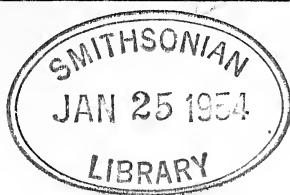


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PART 6

**TRANSACTIONS**  
OF THE  
**SOCIETY FOR BRITISH**  
**ENTOMOLOGY**

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TRANSACTIONS OF THE SOCIETY FOR  
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VOL. 11

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PART 6

A REVISION OF SECTION I (MAYR, 1872) OF THE GENUS  
*SYNERGUS* (HYM. CYNIPIDAE) IN BRITAIN, WITH A SPECIES  
NEW TO SCIENCE

By R. D. EADY, F.R.E.S.

Dept. of Entomology, British Museum (Nat. Hist.).

The list of British species of the genus *Synergus*, as it has stood until quite recently (e.g. Kloet and Hincks, 1945), requires some changes. Ross (1951) has published a revision of the double-brooded species, which constitute the greater part of the second section of the genus according to the accepted classification of Mayr (1872). He found, from extensive breeding work, that certain supposedly good species were seasonal forms of others. The present paper treats of the first section of the genus, which consists entirely of single-brooded species. The keys in Mayr's work (1872) are based largely on colour differences which are not always reliable, but, in his descriptions, Mayr indicates other characters which have sometimes been overlooked by subsequent authors. In the following keys and descriptions, colour characters have been relegated to a secondary rôle, and have only been included in so far as they seem reliable, and in support of structural features.

GENUS *SYNERGUS* HARTIG, 1840.

KEY TO SECTIONS

(A) Second abdominal segment (i.e., large segment) closely punctured apically, the punctures forming a band of width, subdorsally, equal to one quarter to one half the length of the segment, and extending the full depth of the segment from the dorsum to the ventral edge of the tergite. (Figs. 1 and 2).

Single-brooded species that winter in galls as late-stage larvae or pupae, emerging in early summer. . . . . Section I (Mayr, 1872).

(B) Second abdominal segment without punctures apically, or with punctures forming a small patch dorsally at apex, or an indistinct narrow band not reaching to the ventral edge of the tergite. (Fig. 3).

Species, of which many produce two or more broods in the year. . . . .  
. . . . . Section II (Mayr, 1872)

KEY TO SPECIES OF SECTION I

1. Mesoscutum with posterior medial furrow present, extending to at least half the length of the mesoscutum. Frontal carinae reaching to the lateral ocelli . . . . . 2  
— Mesoscutum without posterior medial furrow, or with this represented by a short narrow triangle extending to no more than one-eighth of the length of the mesoscutum from the posterior margin. Frontal carinae not reaching to the lateral ocelli . . . . . 6

2. Second antennal segment short, about as broad as long, sub-globose in the male; male with third antennal segment strongly expanded apically (Fig. 6) ..... *umbraculus* Oliv.  
 — Second antennal segment distinctly longer than broad; male with third antennal segment never so strongly expanded apically (Figs. 7-11) ..... 3
3. Face with strong medial keel, which, in lateral view, is raised above remaining striae of face (Fig. 5) ..... *reinhardi* Mayr  
 — Face without medial keel: the central striae may coalesce, but the resulting carina is never raised above remaining striae of face (Fig. 4)..... 4
4. Abdomen with apical punctures of large segment forming a band whose width at its narrowest, laterally, is not less than one-quarter of the length of the segment, and sub-dorsally may be one-third to one-half of the segment (Fig. 1) ..... 5  
 — Abdomen with apical punctures of large segment forming an indistinct band, whose width at its greatest, sub-dorsally, does not exceed one-quarter of the length of the segment, and laterally measures much less (Fig. 2). [Radial cell of average proportions; length two and one-third to two and two-thirds times the breadth: 2nd abscissa of the radius distinctly, though not very strongly, curved.] ..... *ruficornis* Htg.
5. Radial cell much shorter than average; length hardly exceeding twice the breadth: 2nd abscissa of the radius strongly curved (Fig. 13). Apical punctures of the large segment of the abdomen strong, forming a band of width, laterally, not less than one-third, and sub-dorsally often equal to almost one half of the length of the segment ..... *hayneanus* Htg.  
 — Radial cell longer than average; length, at least, only slightly less than three times the breadth: 2nd abscissa of the radius almost straight (Fig. 12). Apical punctures of the large segment of the abdomen less strong, though distinct, forming a band whose width, laterally, is not less than one-quarter, and sub-dorsally nearly equal to one-third of the length of the segment ..... *pallidipennis* Mayr
6. Mesoscutum with posterior medial furrow in female represented by a short narrow shining triangle (Fig. 16); radial cell shorter, length not more than two and one-third times breadth: 2nd abscissa of radius fairly strongly curved (Fig. 14). Female large abdominal segment at least slightly excised at apex dorsally. Male with third antennal segment distinctly expanded basally and apically (Fig. 11) ..... *evanesens* Mayr  
 — Mesoscutum with posterior medial furrow absent (Fig. 17); radial cell longer, length at least two and a half times breadth, 2nd abscissa of radius only slightly curved (Fig. 15). Large abdominal segment of female not excised dorsally at apex. Male with third antennal segment not expanded, but slightly curved, and inner surface of curve flattened (Fig. 10)..... *clandestinus* sp. nov.

