

On *Hylastes ater* Payk. and *Hylastes brunneus* Er. (Col. Scolytidae)

By BERTIL LEKANDER

According to the Catalogue of the Beetles of Fennoscandia from 1939 (Hellen and others), both *Hylastes ater* Payk. and *H. brunneus* Er. are to be found in Finland, whilst only *ater* is recorded from the other Nordic countries. Strand, in a paper published in 1953, mentioned that he had looked long and in vain for *brunneus* in Norway. Comparing his beetles with specimens from England, however, he found to his surprise, that all his Norwegian specimens were not *ater* but *brunneus*. He checked his identifications by comparison with Paykull's type specimen of *ater*, which, according to Strand, was similar to the English specimens of *ater*. He concluded that *ater* was not present in Norway.

The year after Strand's communication, Hansen (1954) published the results of his thorough analysis of the *Hylastes* species found in the Nordic countries. He stated, among other things, that, in Scandinavia, the two species *ater* and *brunneus* had been confused under the name *ater*. Investigation of the penis and other morphological details proved, however, that two species were indeed involved. He confirmed his identification of *brunneus* by investigation of Erichson's type specimen.

From Hansen's paper it is quite obvious that in Scandinavia there are two species, *ater* Payk., and *brunneus* Er. *Ater* is absent in Finland and Norway, is rare in Sweden and confined mainly to the southern part of the country, and has been found in a few localities only in Denmark: *Brunneus* Er. is common all over the Nordic countries. Such a distribution was accepted in the last Catalogue of the Beetles of Fennoscandia (Hansen and others, 1957).

The Nordic forest entomologists, too, have, with some hesitation, accepted this reappraisal of the two species. In my opinion there are several reasons why forest entomologists have been particularly hesitant to change the name of one of the commonest forest insects to be found all over the Nordic countries. To begin with, we were not very happy to change a name which has been used in scientific works and textbooks for so long, and we would, therefore, have preferred to wait and see if the proposed change of names was valid. Secondly, it did not seem probable that Paykull, who collected mainly in Uppland, Central Sweden, would have found and described a species which is not only very rare generally but is not recorded for that province. Unfortunately, it is not certain from his papers or collection from where his

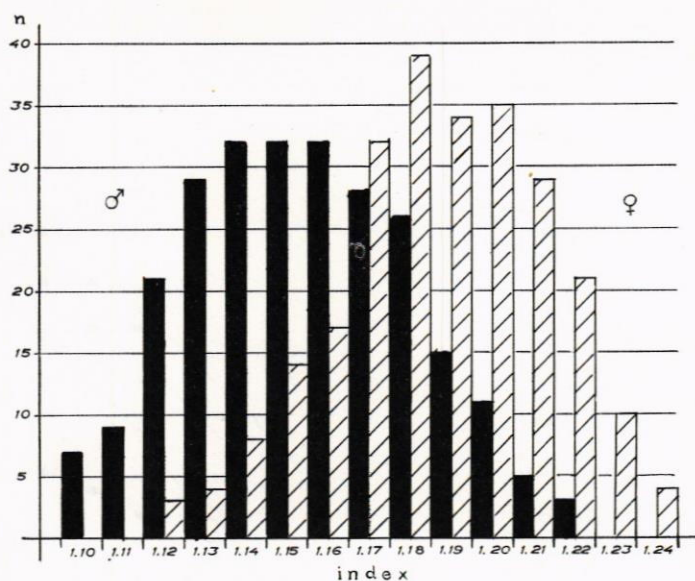


Fig. 1. *Hylastes brunneus*. Index of the pronotum, derived from 250 males (black) and 250 females (hatched).

insects had come. It does seem odd, however, that the single specimen (see later) in his collection should be a species that, at least today, is very seldom seen, and not the one that is so common everywhere. Finally, it proved difficult to distinguish the two species, especially as several morphological characters in the common species in Sweden vary within wide limits.

This investigation was made, therefore, in order to obtain some idea of these variations, and to detail the main differences between the two species in question.

