [fig. 1].

Spots on the frons and abdomen. The extensive variability can be seen in frontal spots, especially the lateral and median ones. Sometimes only the central spots vary, sometimes the lateral ones. Specimens may happen in which all, or at least the majority of characters, are typical of *Ch. hispanica* (SZIL.), while the lateral spot, or both central spots, are typical of *Ch. pluvialis* (L.).

The spots on the abdomen take the form of pale, rounded lateral blotches. In *Ch. pluvialis* (L.) there are two of them on each tergite, beginning with the second and in general ending on the VIIth; frequently, however, no spots

on the VIIIth tergite are visible and sometimes they are absent from the second or even from the third tergite [table 1]. In *Ch. hispanica* (SZIL.) the spots have receded to the terminal tergites, whereas „non-typical” individuals of both species, exhibit to a certain extent an intermediate arrangement of the spots.

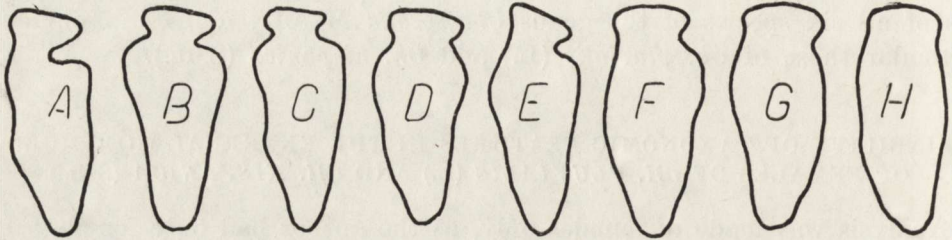


Fig. 1. Variability in first antennal joint in females of *Chrysozona pluvialis* (L.) and *Chrysozona hispanica* (SZIL.): A, B, F — *Ch. pluvialis* (L.); C, D, E, G, H — *Ch. hispanica* (SZIL.),

Colour. The colour of the wings and the whole body is, in my opinion, one of the most important characters separating *Ch. hispanica* (SZIL.) and *Ch. pluvialis* (L.), and, in comparison with the foregoing features, it is subject to the relatively smallest intraspecific variability. Determination of the specimens in the field does not present any difficulties. The particular habitus as well as the behaviour of the individuals of these species make it possible to identify easily the living specimens. *Ch. pluvialis* (L.) is of olive green colour.

Table 1

Differences in the arrangement of spots on the abdominal tergites in females of *Ch. pluvialis* (L.) and *Ch. hispanica* (SZIL.)

Tergite	Number of individuals in %	
	<i>Ch. pluvialis</i> (L.)	<i>Ch. hispanica</i> (SZIL.)
II	84	60
III	100	92
IV	100	100
V	100	100
VI	98	100
VII	10	42

The characteristic „marbling” of its wings is caused by the whitish spots arranged in rosette patterns on the brown surface of the wing which gets a „smoky” appearance. The colouring of the *Ch. hispanica* (SZIL.) is more strongly contrasting. The pubescence and dusting on the black, or blackish, body is bluish grey. The abdominal spots and bands of the abdominal tergites are of the same colour. The wings are considerably lighter in colour, and in some cases the

additional brown smoky appearance of the wing surface is completely absent. The whitish spots on the wings also form rosette patterns (as is the case, in fact, with other representatives of the genus *Chrysozona* MEIGEN).

Size. The body dimensions of both species [table 2] are on the average smaller in my material than those given in the literature. I also obtained a different average length of body. OLSOUFIEV (1937) states that *Ch. hispanica* (SZIL.) is slightly larger than *Ch. pluvialis* (L.), whereas the specimens of both species in the Kampinos Forest are of approximately uniform size, and the average body length of *Ch. pluvialis* (L.) is even slightly greater than that of *Ch. hispanica* (SZIL.).

Table 2

Body length in females of *Ch. pluvialis* (L.) and *Ch. hispanica* (SZIL.)