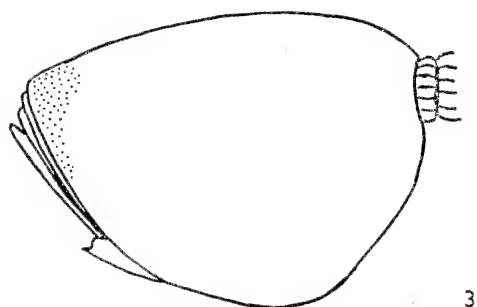
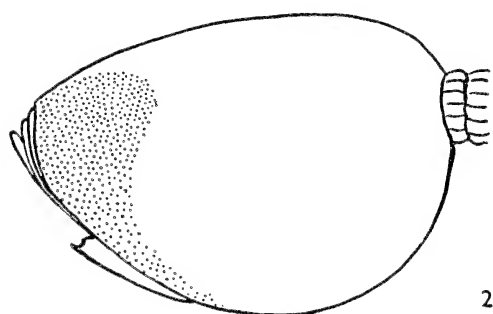
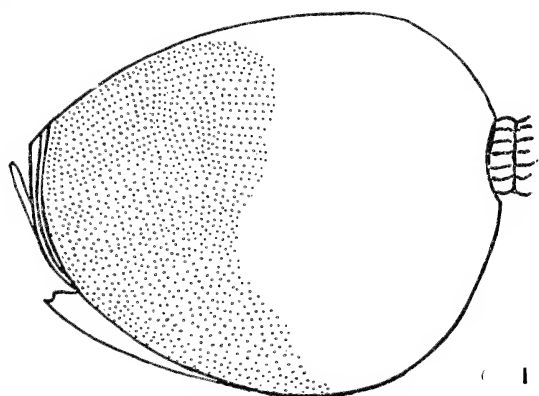


Fig. 1: Diagram of abdomen, to show punctures at apex of large segment, of *Synergus reinhardi* Mayr, female. Fig. 2: do. do. *S. ruficornis* Mayr, female. Fig. 3: do. do. *S. nervosus* Htg., female, second section of genus.

## DESCRIPTIONS OF SPECIES

*S. umbraculus* Oliv. (= *melanopus* Htg.).

Frontal carinae distinct and reaching to lateral ocelli; frons coriaceous with scattered punctures in male, rugose-punctate in female; vertex in both sexes rugose-punctate. Mesoscutum transversely rugose with shining coriaceous sculpture between rugae; posterior medial furrow extending to almost three-quarters the length of the mesoscutum; mesopleura strongly striate. Large segment of abdomen with apical band of punctures distinct in both sexes and of width almost half the length of the segment. Antennae with second segment about as broad as long, sub-globose in male: third segment in male strongly expanded apically. Radial cell of forewing with length two and a half to two and three-quarters times the width: second abscissa of radius slightly but evenly curved.

The head varies in colour on the face and cheeks, in male from yellow to red, and in the female from red to almost black, with a faint reddish tinge round the mouth and on the lower parts of the cheeks. Abdomen dark red to black.

In Britain the species is bred from the galls of *Andricus kollari* (Hartig), in which it forms scattered cells, varying in number per gall from one upwards, in the peripheral tissue, without harming the gall-maker or distorting the gall to any extent. It also occurs in galls where the centre is occupied by the next species. Sometimes loose groups of cells occur close to the centre of the gall, thereby resembling the cell groups of *reinhardi*; but these groups lie always outside the wall of harder tissue that limits the central occupant of the gall, in this case, usually the gall-maker or its parasite.

