

Elżbieta PODSIADŁO

Variation in the taxonomic characters of the fore wings and antennae in females of *Habrolepis dalmani* (WESTWOOD, 1837) (*Hymenoptera, Chalcidoidea, Encyrtidae*)

[With 5 figures in the text]

Abstract. The taxonomic characters of the fore wings and antennae in *Habrolepis dalmani* (WESTWOOD, 1837) demonstrate a great variation. The characters of *Habrolepis italicus* DELUCCHI, 1965 fall within the range of this variation and that is the reason why the status of *H. italicus* as a good distinct species has not been proved sufficiently.

INTRODUCTION

Species of the genus *Habrolepis* FOERSTER are identified on the basis of the characters of the fore wings and antennae in females (DELUCCHI 1965). This was the basis on which *Habrolepis italicus* DELUCCHI, 1965, very similar to *Habrolepis dalmani* (WESTWOOD, 1837), was described as a new species. However, *H. dalmani* females collected in Poland show a great variation in these characters and therefore many should be assigned to *H. italicus*.

The pattern of infuscation of the distal parts in the fore wings in *H. dalmani* females is presented in Fig. 1, and their antennae in Fig. 2. In *H. dalmani* described after the key of DELUCCHI (1965) the distance (D) between the hyaline medio-anterior area (ZMA) and the hyaline medio-posterior one (ZMP) is bigger than the length of each of these areas; the maximum width of the infuscated apical area (ZA) is generally larger than the width of the hyaline subapical band (BS); the hyaline medio-posterior area (ZMP) does not widen towards the centre of the wing; each of the segments I-III of the antennal funicle (funiculus) is usually 1.5 times as wide as it is long.

According to DELUCCHI (1965) the fore wings in *H. italicus* have alternative characters and that means: distance (D) smaller than the length of ZMA and ZMP; the maximum width of ZA generally smaller than the breadth of BS; area ZMP widening towards the centre of the wing. Antennal funicle segments I-III twice as wide as they are long.

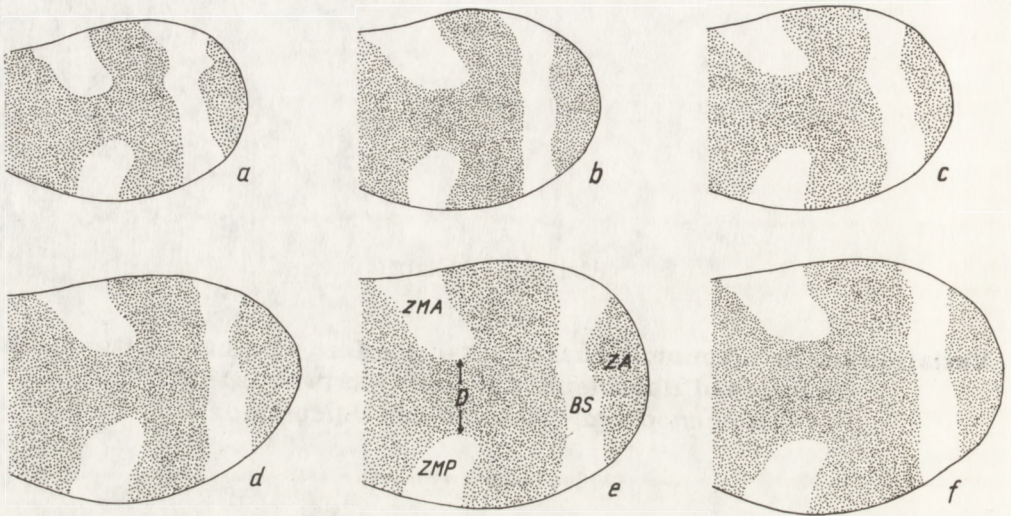


Fig. 1. Variation in the infuscation of the distal part of the fore wings in the females of *Habrolepis dalmani*: a, b, c - wings of the females of the summer generation; d, e, f - wings of the females of the overwintering generation, ZMA - hyaline medio-anterior area, ZMP - hyaline medio-posterior area, BS - hyaline subapical band; ZA - infuscated apical area, D - distance between the hyaline medio-anterior area and the hyaline medio-posterior area.

