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Note on *Agrobombus smithianus* White (Hymenoptera, Bombidae).

(With 5 figs.)

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Заметка об *Agrobombus smithianus* White (Hymenoptera, Bombidae).

(С 5 рис.)

This interesting species was established by Adam White in 1852 on specimens from Shetland; they had been determined by Friederick Smith as *Bombus arcticus* Dahlbom (Ann. Mag. Nat. Hist, (2), X, 1852, p. 294; Proc. Linn. Soc. London, II, 1855, p. 158). The first description was given by F. Smith in 1854 (Catal. Hym. Ins. Brit. Mus., II, p. 387). Since that time a number of new localities in the distribution of this species have been recorded in various papers and notes. Unfortunately, some of the previous authors confused *A. smithianus* with allied species of *Agrobombus*. It is quite, necessary, therefore, to examine critically all these old data.

Thanks to the kindness of Mr. A. S. Skorikov I had the opportunity of studying the materials concerning this species in the collection of the Zoological Museum of the Russian Academy of Sciences, as well as materials sent to Mr. Skorikov from the Zoological Museum of the University of Helsingfors, Finland. A number of specimens of *A. smithianus* is also being kept in the collection of A. P. Belizin (Velsk, government of Vologda) as well as in my little collection. These rather abundant materials, obtained from England, Norway, Finland and Russia, permitted me to study *A. smithianus* more carefully and to establish its distinctive characters in respect to *A. muscorum*. Both species may be separated as follows.

A. smithianus (White).

♀. Head (except the vertex and, sometimes, yellowish short hairs on the face), underside of the body and all the legs covered with deep black hairs.

Vertex of pale, thorax of bright ferrugineous color. Tergite I on its sides, and tergite II in the middle, usually with admixture of black hairs.

Coat long and uneven. Body broad.

Large species: ¹ length 19 — 20, expanse 34 — 36 mm.

A. muscorum (F.).

♀ Head, underside of the body, femora of the first and second pairs of legs and the femora and tibiae of the third pair covered with pale yellow hairs.

Vertex, like the abdomen, pale yellow, thorax with a pale ferrugineous spot in the middle covering most of the dorsum. Tergites I and II without black hairs.

Coat short and even. Body not broad.

Middle-sized species: length 17 — 18, expanse 33 — 35 mm.

¹ See also Krüger, Edgar, Zool. Jahrb., XLVIII, Abt. Syst., 1924, pp. 1—128. This author made his measurements of *A. smithianus* only on Shetland specimens.

♀. Similar to female: Underside of the abdomen with ciliaries of pale hairs. Face sometimes with admixture of black hairs. Sides of thorax sometimes with pale ones.

♂. Clypeus with pale yellow hairs in its middle and with admixture of black hairs on the periphery. Face with admixture of pale hairs all over its surface. Sides of thorax with pale yellow hairs. Underside of abdomen with pale hairs. Legs with admixture of a few pale hairs.

Sternite VIII usually large, more than four times shorter than its greatest width (fig. 2).

♀. Quite similar to the female, but tempora with admixture of black hairs.

♂. In coloring quite similar to the female.

Sternite VIII always not so large, only a little more than three-times shorter than its greatest width (fig. 4).

Thus, only in following features *A. smithianus* may be separated from *A. muscorum*: they are the color of females, males and workers of the typical form, the size of the body and character of the coat of females, and, to some extent, the form of sternite VIII of males.

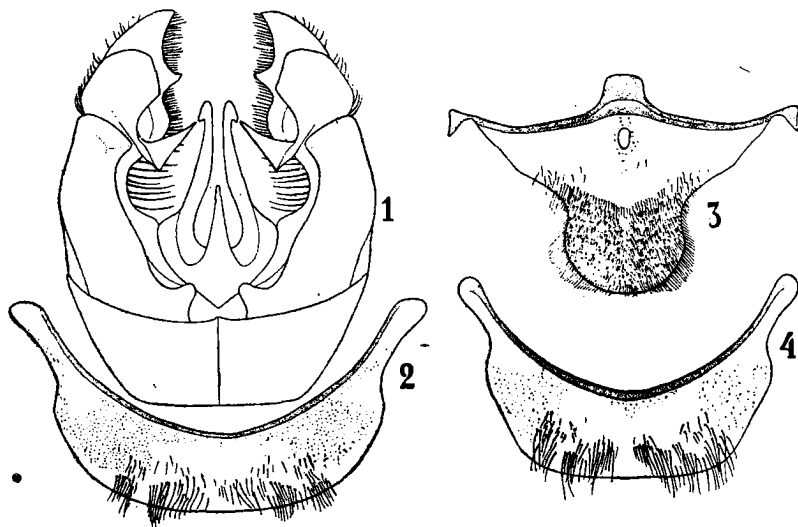


Fig. 1. Dorsal view of male genitalia of *Agrobombus smithianus* White.—

Fig. 2 and. 3. Sternites VIII and IX of the male of *A. smithianus* White.—

Fig. 4. Sternite VIII of the male of *A. muscorum* F.