*S. reinhardi* Mayr

Face with strong medial keel raised above the remaining striae; frons coriaceous between strong frontal carinae, centrally and on vertex rugose-punctate with coriaceous sculpture between punctures. Mesoscutum rugose, with largely transverse rugae and shining coriaceous sculpture; posterior medial furrow extending to half the length of the mesoscutum; mesopleura with weak striae in upper part merging to strong striae lower down. Abdomen with apical punctures of large segment distinct, forming a band of width sub-dorsally equal to half, and laterally to not less than one-third the length of the segment. Second segment of antennae about one and a quarter to one and a half times long as broad; male with the third segment weakly expanded apically (Fig. 7). Radial cell of forewing two and a quarter to two and a half times as long as broad, and with second abscissa of radius slightly but evenly curved.

In both sexes the head is black, sometimes with a trace of red in the mouth region; abdomen black.

This species forms cells geometrically arranged in the centre of the gall of *A. kollari*. By the expansion of these cells, the cell of the gall-maker is reduced to the point of total elimination, and the disappearance of the host larva results. The cell group is always bounded by a paler-coloured wall of harder tissue continuous with and indistinguishable from that of the wall of the gall-maker's cell. *S. reinhardi* appears to oviposit earlier than *S. umbraculus*, when the Marble gall is still very small, and so is frequently bred from diminutive galls whose development has ceased with the comparatively early

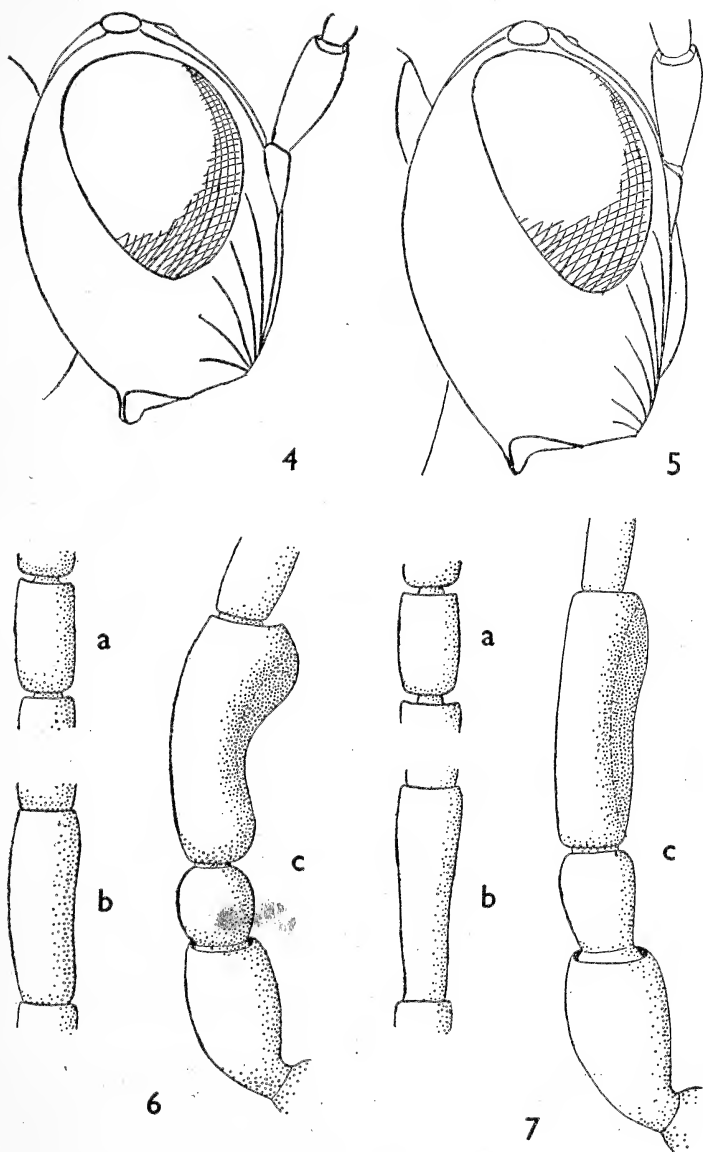


Fig. 4: Head, right profile, of *Synergus umbraculus* Oliv., female. Fig. 5: do. do. *S. reinhardi* Mayr, female. Fig. 6: Right antenna, inner aspect, (a) 14th segment, (b) 5th segment, (c) first three segments, of *S. umbraculus* Oliv., male. Fig. 7: do. do. *S. reinhardi* Mayr, male.

death of the host larva. In larger galls occupied by this species, *S. umbraculus* is frequently bred from the peripheral tissue. I have seen a female of *reinhardi* ovipositing on a gall of *kollari* in June when the gall was no larger than a pea. When the gall was opened it revealed a series of stalked eggs within the small central chamber formed by the host larva.