Some modern systematists' view on Hylastes ater and brunneus

To begin with let us assume that the common Nordic species is *H. brunneus* Er. and the rare one *H. ater* Payk. I will give the reasons for my acceptance of this being the case after describing my material. Firstly, however, I will summarise the characteristics given by some modern systematists for distinguishing the two species. The following has been abstracted from Hansen 1954 (H), Nunberg 1954 (N), Pfeffer 1955 (P), Strand 1953 (S) and Reitter 1916 (R).

ater Payk.

brunneus Er.

Pronotum

1.11—1.20 × longer than broad . . . (P)	1.07—1.12 × longer than broad . . . (P)
1.15—1.25 × longer than broad . . . (N)	a little longer than broad (R)
distinctly longer than broad (R)	usually as long as broad (H)
more extended in length than <i>brunneus</i> (S)	broadest behind the middle (R)

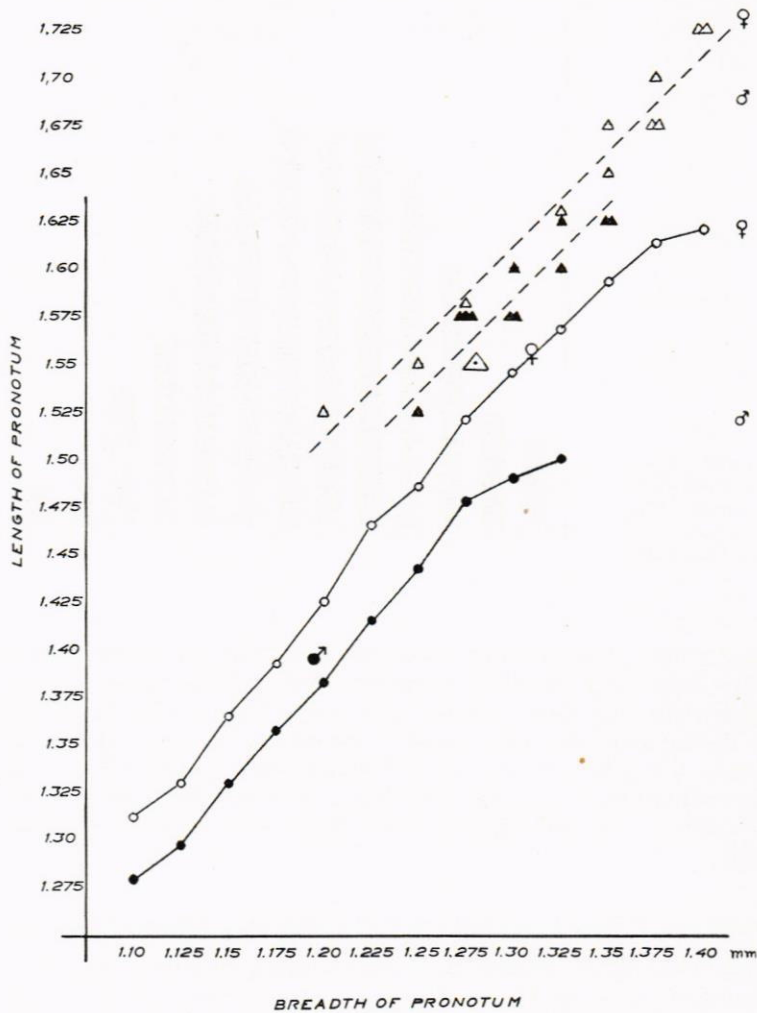


Fig. 2. The relationship between pronotum length and breadth.

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|------------------|----------------------------------|
| Black points: | <i>Hylastes brunneus</i> , males |
| Rings: | — — females |
| Male sign: | — — type |
| Female sign: | — — paratype |
| Black triangles: | <i>Hylastes ater</i> , males |
| Open triangles: | — — females |
| Big triangle: | — — type |

ater Payk.

brunneus Er.