Similar hosts are also a factor that makes these two forms close to each other. Only these two have scale insects of the genus *Asterodiaspis* (formerly *Asterolecanium*) as hosts, all the other species of *Habrolepis* parasitize in diaspidine scale insects (*Diaspididae*).

H. dalmani is a European species, now widespread in many parts of the world. *H. italicus* has so far been recorded in the region of the Mediterranean Sea (DELUCCHI 1965) and in the Crimea (TRJAPIZIN 1978).

The biology of *H. dalmani* has been investigated (PODSIADŁO 1986). It has been found out that under the conditions of our climate the species generally has two generations a year: one overwintering and one in summer, and that females of the summer generation are slightly smaller than those of the overwintering generation. The biology of *H. italicus* remains unknown.

The present investigations were designed to study the variation in the taxonomic characters of the fore wings and antennae in *H. dalmani* females of both generations collected in Poland.

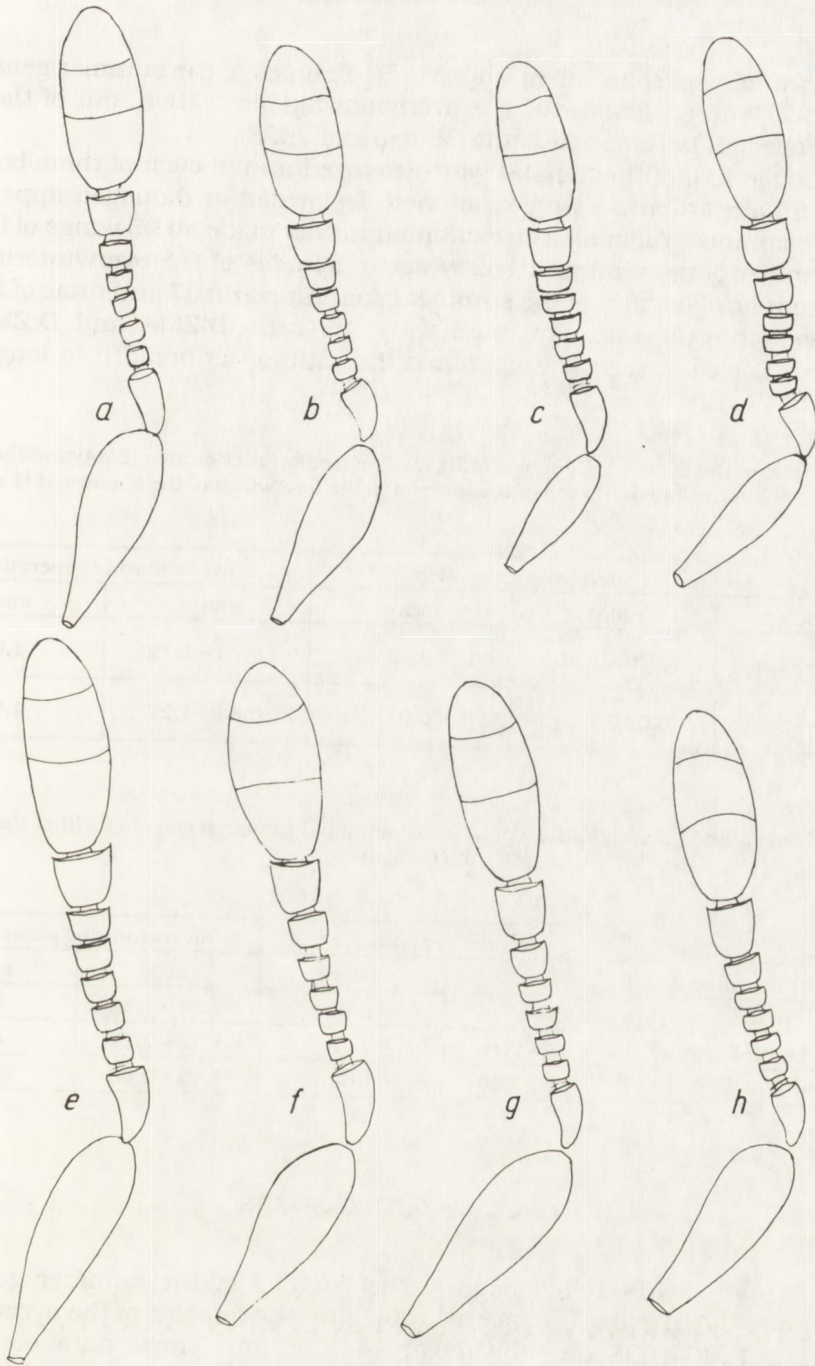


Fig. 2. Shape variation of the antennal segments in the females of *Habrolepis dalmani*: a, b, c, d – antennae of the females of the summer generation; e, f, g, h – antennae of the females of the overwintering generation.

MATERIAL AND METHOD

The material was collected in Warsaw: 51 females of the summer generation in July 1977 and 51 females of the overwintering generation, out of the latter 16 were collected in June 1982 and 35 in June 1988.