Species	Minimum length	Maximum length	Range of size	Average length of body
<i>Ch. pluvialis</i> (L.)				
own material	7,5	10,0	2,5	8,96
OLSOUFIEV	8,0	12,0	4,0	—
MOUCHA and CHVÁLA	8,0	12,0	4,0	—
KRÖBER	5,7	11,0	5,3	—
<i>Ch. hispanica</i> (SZIL.)				
own material	7,0	10,5	3,5	8,9
OLSOUFIEV	9,0	12,0	3,0	—
MOUCHA and CHVÁLA	8,5	12,0	3,5	—

DIFFERENCES IN THE STRUCTURE OF THE COPULATORY APPARATUS

The structure of the copulatory apparatus is being increasingly widely used in the systematics of *Diptera*. The notion of the copulatory apparatus is usually enlarged to include the entire posterior part of the abdomen — the so-called postabdomen (in the case of *Chrysozona* MEIGEN this is not visible from the exterior), and is to be understood as such in the present work. In different works, different terms are used, e. g. genitalia (OVAZZA and TAUFFLIEB, 1954) or genital apparatus (STACKELBERG and TERTERJAN, 1953). The morphological differences in the copulatory organ have only recently been applied in the taxonomy of *Tabanidae*. In 1950 BRYGOO voiced his opinion that criteria of this kind are not essential (after OVAZZA and TAUFFLIEB, 1954), although earlier COLLIN (1940), as the result of his study on the females of three species of the genus *Tabanus* L., revealed the possibility of using the shape of the cerci and of the VIIIth sternite (subgenital plate — after STACKELBERG and TERTERJAN, 1953) for identification. Other works (OLDROYD,

1952 — after OVAZZA and TAUFFLIEB, 1954; STACKELBERG and TERTERJAN, 1953; OVAZZA and TAUFFLIEB, 1954; ŠEVČENKO, 1960, 1961, 1962) confirm the importance of the organ in question in taxonomy. This is most clearly evident in the last of the works referred to above. A general morphological interpretation of the structure of the copulatory apparatus of *Tabanidae* is to be found in the paper by OVAZZA and TAUFFLIEB (1954), and in that by STACKELBERG and TERTERJAN (1953). The aim of the majority of works so far published was rather to investigate the structure and variations of the copulatory apparatus in concrete examples (STACKELBERG and TERTERJAN, 1953), or to obtain certain comparative data (COLLIN, 1940; OVAZZA and TAUFFLIEB, 1954). Only certain species of the *Tabanidae* have been examined, the majority of which do not belong to the genus *Chrysozona* MEIGEN. An exception to the above is *Ch. turkestanica* (SZIL.) in the paper by STACKELBERG and TERTERJAN (1953), *Haematopota abyssinica* SURC. (OVAZZA and TAUFFLIEB, 1954) and the species of the genus *Chrysozona* from ŠEVČENKO's works (1961, 1962), although in both these papers the structure of the copulatory organ of females only is taken into consideration. It is only in the paper of OLSOUFIEV (1937) that a slight mention is made of the genitalia of males, and a schematic drawing given. It seems, of course, quite understandable that the females, on account of their epidemiological and economic significance, have been the centre of interest, and that the males, as being more difficult to catch and not directly harmful, have been passed over.

Below are given the descriptions of the copulatory apparatus of males [with the exception of *Ch. variegata* (FABR.) and *Ch. bigoti monspellensis* (VILL.)] and of females of all six Polish species of the genus *Chrysozona* MEIGEN¹.

Chrysozona italica (MEIGEN, 1804)

Female [fig. 2 - 7]. VIIIth tergite is the least changed of all the elements of the postabdominal segments. It bears strong, but not dense setae of medium length in its central and caudo-lateral parts. Tergite IX narrowly triangular, with several setae on the posterior margin. Tergite X fairly large and setaceous. Its caudal exterior margin slightly thickened and rounded. Tergite XI reduced as in all other species in the genus. Cerci elongate (length greater than width) with denser setae on the tips. Interior margins with small depressions. *Ch. italica* (MEIG.) may be distinguished from the remaining Polish species of the genus by the shape of the cerci. Subgenital plate (VIIIth sternite) wide (width greater than length), convex on the ventral side (especially the anterior surface). Anterior margin almost straight, the lateral — slightly incised. Side projections triangular. Anterior part slightly sclerotized, of the same width

¹ The terminology used in the description of the female copulatory apparatus is based on the paper of STACKELBERG and TERTERJAN (1953) that of the male copulatory apparatus has been taken from OLSOUFIEV's work (1937).