It is necessary to note the color variability in *A. muscorum* and its remarkable constancy in *A. muscorum*. Although the size and form of body of the female of *A. smithianus* are rather variable, especially of females from Scandinavia and Russia, which are notably smaller, nevertheless they remain as quite real characters, both Scandinavian and Russian females being always larger than those of *A. muscorum*. In the same time the color of dorsum of thorax is always brighter than in *A. muscorum*. The body coat represents also a real character. But the genitalia and sternite IX in both species are quite similar (fig. 1 and 3). On the contrary, sternite VIII is rather variable in form; all British specimens having it very similar to figure 2, and a part of Scandinavian and Russian ones have it nearly similar to that of *A. muscorum* (fig. 4).

Typical form is found in Shetland (White, l. c.; Bond, Trans. Ent. Soc. London, III, 2, 1864—1866, p. 82; Briggs, Entomologist, XVII, 1884, p. 200; Morice, Ent. Mo. Mag., XXX, 1894, p. 259), Farøer (Friese, Fauna Arctica, II, 2, p. 487), Hebrides (Saunders, Trans. Ent. Soc. London, 1884, p. 231; Sladen, The Humble-bee, its life-history and how to domesticate it, 1912, p. 321), North Wales (Nevinson, Ent. Mo. Mag., XXXVII, 1901, p. 72), Cornwall (Rollason, ibid., XLVI, 1910, p. 38), Kent (Perkins, ibid., XXVI, 1890, p. 111), Scilly islands (Bridgman, Entomologist, XII, 1879, p. 54; Yerbury, Ent. Mo. Mag., XL, 1904, p. 156), Alderney (Saunders, ibid., XXXVIII, 1902, p. 146), S.W. Ireland (Saunders, l. c., p. 54), Hillesø island (Sparre-Schneider, Tromsø Mus. Aarsh., XXXI—XXXII, 1909—1910, p. 127), Helgeland, Vega island, Frøderne islands near Bergen (Sparre-Schneider, l. c., XXVIII—XXIX, 1906—1907, pp. 127—128), Schären island, South Finland (Forsius and Nordström, Notulae Ent., III, 1923, p. 114), Humantsi, Finland (Skorikov, Mem. Soc. Nat. Jaroslavl, IV, I, 1925, p. 23), Archangel (Skorikov, l. c., p. 23) and the governments of Ivanovo-Voznesensk (Skorikov, l. c., p. 23; Казанский, Шмелиное население Иваново-Вознесенской губернии, 1925, p. 49) and Jaroslavl (Отчет о деятельности Акад. Наук СССР за 1927 год, I, 1928, p. 148). The data about *A. smithianus* enclose in themselves all the earlier data on „*Bombus arcticus*“. Both species were studied comparatively by F. Smith (Zoologist, 1860, p. 7077; Entomologist, III, 1866—1867, p. 268) who established a great affinity of the latter to *A. agrorum* (F.), a variety of which it is now stated to be.¹ So, Smith's early indications (Catal. Hym. Ins. Brit. Mus., II, 1854, p. 387) on the occurrence of *A. smithianus* in Norway, Lapland and Finland, based on the data of Dahlbom, Zetterstedt and Nylander, are incorrect. Saunders (Ent. Mo. Mag., XXXII, 1896, pp. 275—277; see also Perkins, ibid., LIII, 1917, p. 161) also included into *A. smithianus* some specimens of *A. muscorum* and *A. helferanus*. The following data must be taken in doubt. The pale form of *A. smithianus* taken by Sladen near Rye (Ent. Mo. Mag., XXXIV, 1898, p. 254) is, probably, a race of *A. muscorum*. To the last species should be joined also the specimens of *A. smithianus* listed by Saunders (ibid., XXXVIII, 1902, p. 146) from Jersey, Guernsey and St. Briac (Brittany). The dark specimen of the male of *A. smithianus* from S.-W. Ireland noted by Saunders (ibid., XXXVIII, 1902, p. 52) is, probably, a dark form of *A. helferanus*.