The body length of the females was measured and in each of them both fore wings and both antennae were examined. Deformed or damaged appendages were not examined. All in all, the examination was made on 95 wings of females of the summer generation and 102 wings of females of the overwintering one, on 91 antennae of females of the summer generation and 97 antennae of females of the overwintering one. For each wing the ratio D:ZMA and D:ZMP was calculated. For each segment examined the ratio of its breadth to length was calculated.

Table 1. Ratio of the distance (D) between the hyaline medio-anterior area (ZMA) and the posterior one (ZMP) to the length of each of these areas in the fore wings of the females of *H. dalmani*

ratio	summer generation		overwintering generation	
	range	mean	range	mean
$\frac{D}{ZMA}$	0.76 - 1.05	0.89	0.76 - 1.19	1.00
$\frac{D}{ZMP}$	0.68 - 1.18	0.91	0.84 - 1.27	1.07

Table 2. Ratio of the breadth to the length in the antennal funicle segments I - III of the females of *H. dalmani*

number of segment	summer generation		overwintering generation	
	range	mean	range	mean
first	1.25 - 2.05	1.58	1.20 - 1.92	1.50
second	1.37 - 2.18	1.67	1.32 - 2.17	1.59
third	1.37 - 2.00	1.68	1.45 - 2.08	1.61

ANALYSIS OF THE RESULTS

Body length (without ovipositor). The females of the summer generation measured 896-1372 μm , the mean 1105.1 μm ; the females of the overwintering generation 1106-1638 μm , the mean 1440.9 μm . These data confirm the author's previous results (PODSIADŁO 1986) showing that females of the overwintering generation reached a body size slightly bigger than that recorded in females of the summer generation.

Fore wings. The ratio of the distance between areas ZMA and ZMP to the length of each of these areas is considered to be the most important taxonomic character of *H. dalmani* and *H. italicus* females.