as caudal part. Stronger sclerotization occurs only in the areas where the anterior margin of the subgenital plate joins the lateral. Lateral parts semicircular. Pubescence begins on these margins and extends further to the caudal part. A longitudinal groove runs through the middle of the caudal part (sometimes very faint, or even invisible). There are also more or less sclerotized sections of the VIIIth sternite (subgenital plate) visible. Genital plate (IXth sternite) U-shaped with parallel sides. Outer margin of the true plate not very deeply incised, angles rounded. Internal border semicircular. Lateral connective parts strongly thickened, but thickenings are not branched. Thickenings extend to

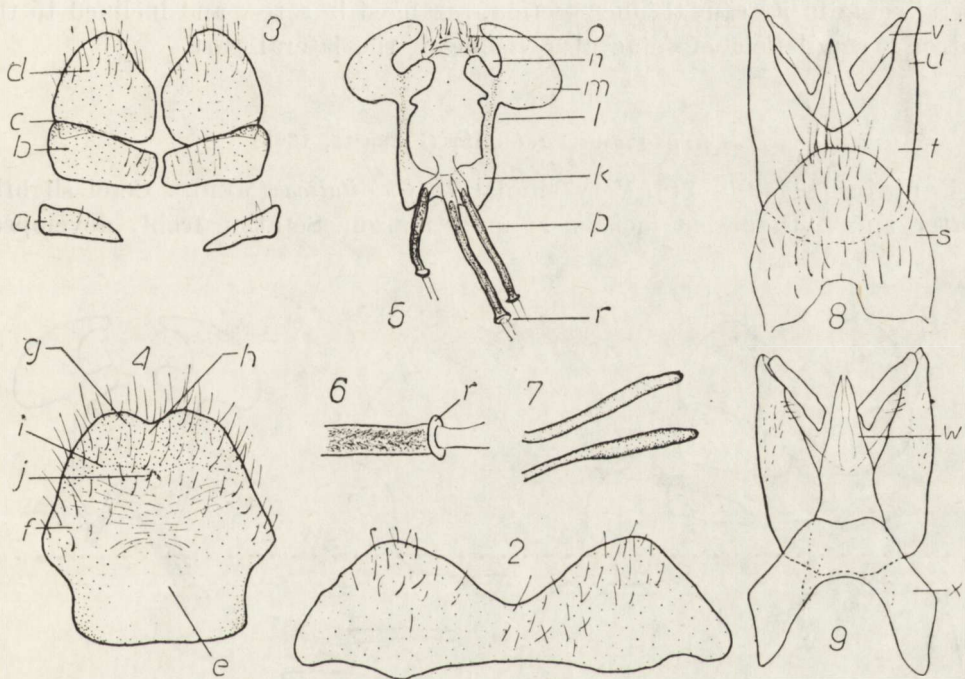


Fig. 2-9. Copulatory apparatus of *Ch. italica* (MEIG.): 2-7 Female [2 - VIIIth tergite. 3 - a) IXth tergite, b) Xth tergite, c) rudiments of XIth tergite, d) cerci. 4 - subgenital plate e) anterior - ,f) lateral - ,g) posterior - parts of subgenital plate, h) groove, i) border of dorsal bend of subgenital plate, j) sclerotized sections of subgenital plate. 5 - genital plate, k) true genital plate, l) lateral connective part, m) caudal part of genital plate, n) incision in caudal part, o) spine-bearing projection, p) initial part of seminal receptacle duct, r) collar. 6 - part of seminal receptacle duct with collar. 7 - seminal receptacles] 8-9 Male [8 - view from ventral side. s) VIIIth sternite, t) hypopygium, u) valves, v) second joint of valves. 9 - view from dorsal side. w) penis shield, x) VIIIth tergite].

the true genital plate on one side, and reach to the bottom of the incisions in the caudal part of the genital plate on the other side. Caudal parts with distinct, deeply cut incisions. Inner parts with clavate processes carrying spines arranged more or less distinctly in rows. Thickened initial parts of the

seminal receptacle ducts long and narrow [character typical of *Chrysozona italica* (MEIG.)], ending in small, sclerotized collars. Seminal receptacles long, narrow, narrowing posteriorly, and rounded at the tip. Sternites X and XI only very slightly sclerotized.