- | | |
|--|--|
| sides slender, rounded (P) | not so long as <i>ater</i> (S) |
| sides more parallel than <i>brunneus</i> (S) | |
| sides almost parallel (R) | |

ater Payk.*brunneus* Er.*Elytra*

1.85—1.95 × longer than broad . . . (P)	twice as long as double breadth . . . (R)
distinctly longer than broad (R)	not so elongate as <i>ater</i> (S)
more extended in length than <i>brun-</i>	
<i>neus</i> (S)	apical region with more hair (S)
a little more extended in length than	interstices shining without micro-
<i>brunneus</i> (H)	reticulation (S, H)
apical region with not so much hair (S)	interstices somewhat broader than
	striae (P)
interstices micro-reticulate, dull (S, H)	interstices distinctly transversely
	waved with slender asperations in
	irregular rows (P)
interstices twice as broad as striae (P)	
interstices slender transversely	
waved with small asperations in	
irregular rows (P)	

Colour

shining black (H)	brown-black brown (H)
black (R)	rusty brown-brown black (R)

Penis

without strong constriction of the	with strong constriction of the api-
apical part (H)	cal part (H)

Length

3—5 mm (H)	3.5—5 mm (H)
4.5—4.8 mm (R)	4 mm (R)
3.8—4.8 mm (P)	3.5—3.8 mm (P)

The foregoing survey attempts to summarise the characteristic features of the two species noted by other authors. Each will be commented upon individually in the following account of my investigation of materials from Sweden and south England.

The Swedish material

The Swedish material was collected at Yxviken sawmill, ca 5 km north of Finspång in the northern part of Östergötland. For a short while in early summer *H. brunneus* may be commonly found crawling about on fresh heaps of sawdust, very often with *Hyllobius abietis*. In June 1956 several thousand insects were collected from such a site, and from them, 250 males and 250 females were picked out at random.

With the aid of an ocular micrometer scale in a microscope, at a magnification of 40×, measurements were made of the length and breadth of the

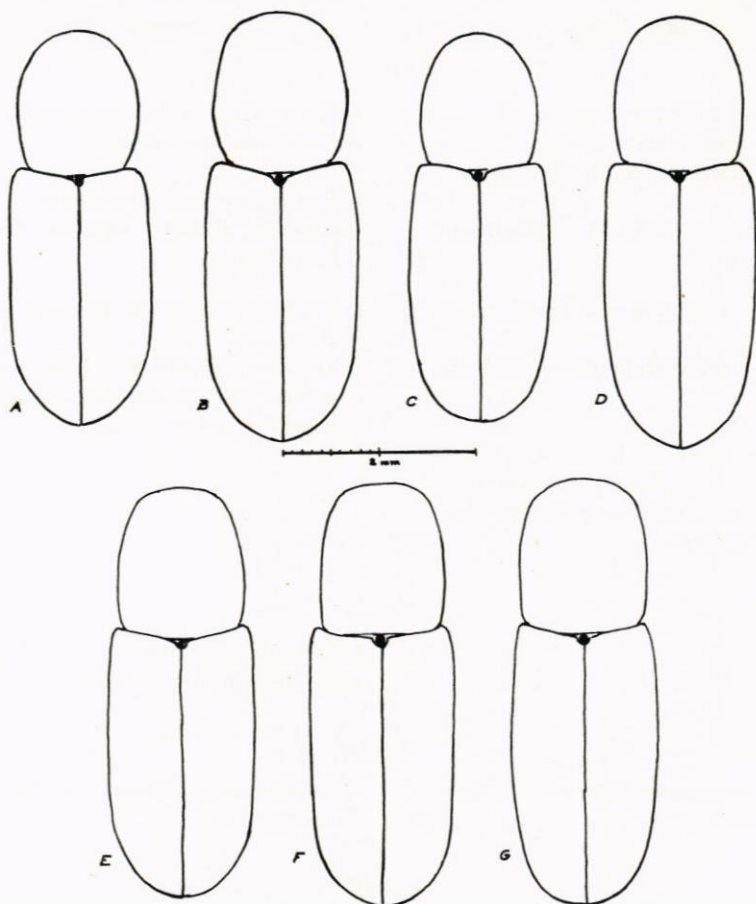


Fig. 3. *Hylastes brunneus*, Swedish population: A male, B female, C Erichson's type (male), D Erichson's paratype (female). *Hylastes ater*, English population: E male, F female, G Paykull's type (female).

pronotum, and the length and double breadth of the elytra. The distance from the anterior margin of the pronotum to the apex of the elytra was also measured. The "indices" of the pronotum and elytra were then calculated by dividing the lengths by the corresponding breadths.