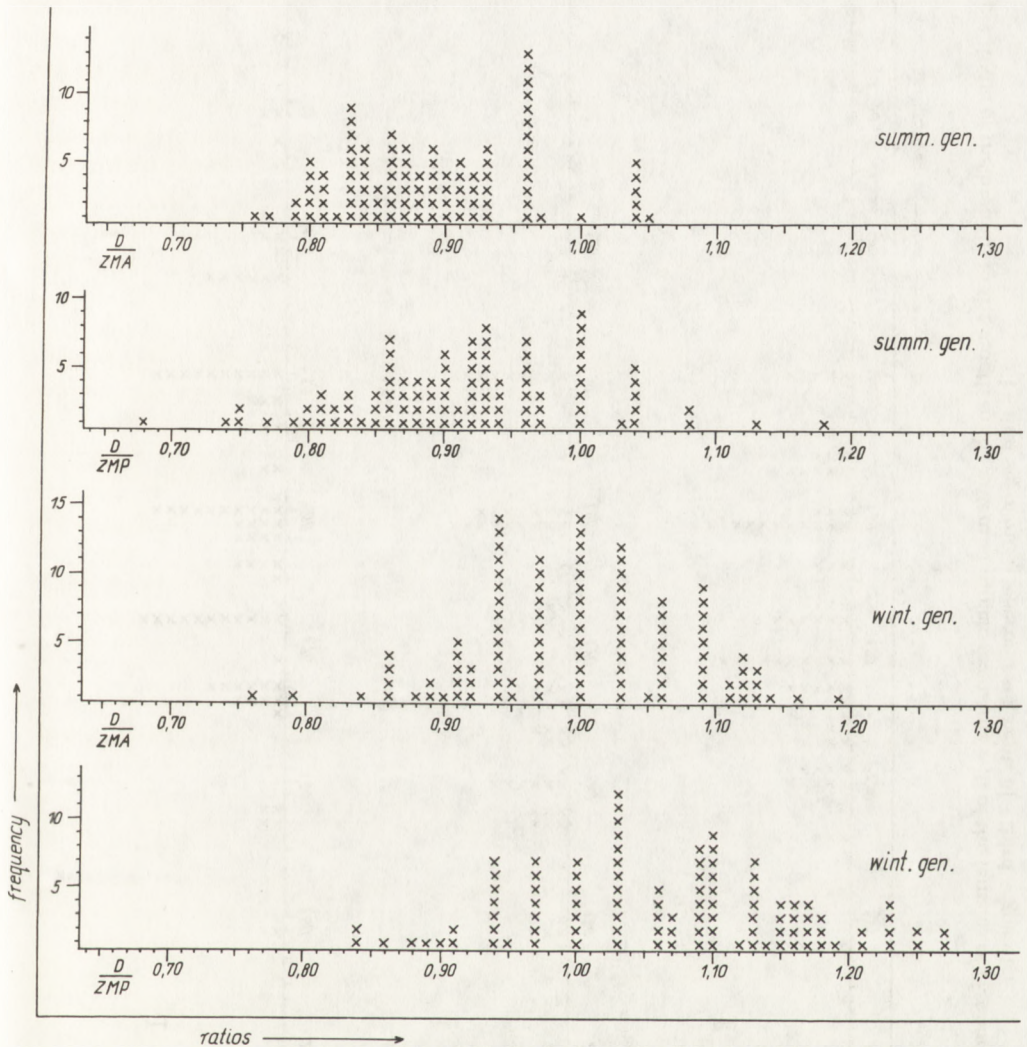


Fig. 3. Ratio of the distance (D) between the hyaline medio-anterior area (ZMA) and the posterior one (ZMP) to the length of each of these areas in the fore wings of the females of *H. dalmani*. summ. gen. - wings of the females of the summer generation, wint. gen. - wings of the females of the overwintering generation.

If the value of this ratio is bigger than 1 it means that the distance is larger than the length of a given area, and this, according to DELUCCHI, is a character of *H. dalmani*; however, when smaller than 1, the value of this ratio means that the distance is shorter than the length of a given area, thus being, according to the same author, a character of *H. italicus*.