Male [fig. 8-9]. The only one specimen in the collection was damaged, with no cerci. VIIIth tergite narrowed in the caudal part, with slight, shallow depression at tip. Outer margin oval. VIIIth sternite rounded at tip, completely setaceous. Hypopygium slightly narrowed at base, with depression at apex. Valves slightly opened outwards, thin. Second joint of valves widened posteriorly, with slight incision on the inner side. Dorsal side of the valve bearing several setae in its caudal-inner section, arranged in a row and inclined to the centre; a small field of setae also visible in the lateral part.

Chrysozona variegata (FABRICIUS, 1805)

Female [fig. 10-14]. Very similar to *Ch. italica* (MEIG.). Cerci slightly shorter and with absent incision at inner margin. Setation feebly developed.

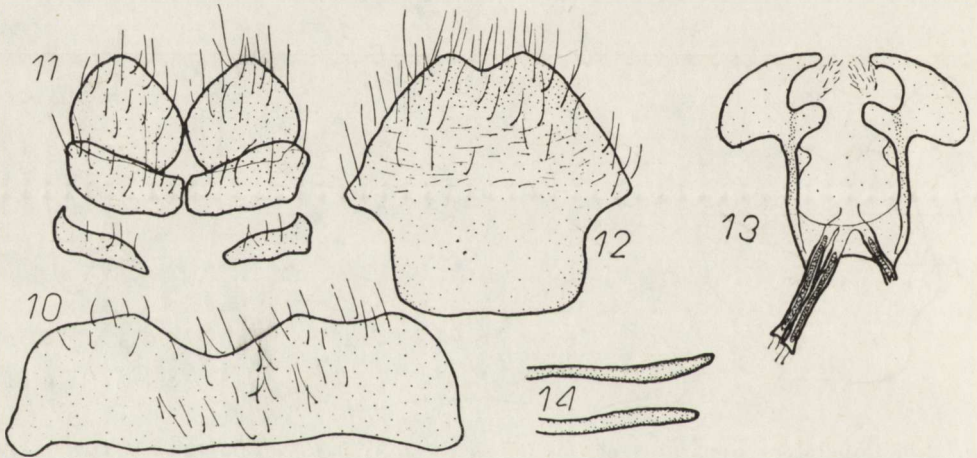


Fig. 10-14. Female copulatory apparatus of *Ch. variegata* (FABR.) (for explanation see fig. 2-7).

Xth tergite with more delicate, but longer setae extending far on to the cerci. Genital plate similar to that of *Ch. italica* (MEIG.). Central part of the true plate thinner, clearly separated from sides by a narrow thickening. Spine-bearing tubercles on the caudal parts of the genital plate flatter, widened, with more delicate and less regularly arranged spines. Initial parts of seminal receptacle duct slightly shorter than in *Ch. italica* (MEIG.).

This species has so far been found in the Białowieża Forest (SACK, 1925) and in the Szczecin region (KARL, 1935).

Chrysozona crassicornis (WAHLBERG, 1848)

Female [fig. 15 - 19]. Copulatory apparatus of *Ch. crassicornis* (WAHLB.) except for its generally smaller size, more compact structure, denser and stronger pubescence, similar to that of *Ch. italica* (MEIG.). Xth tergite shorter and wider. Caudal margin with several setae which are longer than cerci. Width of cerci greater than length. Cerci without distinct incision at inner margin. Cerci and basal plates (tergites X and XI) considerably shorter than those of *Ch. italica* (MEIG.) (only about 1/4 of its length). Subgenital plate similar to that of *Ch. italica* (MEIG.) but smaller and with stronger, longer pubescence. True genital plate (with the exception of the caudal part) edged by a distinct double margin. Caudal edge of the plate forms an almost straight line, or at most very slightly emarginated. Lateral connective parts fairly wide, distinctly thickened only in the centre, with angulated, plate-like projections on sides. Incisions in the caudal parts narrow and deep. Inner projections of these parts situated near the extension of the lateral connections and parallel to them. Initial sections of seminal receptacle duct short and sclerotized only at a short distance from the collar. Collar large, flat and characteristic of *Ch. crassicornis* (WAHLB.).

Male [fig. 20 - 21]. Copulatory apparatus large, higher and wider by about 1/4 than in the remaining species. Hypopygium distinctly narrows anteriorly at about half its length, its narrowed part with folded edges. Basal part long, bifurcation confined only to the caudal part. Inner edges of the caudal parts of the valves with a small patch of delicate setae. Second segments of valves fairly thick, widened posteriorly, with distinct semicircular incision on the inner edges. Cerci oval, elongate.