Blair (1946) first published a note on the different positions in the Marble gall of the cells of these two species. His observations I have confirmed in over three hundred galls: in most cases the larvae or pupae were removed from their noted positions in the gall, and reared in separate containers.

*S. pallidipennis* Mayr

Face without medial carina; frontal carinae distinct and reaching to the lateral ocelli; frons and vertex coriaceous with scattered punctures. Mesoscutum transversely-rugose with posterior medial furrow extending to one half or rather more than half the length of the mesoscutum; faint shining coriaceous sculpture between the rugae; mesopleura rather weakly striate with some stronger striae interspersed in lower part. Apical punctures of large segment of abdomen sometimes weak, forming band of width subdorsally not exceeding one third the length of the segment, and laterally not less than one-quarter of the segment; second (large) segment of the female abdomen deeply excised at apex. Antennae with second segment longer than broad; in male with third segment distinctly expanded apically (Fig. 8). Radial cell long, length about three times breadth, the variation above and below this figure being very slight; second abscissa of radius almost straight.

Both sexes have the head entirely black and the abdomen dark red.

This species has not previously been recorded in Britain. While examining material of *S. reinhardi* and *S. umbraculus* bred from the galls of *A. kollari* mentioned earlier, and now in the British Museum collection, I discovered a series of this species included. These had been bred as follows: from a gall collected at Worcester Park, Surrey, in early February, 1950, there were two males and fifteen females; from galls collected at Arbrook Common, Surrey, by Mr. J. F. Perkins in the same year, one collected in February yielded six males and four females, two taken in April gave two females from one, and one female from the second. They were bred from close packed, centrally placed cells in rather diminutive galls of *A. kollari* which closely resembled the cell formation of the previous species. This year (1952) Miss J. Boyer has reared another small series, five males and three females, from a gall of *A. kollari* collected at Wimbledon Common, Surrey.

On the Continent the species has been recorded from *Andricus* (*Adleria*) *kollari* Htg., *coriaria* Htg., *lignicola* Htg. and *gallae-tinctoriae* Ol.

*S. evanescens* Mayr

Frontal keels weak and not reaching to the lateral ocelli; frons and vertex punctate with coriaceous sculpture between punctures. Mesoscutum with transverse rugae, sharply carinate centrally and with shining coriaceous sculpture in interspaces; posterior medial furrow represented by a short narrow triangular patch, glabrous and shining. Mesopleura weakly rugose—striate in female, in male almost coriaceous in some specimens. Abdomen with large segment finely punctate apically, the band being of width approximately equal to one-third the length of the segment; in female excised apically, quite strongly so in some specimens. Second segment of antennae