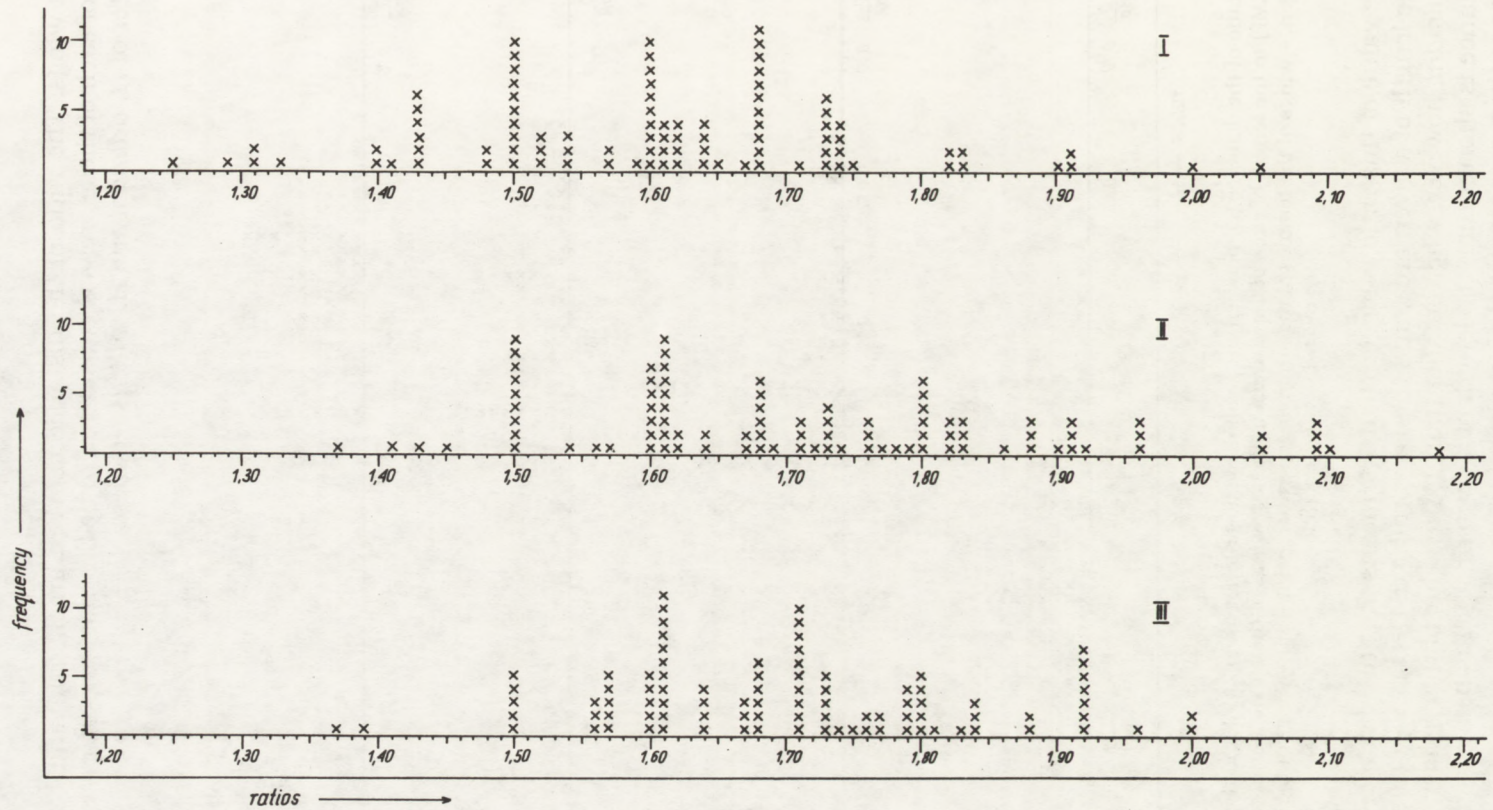


Fig. 4. Ratio of the breadth to the length in the antennal funicle segments I-III of the females of *H. dalmani* in the summer generation. I - first segment, II - second segment, III - third segment.