Chrysozona pluvialis (LINNAEUS, 1761)

Female [fig. 22 - 26]. VIIIth tergite exhibiting fairly large variability, usually, however, narrowed in the caudal part and with large incisions both in the caudal and basal parts. IXth tergite varying from triangular to rhomboidal. Xth tergite short, triangular and projecting laterally; its latero-basal edge with slight incision. Cerci slightly elongate and sharpened at tips; their width, in general, does not exceed length. Subgenital plate variable (typical shape is shown in fig. 24). Anterior part triangular, lateral parts visibly narrow in the caudal side. Setation generally slight. True genital plate very narrow with fairly narrow posterior angles; its posterior edge semicircular, interior edge incised. Lateral connective parts short, narrow, thickened, sometimes with thin projections bent either towards the centre, or outwards. Lateral thickenings reaching the bottom of the incisions in the caudal part and often widen posteriorly. Incision shallow, wide. Projections of caudal parts with spine-bearing tubercles bent towards centre; spines strong, of medium length

arranged in distinct rows. Initial sections of seminal receptacle duct of medium length. Collars small. Seminal receptacles long, distinctly narrowed posteriorly.

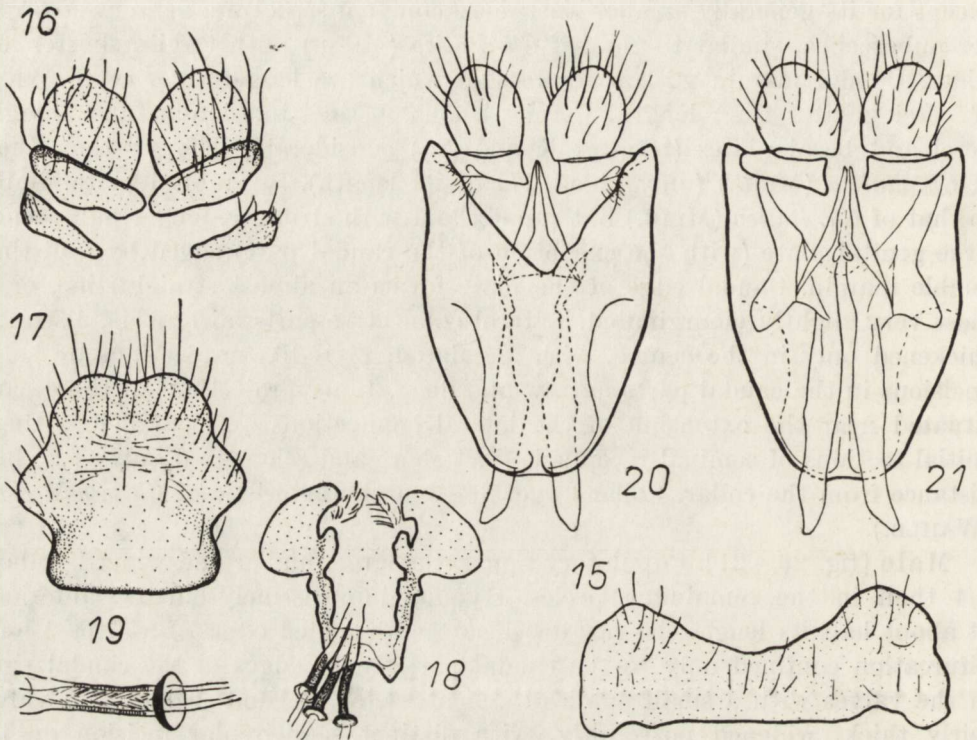


Fig. 15-21. Copulatory apparatus of *Ch. crassicornis* (WAHLB.): 15-19 Female. 20-21 Male. [20 - view from ventral side. 21 - view from dorsal side] (for explanation see fig. 2-9).

Male [fig. 27 - 28]. Copulatory apparatus roughly rectangular in shape. Hypopygium distinctly broadened in the caudal part with lateral margins bent exteriorly. Posterior margin slightly convex, with very slight depression near the ejaculatory duct. Bifurcation reaching half of total length. Edges of incision undulated, the angle at which they separate fairly narrow. Second segment of valves narrow, very slightly widened posteriorly. Inner margins with a slight depression. Cerci with slightly sharpened apices.