Following new localities are to be added: St. Nicholas Monastery (Nikolskij Monastyr) near Archangel, 5. VI. 1904 (R. Pole), 1 ♀; Chotilovo, Valdaj district, government of Novgorod, 26. VI. 1926 (V. Попов), 1 ♀; 10. VII. 1926 (Miss L. Lebedev), 1 ♀; 17 and 29. VII. 1926 (V. Попов), 2 ♀; 11. IX. 1926 (Miss L. Lebedev), 1 ♂, taken as a victim of the fly *Laphria gibbosa*: Madloma river, Kirillov district, government of Tsherepovetz, 15 (♂, 1 ♀), 16 (16 ♀) and 18 (2 ♀). VII. 1926 (A. Belizin); Kozlovo, 21 (7 ♀), 22 (6 ♀), 23 (8 ♀) and 31 (1 ♀) VII. 1926 (A. Belizin); Lukinskoe, Kirillov district, 12. VII. 1926 (A. Belizin), 1 ♀; Belozersk, 2 (1 ♀ 1 ♂) and 3 VIII (1 ♀). 1926 (A. Belizin); Nakaevo, Mologa district, go-

¹ Smith writes (p. 268): „the pubescence that clothes the body of *B. arcticus* beneath is pale“, but from the Dahlbom's description (Bomb. Scand. Monogr. Tractati, 1832, p. 50) it may be understood that the underside of this form is also black: „supra fulvus, subtus ater“.

vernment of Jaroslavl; 29. VII. 1927 (D. Vachrameev), 3 ♀, on these specimens is based the indication in the Отчет о деят. Ак. Наук СССР за 1927 г. mentioned above; Ekaterininskoe, Slobodsk district, government of Vjatka, '6. VIII. 1929 (A. Shernin), 2 ♀ (one of them now in the collection of the Paedagogical Institute of Vjatka); Sotkamo, Finland (W. Nylander), 1 ♂; Limingo, Finland (Ed. Nylander), 1 ♀, and „Fennia“ (coll. Nylander), 1 ♀, the last three in the collection of the Zoological Museum of Helsingfors. One female from the neighbourhood of Archangel, 9.VI.1899 (Keller), one worker from Ustj-Tzyljma, Petshora district, government of Archangel, 29.VI.1907 (Zhuravskij), one worker from the lake Vozhe, 17.VII.1926 (A. Belizin) and one worker from Kozlovo, Kirillov district, government of Tsherepovetz, 22.VII.1926 (A. Belizin), have the tergite V black with admixture of few pale hairs on its sides: var. **bannitus** Skor. nova.

In 1901 a pale form of *A. smithianus* from Scotland covered with pale hairs on the underside of the body was described by Evans (Ent. Mo. Mag., XXXVII, 1901, p. 47), as a race *pallidus*. The pale specimens of *A. smithianus* had been found by many authors, for example, by Morice (Ent. Mo. Mag., XXX, 1894, p. 259) in Orkney. But lastly this form is synonymized with *A. muscorum*. For example, Dr. Perkins wrote: „Smith's *B. venustus* was essentially based on the pale form of *smithianus*, later known to us as *muscorum* L.“ (Ent. Mo. Mag., LIII, 1917, p. 161); or: „this name (*A. muscorum*) is now applied to the pale form of the bee known as *B. smithianus* in older British lists“ (Trans. Devon. Ass. Advanc. Sci. Litt. Art, 1923, p. 218), and: „this name (*A. muscorum*) is now applied to the pale southern form of *B. smithianus* of the Shetlands“ (Proc. Brist. Nat. Soc., 45, VI, pt. 2, p. 147). Sladen (The humble-bee, etc., 1912, p. 200) adds to his description of *A. smithianus*: „but specimens from Stromnes, Orkney, show only traces of black on the face, underside, and legs, although the coat is long“. I have examined three females from Stromness and Kirkwall, Orkney, from the collection of the Zoological Museum of Helsingfors; their color is quite resembling that of *A. muscorum*, but the size, form of the body and character of coat are similar to those of *A. smithianus*. Pale-haired workers from Rousay and Kirkwall, Orkney, in the collection of the Zoological Museum of the Russian Academy of Sciences have hairs on the tempora nearly always black and the admixture of many black hairs on the periphery of face. The structure of sternite VIII of two pale haired males from Lerwick, Shetland, and of a number of them from Kirkwall and Rousay, Orkney, and Kingussie, Invernesshire, in the same collection, is quite similar to that in the typical form of *A. smithianus* from Shetland. Thus, the presence of a pale form, or race of this species, is firmly stated. The range of this race is not clear enough. With no doubt, all specimens mentioned by Evans (l. c., p. 47) from Kingussie (Invernesshire), Aberfoyle (S.-W. Perthshire), Evanfoot (Lanarkshire), as well as specimens from the Perth district, Dumbertonshire and Kirkenbrightshire belong to this race. Probably, Evans is also right in believing that „*B. senilis*“ from Perthshire (Scott. Nat., 1887, p. 177) must be synonymized with the pale race of *A. smithianus*. The pale specimens indicated by Sladen (1898, p. 254) and Saunders (1902, pp. 52 and 146) and mentioned above should be synonymized only after a careful study. The race *pallidus* is of a great interest as a sample of remarkable convergency with *A. muscorum*.