Pronotum. The proportions of the pronotum are of diagnostic importance in distinguishing the two species. Measurements made on the Swedish material show that there is a definite difference between males and females. The pronotum of the males is, on average, shorter and broader than that of the females, which is quite obvious from fig. 1. The index of the males varied between 1.10 and 1.22, average 1.154 ± 0.027 , and of the females between 1.12 and 1.24, average 1.187 ± 0.025 .

In order to test whether the index was constant throughout the range of the population, the curves in fig. 2 were constructed for mean values of

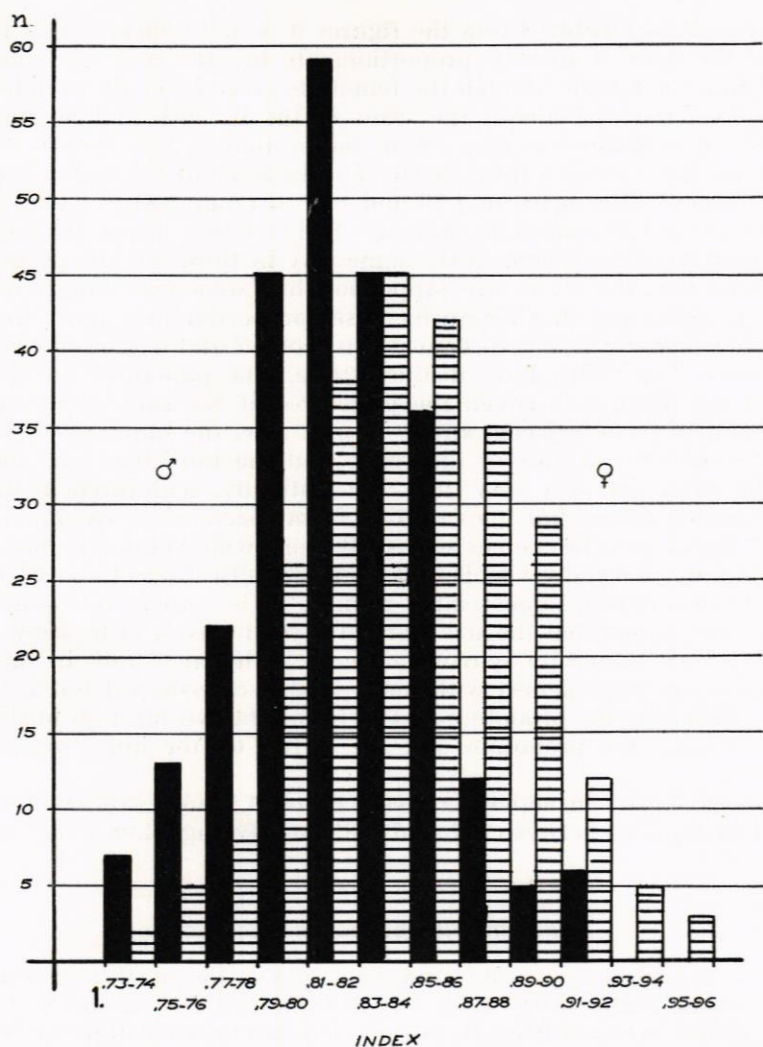


Fig. 4. *Hylastes brunneus*. Index of the elytra, derived from 250 males (black) and 250 females (hatched).

length calculated from the breadth of the pronotum. The curve for females runs higher than that for males, showing clearly that the pronotum of females is proportionately longer and more slender. Further, the curves show that the length increases in direct proportion to the breadth. Only at the extremes do the curves level out to some extent, but the conclusion that length increases less than does breadth at these values must only be tentative in view of the paucity of data.