Chrysozona hispanica (SZILADY, 1923)

Female [fig. 29 - 34]. Copulatory apparatus very similar to that of *Ch. pluvialis* (L.), showing considerable variability in all its parts. As the differences are extremely small, the separating of the females of these two species on the basis of structure of their copulatory apparatus is impossible. VIIIth, IXth and Xth tergites similar to those in other species. Xth tergite as a rule does

not extend sideways beyond the cerci. Cerci usually rounded, sometimes with slightly sharpened tips. Subgenital plate variable, but, on the whole, narrower than in *Ch. pluvialis* (L.). Genital plate similar as in preceding species but with slightly larger and more massive caudal parts, and with wider and blunter caudal projections. Collar surrounding the end of the thickened seminal receptacle duct small but fairly deep. Seminal receptacles sometimes slightly widened posteriorly, usually with rounded tips.

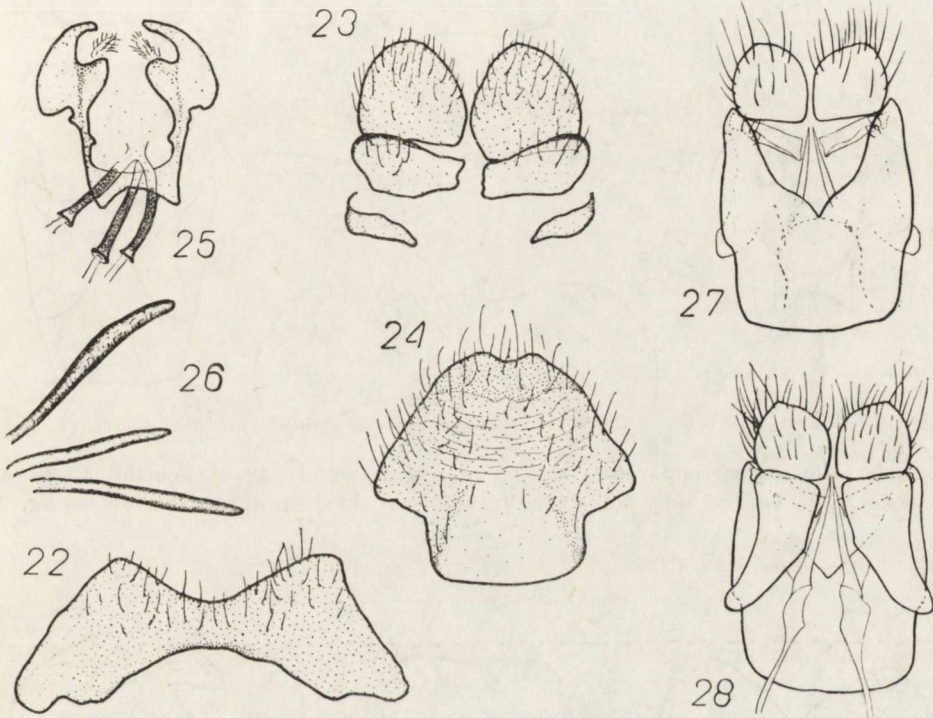


Fig. 22-28. Copulatory apparatus of *Ch. pluvialis* (L.): 22-26 Female. 27-28 Male [27 — view from ventral side. 28 — view from dorsal side] (for explanation see fig. 2-9).

Male [fig. 35-36]. Hypopygium slightly and evenly narrowing towards base. Its anterior margin with distinct incision in centre. Bifurcation shallower confined only to the caudal part. Inner edges of valves fairly straight. Second segment of valves distinctly widened posteriorly, with large incision on inner edges. Cerci slightly elongate, regularly rounded posteriorly.

***Chrysozona bigoti monspellensis* VILLENEUVE, 1921**

Female [fig. 37-41]. VIIIth tergite narrow, with incisions in the basal and caudal parts. IXth tergites narrow, long, with narrow inner angles. Xth tergites fairly wide. Cerci wide with slightly sharpened tips. Subgenital plate of equal width in both basal and caudal sections. Projections from lateral