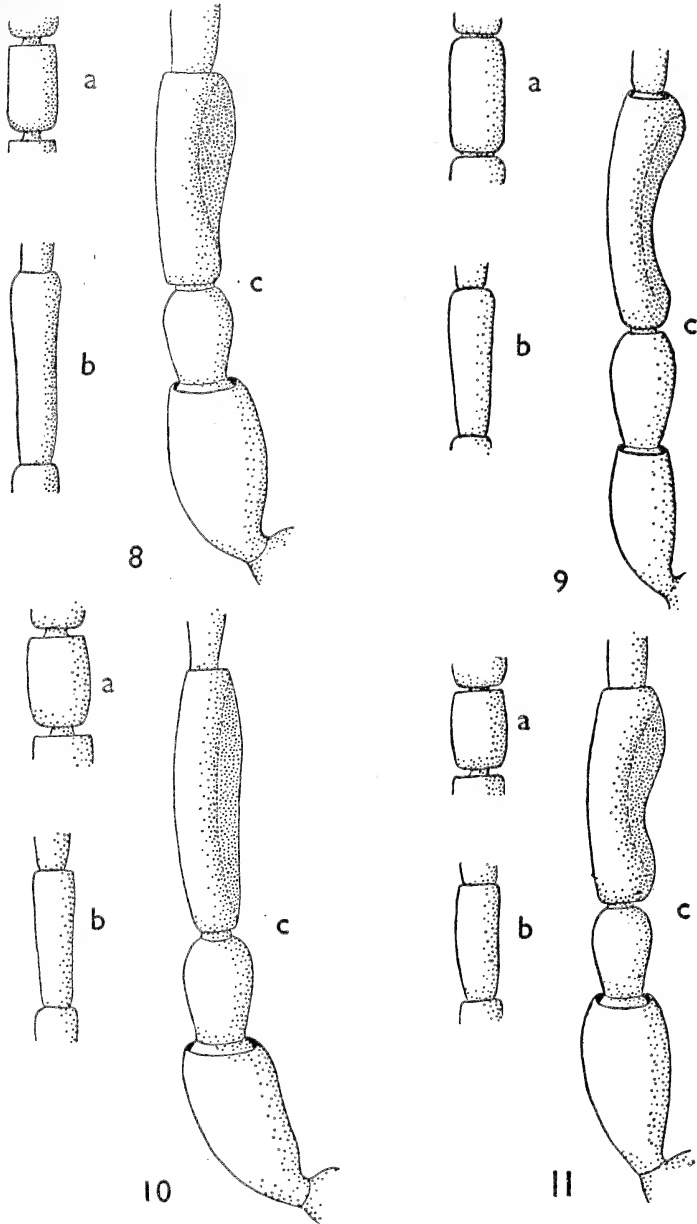


Fig. 8: Right antenna, inner aspect, (a) 14th segment, (b) 5th segment, (c) first three segments, of *S. pallidipennis* Mayr, male. Fig. 9: do. do. *S. ruficornis* Mayr, male. Fig. 10: do. do. *S. clandestinus* sp. nov., male. Fig. 11: do. do. *S. evanescens* Mayr, male.

longer than broad, length to breadth between one and a quarter and one and a half to one; male with third segment obviously expanded apically and basally. Radial cell rather short, length two and a quarter to two and a third times the breadth, second abscissa of radius fairly strongly curved.

Bred from galls of *Andricus foecundatrix* Htg. by Dr. Bagnall in 1928, by Ross (1945) and by Niblett (1945). Recorded by Mayr on the Continent from *A. foecundatrix* Htg. and *multiplicatus* Gir., and *Andricus (Adleria) calicus* Bgsdf.; Kieffer adds *Andricus mayri* Wachtl. and *Adleria kollari minor* Kieff., *mayri* Kieff and *infectoria* Kieff.

*S. clandestinus* sp. nov.

Frontal keels weak, not reaching to lateral ocelli, frons coriaceous punctate in centre; vertex with coriaceous sculpture between punctures. Mesoscutum with sharp transverse rugae, shining in interspaces and with weak coriaceous sculpture; posterior medial furrow absent; pronotum coriaceous medially, rugose laterally on the shoulders; mesopleura striate in female, weakly striate in male with shining coriaceous sculpture between the striae. Abdomen with large segment not excised apically in female, and with apical band of punctures distinct and of even width sub-dorsally and laterally, equal to one-third the length of the segment. Antennae with second segment in both sexes longer than broad, the length about one and a half times the breadth; in male with the third segment not expanded, but slightly curved and flattened on the inner surface of the curve. Radial cell of length usually very slightly more than two and a half times the breadth in both sexes, but in some specimens a little shorter, with the length just under two and a half times the breadth. Second abscissa of radius slightly curved. *Female*: head and thorax black; abdomen reddish brown to black; antennae dark yellow at base and brown apically; coxae and hind femora black (dark brown in a few specimens); front and middle femora basally, and hind tibiae in middle, brown; front and middle femora in apical half, front and middle tibiae and tarsi, hind tarsi, hind tibiae apically and basally and apex of hind femora, dark yellow. *Male*: similar, but with paler antennae.

Types: nine males (including Holotype) and two females, bred vi-vii. 1941, ex acorns of *Quercus robur* L. (*Q. pedunculata*), Berkhampstead, Herts., R. B. Benson. Holotype male (bred vi. 1941) in British Museum Collection.