The shape of the pronotum of both male and female may be seen from fig. 3 A and B. The specimens have been chosen to approximate as closely

to the average as possible. From the figures it is quite obvious that the pronotum of the male is shorter, proportionately broader and has sides more rounded than the female, though the female too has distinctly rounded sides.

Elytra. Differences between the sexes in the breadth and length of the elytra are not so distinct as they are in the pronotum, but there is clearly a tendency for them to be a little shorter and broader in the males, see fig. 4. The male index varies between 1.73 and 1.92, average 1.812 ± 0.038 , and the female between 1.73 and 1.92, average 1.847 ± 0.042 . From the curves of fig. 5, which were calculated in the same way as those for the pronotum, it may be seen that the elytra are proportionately somewhat longer and narrower in females, and that length increases proportionately more than does breadth. In other words, big specimens have longer and narrower wings than smaller ones. The elytra have distinct striae. The punctures are generally large and the distance between the punctures of the same stria, and that between punctures of adjacent striae, is, as a rule, the same, see fig. 6 A, B. In other words, the widths of the striae and the interstices are about the same. The striae are only very little, but distinctly, sculptured in the form of low, rounded ridges, but the variation from specimen to specimen is considerable. Further the interstices are usually somewhat shiny and have a faint micro-sculpture, normally visible only at a magnification of ca 100 \times . Individuals may vary from almost shiny to more or less micro-reticulate. Intermediates are common but the striae are always at least a little shiny.

The elytra are generally sparsely covered with hairs, and, in the apical region, these are interspersed with many small scale-shaped hairs, fig. 6 F.

Colour. Generally the pronotum and elytra are brown black to black. Quite often, anteriorly, the pronotum and the elytra, on the inner margins, are rusty brown.

The length. Varies in males between 3.6 and 4.5 mm, average 4.03 ± 0.16 mm, and in females between 3.7 and 4.8 mm, average 4.28 ± 0.21 mm, see fig. 7.

The material from south England

In England both species are found, *brunneus* in the north and south, and *ater* only in the south, Duffy 1953. I have examined 22 specimens (11 males and 11 females) received from D. Bevan, collected at Bramshill, Surrey, June 1964. The material was, of course, too small for statistical analysis, but quite sufficient for comparison with beetles from central Sweden.

The *Pronotum* is consistently proportionately longer and narrower than the Swedish material. The eleven males had an average index of 1.22 (1.20—1.24) and the females, 1.23 (1.22—1.27). These values have been included in fig. 2 (males black triangles, females open triangles) and it may be clearly seen that the values are considerably higher than for the Swedish material.

The shapes of the pronota appear in fig. 3 E, F and, comparing them with the Swedish specimens, are seen to have a quite different form. The sides are only very slightly rounded and are almost parallel in fact. However, the most important difference between the two species in question lies in the posterior part of the pronotum of *brunneus* being distinctly tapered towards the base, whilst in *ater* the taper is at most only very slight.