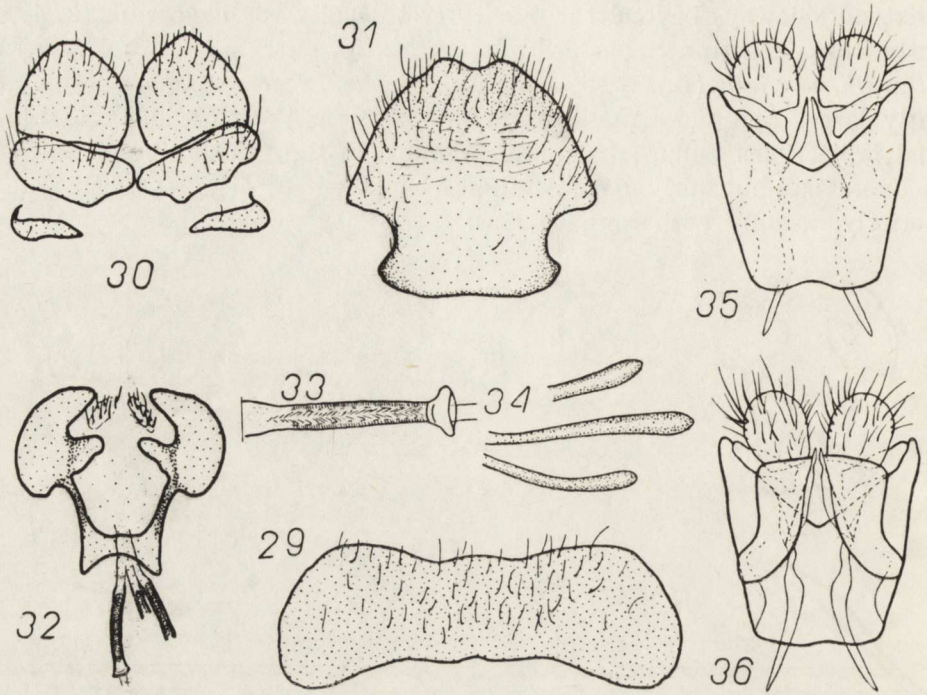


Fig. 29-36. Copulatory apparatus of *Ch. hispanica* (SZIL.): 29-34 Female. 35-36 Male [35 — view from ventral side. 36 — view from dorsal side] (from explanation see fig. 2-9).

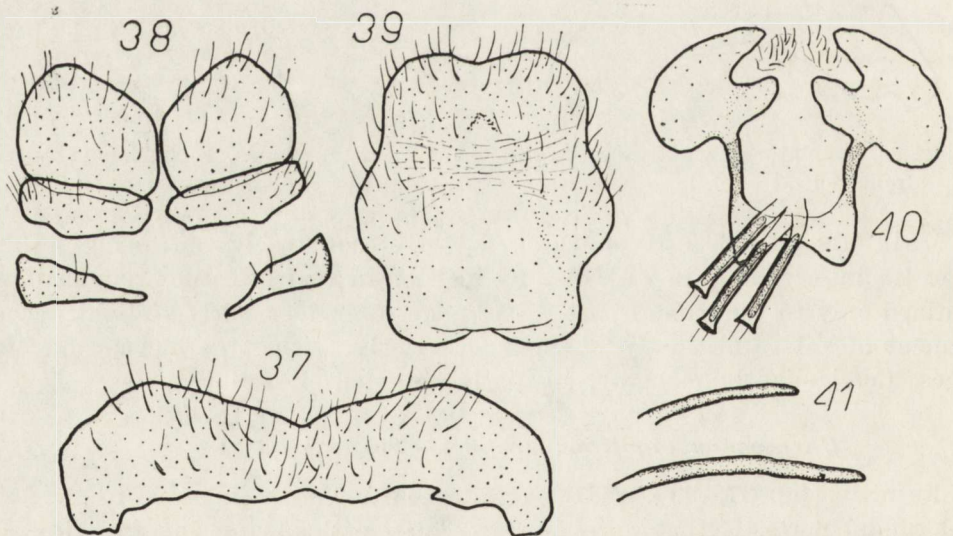


Fig. 37-41. Female copulatory apparatus of *Ch. bigoti monspellensis* (VILL.) (for explanation see fig. 2-7).

parts rounded. Basal end of plate with distinct incision. Genital plate very compact, with lateral connective parts short, strongly thickened. Caudal part of genital plate large, wide, with inner and apical projections blunt. Spine-bearing tubercles wide, spines not very strong, somewhat irregularly arranged. Seminal receptacles narrow and long. Pubescence of the various parts of copulatory apparatus slight.