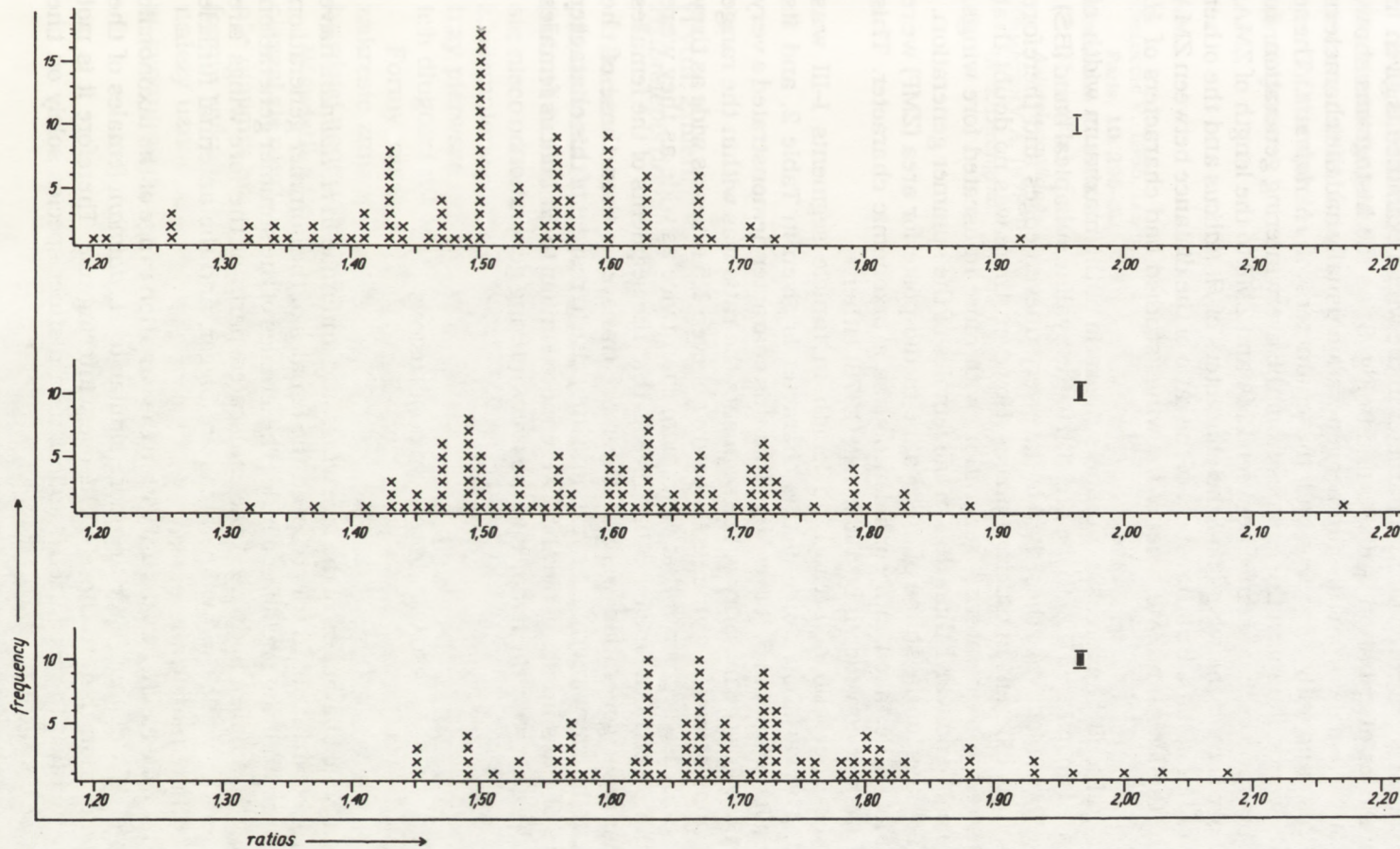


Fig. 5. Ratio of the breadth to the length in the antennal funicle segments I-III of the females of *H. dalmani* in the overwintering generation. Symbols I-III as in Fig. 4.

The range of the variation of this character in the wings examined is given in Table 1, while its distribution is illustrated in Fig. 3. As the histograms show, the wings of the females from the summer generation usually had the characters of *H. italicus*, and only very few had the characters of *H. dalmani*. These proportions were different in the females from the overwintering generation. In respect of the ratio of the distance between ZMA and ZMP to the length of ZMA, almost 50 per cent of the wings had the characters of *H. italicus* and the other half those of *H. dalmani*. But in respect of the ratio of the distance between ZMA and ZMP to the length of ZMP most of the wings studied had characters of *H. dalmani*.

It is very difficult to express in numbers the ratio of the maximum width of the infuscated apical area (ZA) to the breadth of the hyaline subapical band (BS). This is due to the fact that these bands have very uneven edges and therefore their breadth is different in different places. However, there was no doubt that the females of the overwintering generation, with more infuscated fore wings, had the apical band wider than that in the females of the summer generation.

The differences in the shape of the hyaline medio-posterior area (ZMP) were too indistinct to be taken into consideration as a taxonomic character. This character was not considered by TRJAPITZIN (1978) either.