Elytra. The index of the elytra too is higher than that for the Swedish

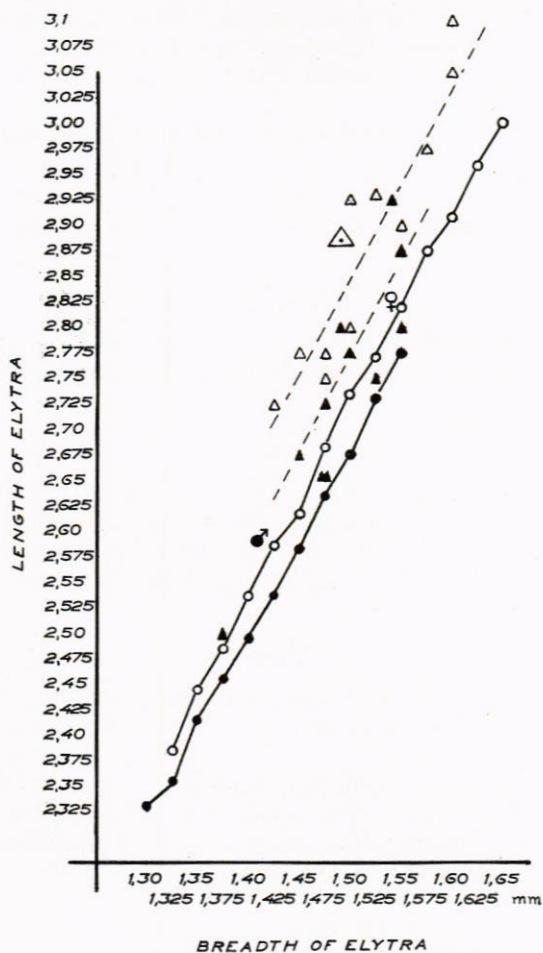


Fig. 5. The relationship between elytra length and breadth.

Black points:	<i>Hylastes brunneus</i> , males
Rings:	— — females
Male sign:	— — type
Female sign:	— — paratype
Black triangles:	<i>Hylastes ater</i> , males
Open triangles:	— — females
Big triangle:	— — type

material, fig. 5, and is for the male on average 1.83 (1.80—1.89), and for the female, 1.89 (1.86—1.95). The striae are very obviously different from the Swedish material, the punctuations being smaller, fig. 6 C and the distance between the striae being ca. twice the diameter of the punctures. In general, the interstices are smooth, but there is the suggestion of low ridges and asperations. The interstices are, however, distinctly micro-reticulate, so that they appear not shiny but dull.

The scale-like hairs on the apical region of the elytra have been lacking, fig. 6 G, in all the specimens I have had at my disposal.

The average length of the males was 4.32 mm (4.0—4.5) and of the females 4.54 mm (4.3—4.8).

A summary of the characteristics of the Swedish and English material will be found below.

The English Material
H. ater

The Swedish Material
H. brunneus

Pronotum

Male on average 1.22, female 1.23 × longer than broad, sides almost parallel.	Male on average 1.15, female 1.19 × longer than broad, sides rounded.
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Elytra

Male on average 1.83, female 1.89 × longer than twice the breadth, interstices clearly micro-reticulate, dull twice as broad as striae punctures.	Male on average 1.81, female 1.85 × longer than twice the breadth, interstices slender micro-reticulate, shiny, as broad as the stria, punctures big.
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Length

On average males 4.32 mm	On average males 4.02 mm
females 4.54 mm	females 4.28 mm

This summary of the characteristic features of the two shows that there are some quite distinct differences between them. In order to make a clear statement upon the nomenclature, therefore, a comparison with Paykull's and Erichson's type specimens was carried out.

Paykull's description of Hylastes ater

In Fauna Suecica, Insecta, tomus III, printed in Upsala 1800, Paykull described a species of bark beetle under the name *Bostr. (ichus) Ater* which, translated from the latin, reads as follows: — "Almost without hair, black, dull, elytra twice as long as broad, striated, interstices rugose. Lives under pine bark".

His comments to this description, very short and so typical of the times, are as follows: — "*Head* black, punctured, bent downwards, antennae reddish, *Thorax* black, as the preceding species (*piniperda*), but more closely and deeply punctured. *Scutellum* punctiform, black. *Elytra* black, broad ca. twice as long as thorax, convexo-cylindrical, striated, interstices closely rugose. *Wings* white, transparent, with dark nerves, *chest* and *abdomen* black. *Legs* black brown-black, *tibia* extended, sawlike toothed, tarsi paler. Hardly as big as the preceding species. Eyes with very short, fine, greyish hairs".

To this description Paykull added a "Var. B": "Black brown-black, the dorsal side of thorax, elytra and legs rusty brown".