Many previous authors believe *A. smithianus* to be only a subspecies

or variety of *A. muscorum*. But a sum of distinct characters in all three castes, in connexion with, probably, quite distinct habits of nesting* (see Sladen, The humble-bee, etc., p. 200), as well as the absence of intermediate forms and, lastly, very different ranges of geographical distribution permit me to consider them as two independent though very closely related species. There are many species of *Bombus*, which are quite identical in their genitalia. In the genus *Agrobombus* there exist similar example, e. g., tworeal species *A. subbaicalensis* (Vogt) and *A. helferanus* (Seidl.) cannot be separated by their genitalia (Skorikov, Rev. Russ. Ent., XIX, 1925, p. 117).

The geographical range of *A. smithianus* (fig. 5) clearly shows that it is an European subarctic species (Skorikov, Mem. Soc. Nat. Jaroslavl, IV, 1, 1925, p. 22; Казанский, l. c., p. 16), living especially on stony, rocky or

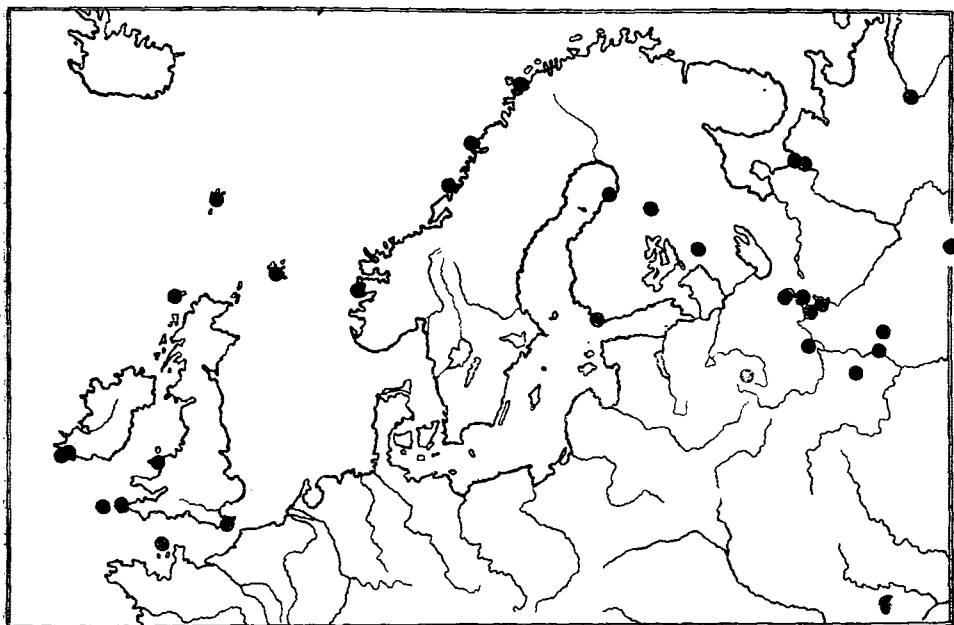


Fig. 5. Map showing the recent geographical distribution of the typical form of *Agrobombus smithianus* White.

steep sea coasts and banks of rivers of Northern Europe. In Russia, however, this dependence from the landscape is not clear. The occurrence of *A. smithianus* in the South of England and Ireland, though in a few specimens, attests it as a relic in the recent fauna. This opinion was advanced by Perkins (Ent. Mo. Mag., XXVI, 1890, p. 111); an other analogous relic species in England is *Pratobombus lapponicus* (L.). According to Sparre-Schneider (l. c., 1909 — 1910, p. 127) the occurrence of *A. smithianus* in some parts of Norway shows the same character; thus, now we may be quite sure that this supposition is correct all over the whole range of this species.

A fact of great interest is that in the governments of Novgorod, Tsherepovetz and Jaroslavl, and namely in these countries, *A. agrorum* v. *moor-selensis* Ball also occurs; this form has also deep black hairs on the underside of the body.