In colour and general appearance and sculpture this is very close to the previous species, from which it may be distinguished by the unexpanded third segment of the male antennae and the longer radial cell. In all earlier keys this species would run down to *S. evanescens*.

Cameron (1893) bred a *Synergus* from acorns but did not publish his determination of it. In 1941 Mr. R. B. Benson bred a series from acorns which ran down in the keys to *Synergus evanescens* (1946, p. 46). Following this Mr. M. Niblett bred further series from stunted acorns from many different localities (1945, p. 72). One specimen in the British Museum bearing the labels "glandium," "4," "pallicornis," and "Cameron 96-76" but not standing under any name in the collection, is also a male of this species. The acorn galls figured by Connold (1908, Pl. IX, Fig. A) as *Andricus glandium* in acorns of *Quercus pedunculata*, resemble acorns occupied by the present species. Mr. Benson has also taken this species from acorns of *Quercus petraea* (*Q. sessiliflora*).

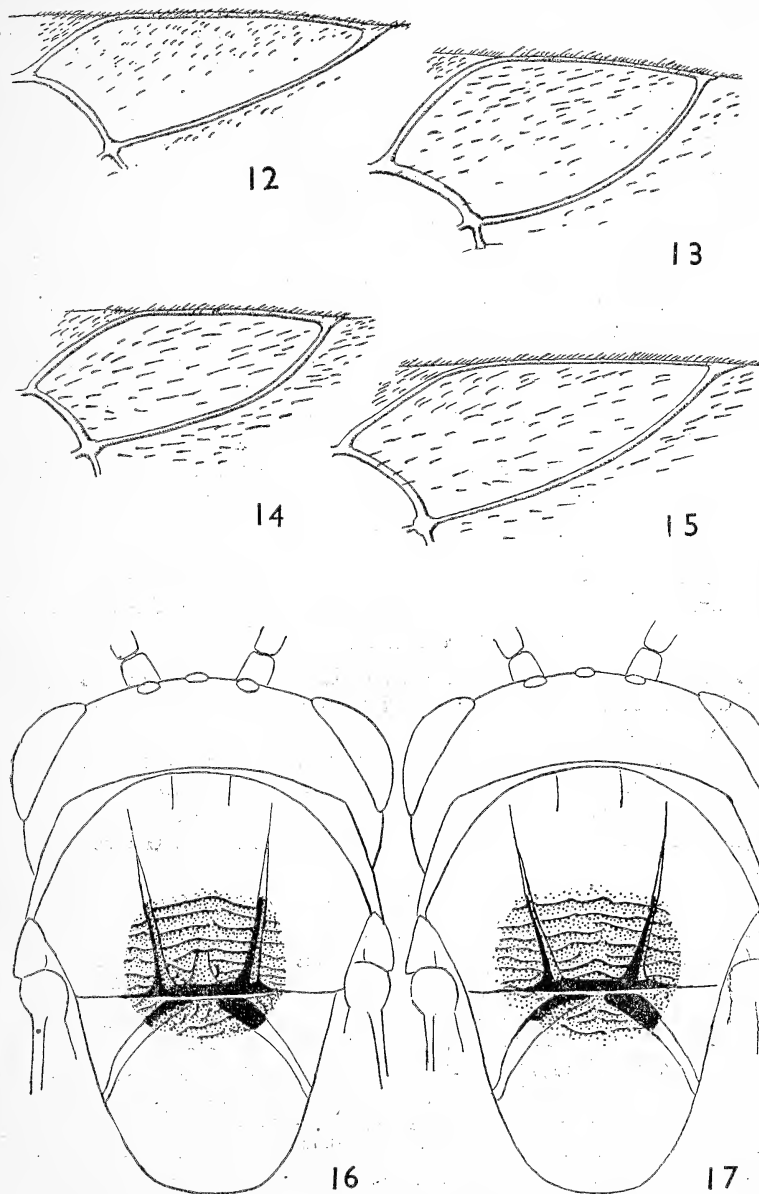


Fig. 12: Right radial cell of *Synergus pallidipennis* Mayr, female. Fig. 13: do. do. *S. hayneanus* Htg., female. Fig. 14: do. do. *S. evanescens* Mayr, female. Fig. 15: do. do. *S. clandestinus* sp. nov., female. Fig. 16: Sculpture of posterior area of the mesoscutum of *S. evanescens* Mayr, female. Fig. 17: do. do. *S. clandestinus* sp. nov., female.

*S. ruficornis* Htg.