Antennae. The ratio of breadth to length in funicle segments I-III was calculated. The variation range of this character is given in Table 2, and its distribution in Figs 4 and 5. It is evident that this character demonstrated a very high variation. For the majority of the segments the ratio was within the range 1.5-2, but there occurred segments that were not even 1.5 times as wide as they were long, and also segments that were more than twice as wide as they were long. A comparison of the mean values reveals that the segments of the females from the summer generation were a little more transverse than those of the females from the overwintering generation. Thus, also in respect of this character the females of the summer generation were more similar to *H. italicus* females than was the case with the females of the overwintering generation.

RECAPITULATION AND CONCLUSIONS

The taxonomic characters of the fore wings and antennae in *H. dalmani* have a wide range of variation. In this respect, the females of the summer generation and of the overwintering one differ a little. The females of the summer generation have a slightly smaller body size, the infuscated parts of the fore wings are relatively smaller while the hyaline areas are bigger, and the antennal funicle segments I-III are more transverse.

Forms described as *H. italicus* fall within the variation range of the taxonomic characters of *H. dalmani*. They are more similar to *H. dalmani* females of the summer generation than to those of the overwintering one. Therefore it is not sufficiently justified to recognize *H. italicus* as a distinct species solely on the basis of these characters.

If further studies on type-specimens of *H. italicus* do not reveal some other discriminating characters and if studies on the biology of this form prove that it does not differ from the biology of *H. dalmani*, this form should be considered part of the species *H. dalmani* and the name *H. italicus* should be listed in the synonyms.

REFERENCES

- DELUCCHI V. 1965. Les *Habrolepis* FOERSTER, 1856 (*Hym.*, *Chalcidoidea*, *Encyrtidae*). *Entomophaga*, Paris, **10**: 295–304.
- PODSIADŁO E. 1986. Morpho-biological studies on primary parasites (*Hymenoptera*, *Chalcidoidea*, *Encyrtidae*) of scale insects from the genus *Asterodiaspis* SIGNORET (*Homoptera*, *Coccoidea*, *Asterolecaniidae*) in Poland. *Ann. zool.*, Warszawa, **40**: 255–296.
- TRJAPITZIN V. A. 1978. *Encyrtidae*. In: *Opredelitel' nasekomyh evropejskoj časti SSSR. Perepončatokrylye*, III, 2. Leningrad, pp. 236–328.

Katedra Zoologii SGGW-AR
ul. Nowoursynowska 166
02-766 Warszawa

STRESZCZENIE

[Tytuł: Zmienność taksonomicznych cech przednich skrzydeł i czułek u samic *Habrolepis dalmani* (WESTWOOD, 1837) (*Hymenoptera*, *Chalcidoidea*, *Encyrtidae*)]

Badano cechy taksonomiczne przednich skrzydeł i czułek u samic *Habrolepis dalmani* (WESTWOOD). Stwierdzono, że mają one szeroki zakres zmienności (tab. 1 i 2). Pod względem tych cech samice pokolenia letniego i zimującego różnią się nieco od siebie. Samice pokolenia letniego mają nieco mniejsze wymiary ciała, zaciemnione partie skrzydeł stosunkowo mniejsze, a przezroczyste pola większe, trzy pierwsze człony biczyka czułek (funiculus) nieco szersze w stosunku do ich długości niż samice pokolenia zimującego.

Formy opisane jako *Habrolepis italicus* DELUCCHI, 1965 mieszczą się w zakresie zmienności cech taksonomicznych *H. dalmani* (rys. 3, 4 i 5). Są one bardziej podobne do samic pokolenia letniego niż zimującego.

W świetle przeprowadzonych badań status *H. italicus* jako odrębnego gatunku okazał się nie dość uzasadniony. Toteż, jeśli badania okazów typowych *H. italicus* nie ujawnią jakichś innych cech odróżniających i jeśli badania nad biologią tej formy wykażą, że nie różni się ona od biologii *H. dalmani*, wówczas formę tę należy uznać za należącą do gatunku *H. dalmani*, a nazwę *H. italicus* umieścić w synonimach.