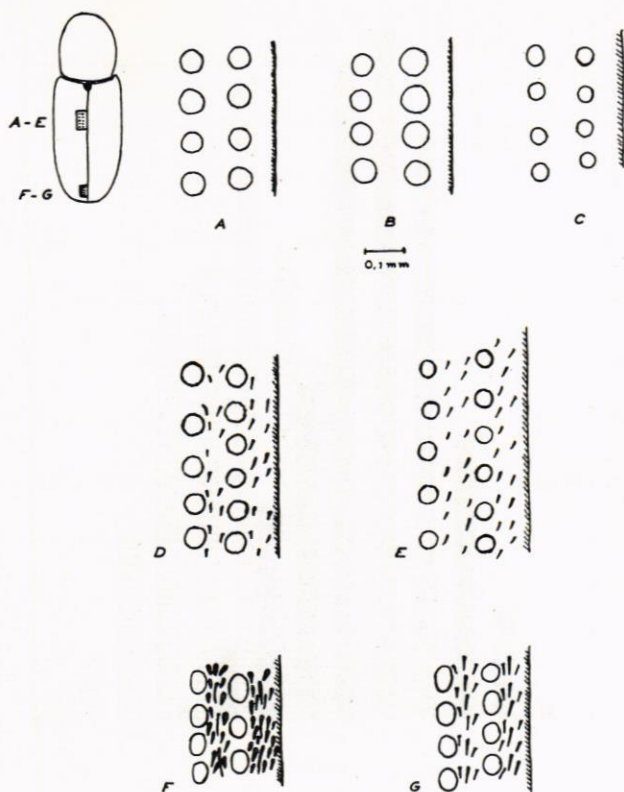


Fig. 6. Parts of two striae of: A Swedish population of *Hylastes brunneus*, male, B female. C English population of *Hylastes ater*. D, F Erichson's type of *Hylastes brunneus*. E, G Paykull's type of *Hylastes ater*. The position of the striae is shown on the schematic figure.

These descriptions do not tell us very much, and fail to provide a clear enough picture of the species. In Paykull's collection, which has been kept unaltered at the Museum of Natural History in Stockholm, there are three specimens under the name of *Bostrichus ater* and four more under "Var. B". A close study of these has shown, unexpectedly, that among the three specimens hidden under the name of *ater* are — according to modern systematic view — three different species, viz. *Hylastes cunicularius* Er., *H. opacus* Er. and *H. ater*. All four of those under Var. B are *Hylurgops palliatus* Gyll.

The only way to bring order and system into the situation was to choose one of these specimens as a lectotype. Obviously it was most convenient to select that specimen which, according to the view of modern systematists, corresponds to our conception of the species *ater* Payk. A new description of it was then made, and is as follows: —

New description of Hylastes ater Payk

Oblong, cylindrical, 4.4 mm long. Head bent downward, black distinctly punctured, the ridges between the punctures micro-reticulate, covered with yellow hairs. Eyes broadest at top, tapering ventrally, bare. Antennae with oval club, light brown, rostrum with a rostro-dorsal depression divided by a