CONCLUSIONS

The taxonomic characters of the Polish species of the genus *Chrysozona* MEIGEN reveal wide variability when a large amount of material is examined. If the morphological differences between species are conspicuous the identification of each individual is easy, but where these differences are small, and, as in the case of *Ch. hispanica* (SZIL.) and *Ch. pluvialis* (L.), they show considerable variation, the situation becomes complicated. Sometimes there would appear to be a case of transition, through a series of intermediate forms, from one species to another. This is especially distinct in the case of the structure of the antennae, although other features reveal this transition as well. One of the taxonomic criteria considered to be important is the structure of the copulatory apparatus of both males and females. There are no stable differences in the structure of the copulatory apparatus between females of certain species of *Chrysozona* MEIGEN. Only in *Ch. italica* (MEIG.) and *Ch. crassicornis* (WAHLB.) the copulatory apparatus of both male and female forms a reliable character enabling this species to be distinguished from the others. In *Ch. hispanica* (SZIL.) and *Ch. pluvialis* (L.) certain, rather small, differences, in the genitalia of the females, become apparent when a large amount of material is compared. This character cannot therefore be used for identification of single female specimens. It is far easier to determine the males on the basis of structure of the copulatory apparatus, but on account of the smaller number of individuals used for analysis it is impossible to establish in which way and to what degree the intraspecific variability in genitalia is expressed. It will not be possible to speak of the decisive suitability of the copulatory apparatus as a criterion in the taxonomy of the genus *Chrysozona* MEIGEN until a good knowledge has been obtained of all, or at least of the majority of the representatives of this genus. Nevertheless, the structure of the copulatory apparatus can now be regarded as yet another taxonomic criterion, but one which does not, however, permit the identification of species in every case. *Ch. pluvialis* (L.) and *Ch. hispanica* (SZIL.) differ, in addition to morphological characters, by many biological ones such as time of occurrence of imagines, dependence of flight activity on temperature, and distribution in a given area. The results which I obtained with regard to *Ch. pluvialis* (L.) and *Ch. hispanica* (SZIL.) agree in their general outlines with those obtained by TROJAN (1958) in his investigations of these two species.

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STRESZCZENIE

Na przykładzie dwu blisko spokrewnionych gatunków: *Chrysozona hispanica* (SZIL.) i *Chrysozona pluvialis* (L.) dokonano analizy cech taksonomicznych dotychczas wykorzystywanych w obrębie rodzaju *Chrysozona* MEIGEN. Stwierdzono, że zakresy zmienności wewnątrzgatunkowej tych cech są bardzo szerokie i zachodzą na siebie, pozwalając przez to na rozróżnianie gatunków dopiero przy zestawieniu większej ilości materiału. Dokonując przeglądu sześciu występujących w Polsce gatunków z rodzaju *Chrysozona* MEIGEN. [*Ch. italica* (MEIG.), *Ch. variegata* (FABR.), *Ch. crassicornis* (WAHLB.), *Ch. pluvialis* (L.),

Ch. hispanica (SZIL.), *Ch. bigoti monspellensis* (VILL.)], przeprowadzono także próbę rozróżniania ich na podstawie budowy aparatów kopulacyjnych zarówno samczych, jak i samiczych. Kryterium to zawiodło odnośnie do samiec *Ch. hispanica* (SZIL.) i *Ch. pluvialis* (L.).

РЕЗЮМЕ

На примере двух близкородственных видов *Ch. hispanica* (SZIL.) и *Ch. pluvialis* (L.) автор производит анализ систематических признаков, используемых до сего времени при определении видов рода *Chrysozona* MEIGEN. Установлено, что границы внутривидовой изменчивости этих признаков настолько широки, что заходят друг на друга, а различить отдельные виды можно только при сопоставлении большего количества материала. Просматривая шесть встречающихся в Польше видов рода *Chrysozona* MEIGEN — *Ch. italiaca* (MEIG.), *Ch. variegata* (FABR.), *Ch. crassicornis* (WANLB.), *Ch. pluvialis* (L.), *Ch. hispanica* (SZIL.), *Ch. bigoti monspellensis* (VILL.) — автор пробует различить их на основании строения копуляционных аппаратов как самцов, так и самок. Критерий этот не оправдал себя в отношении самок *Ch. hispanica* (SZIL.) и *Ch. pluvialis* (L.).

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