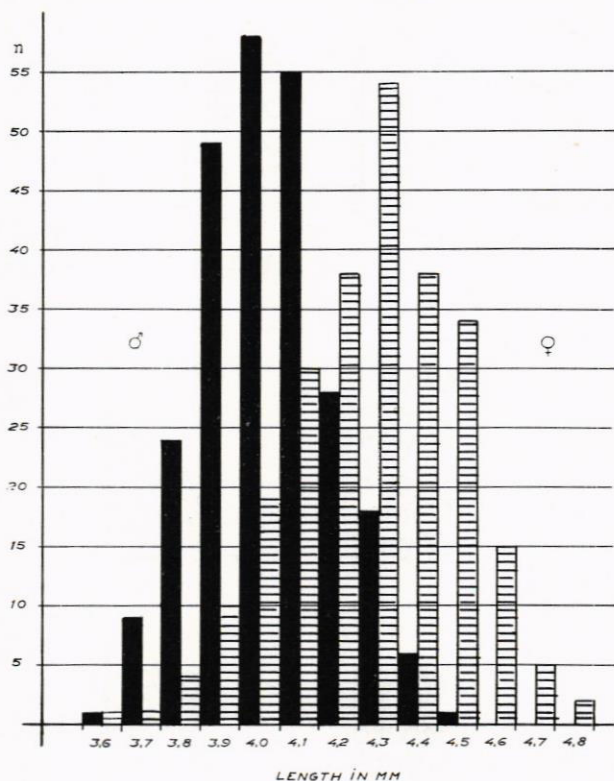


Fig. 7. *Hylastes brunneus* the length of 250 males (black) and 250 females (hatched).

medium keel-like line, stretching without interruption to base of rostrum. In the depression many yellow hairs. Pronotum 1.55 mm long, 1.28 mm broad, index 1.21 with slightly convex sides, fig. 3 G, distinctly punctured, the punctures not confluent, intervals between them shiny. Dorsally with punctures so sparse as to form a shining median line extending for about $\frac{2}{3}$ the length of pronotum. Margins of pronotum with yellow hairs, dorsum bare. Dark brown, anteriorly somewhat lighter. Elytra 2.88 mm long and with a double breadth of 1.40 mm, index 1.93, dark-brown. Striae distinct with punctures in straight lines, interstices ca. twice as broad as striae, fig. 6 E. Anterior of interstices transversely granulated, posteriorly progressively with less feature but with indication of small granules or ridges, microreticulate, dull, with two rows of short, yellow hairs (Fig. 6 E), which in the apical region of the elytra increase to three rows, fig. 6 G.

Lectotype: female, Paykull's collection, Museum of Natural History, Stockholm.

Erichson's type of Hylastes brunneus

Erichson's type in the Naturhistorisches Museum in Berlin is a male, and the paratype a female. I am most grateful to the museum for having allowed me to examine these specimens.

The pronotum of the male is 1.39×1.19 mm, index 1.17, and of the female 1.56×1.31 mm, index 1.19. These values are shown on fig. 2. The female tallies well with the mean values for the Swedish population, but the male lies a little outside the corresponding Swedish value although still well within the range of the population, see fig. 1. The shape of the pronotum may be seen in fig. 3, C, D. The sides are rounded and, towards the base, there is an obvious constriction or taper.

The elytra of the male are 2.59×1.41 , index 1.84, and of the female 2.83×1.54 mm, index 1.84. These values are shown in fig. 5, and the fit with the Swedish material is as for the pronotum. The punctures of the striae are large and the interstices are of about the same breadth, fig. 6 D. The interstices are only slightly or not at all micro-reticulate, and the wings are therefore shiny. Further, the interstices have an irregular double row of hairs which, in the apical region of the elytra, change to a single row and irregular rows of scale-like bristles, fig. 6 F. In this character the difference between *brunneus* and *ater* is very striking, compare fig. 6 F and G.

Summary

A comparison with Paykull's and Erichson's type shows, that the Swedish population agrees in all respects with Erichson's type of *brunneus*. From fig. 3 it is evident that the appearance of the male (A) and female (B) are the same as Erichson's type (C) and paratype (D) respectively. Further, the puncturation and distribution of hairs are precisely the same (compare fig. 6 A, B and D).

At the same time, the south England material agrees quite well with Paykull's type of *ater*, compare fig. 3 F and G, and 6 C and E.

I am of the opinion, as were Strand and Hansen earlier, that the common species in the Nordic countries is *brunneus* Er. and that the "continental" species *ater* Payk. is rare.

I am indebted to Professor L. Brundin, Naturhistoriska Riksmuseet, Stockholm and dr F. Hieke, Institut für spezielle Zoologie und Zoologisches Museum, Berlin, for lending me the type specimens of *ater* and *brunneus* respectively. My sincere thanks are also due to D. Bevan, Forestry Commission Research Station, Alice Holt Lodge, England, for the material of *ater* from south England, and for his correction of my English manuscript.

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