Frontal carinae rather weak but reaching to the lateral ocelli, frons coriaceous with scattered shallow punctures, vertex rugose-punctate. Mesoscutum transversely rugose, with shining coriaceous sculpture in the interspaces; posterior medial furrow one-half to three-quarters the length of the mesoscutum. Abdomen with large segment having the apical punctures weak, forming a band whose greatest width, sub-dorsally, does not exceed one-quarter of the length of the segment (Fig. 2), in female long, and not excised dorsally at the apex. Antennae with the second segment conspicuously longer than broad; in male with the third segment rather slender in middle, slightly curved, and gently expanded basally and apically (Fig. 9). Radial cell with length two and one-third to two and two-thirds times the breadth; second abscissa of the radius distinctly, though not very strongly curved.

This description was made from one male and one female from Austria, determined by Mayr, and three females from Britain, bred in July from galls of *Andricus globuli* Htg. The British specimens were bred and determined by J. Ross.

This species was previously included in the British list on the basis of specimens recorded by Morley (1931), bred from galls of *Rhodites rosae* by Mr. Albert Piffard: since examining these specimens I have no doubts as to their being *Periclistus brandti* Rtz., the common inquiline in this gall.

Mayr recorded the species from galls of *Andricus globuli* Htg.; Kieffer adds *Andricus ostreus* Htg., and Tavares records it from *Andricus bocagei* Tav.

*S. hayneanus* Htg.

This species has stood in the British list on the basis of a single male recorded by Morley (1931). I have examined this specimen, and have been able to place it as *S. umbraculus* Oliv.

*S. hayneanus* is reported as bred on the Continent from galls of *Andricus* (*Adleria*) *coronata* Gir., *lignicola* Htg., *mayri* Kieff., *stefanii* Kieff., and *gallae-tinctoriae* Oliv., none of which species has been found in this country. *Synergus hayneanus* Htg. is therefore to be deleted from the list of British insects.

## SUPPLEMENT

The present paper together with that of Ross (1951) leaves, for comparable treatment, the British single-brooded species of Section II of *Synergus*; i.e. *incrassatus* Htg., *pallicornis* Htg., *apicalis* Htg., and *rotundiventris* Mayr.

Ross considered he saw insufficient material of *apicalis* to judge its specific status. I consider it to be a valid species, and generally single-brooded, having seen over two hundred specimens bred in the spring (1951, 1952) from oak twigs containing galls of *Andricus quercus-radici* f. *trilineatus* Htg., collected by Mr. and Mrs. J. F. Perkins; and all agreed with Mayr's description (1872) and with specimens determined by him. The occasional appearance of specimens in the autumn is comparable with the appearance in September this year (1952) of *Synergus umbraculus* Ol. (2 ♂♂, 1 ♀) from immature galls of *Andricus kollari* Htg., while larvae of the same species were found in neighbouring galls.

*Synergus rotundiventris* Mayr has not previously been listed as British, due to its confusion with *Saphonecrus* (*Sapholytus*) *connatus* Htg. It resembles *apicalis* in the shining coriaceous mesoscutum with widely-spaced interrupted

transverse carinae, but differs in the longer weaker frontal carinae, the short notaulices (absent anteriorly), the absence of the posterior medial furrow, the shorter radial cell (open or faint anteriorly), and the dark appearance of both sexes. I have seen two females caught by Mr. Marsden-Jones (May, 1949), four of each sex bred from oak twigs mentioned above, and two females from the B.M. collection, formerly placed under the next species.

*Saphonecrus connatus* Htg. differs from *Synergus rotundiventris* Mayr in the complete absence of frontal carinae, the evenly dull coriaceous frons and mesoscutum (the former slightly depressed medially, and the latter with closely-spaced weak transverse rugae), and the thirteen-segmented female antennae. Specimens examined were a series (4 ♂♂, 15 ♀♀) collected in Sweden in 1938 by Mr. and Mrs. J. F. Perkins, and two British females collected by Mr. R. B. Benson.

The work of Ross revolutionized our understanding of the group of species he studied. The study was based on a large amount of breeding work, extending over many years, and the results could not have been achieved in any other way. But with these species in particular, the earlier keys, based on continental material, are misleading, and the characters difficult to interpret for British specimens in the absence of the authors' specimens. I have compared a number of specimens, determined by Mayr, with the Ross material in the British Museum, and decided that two changes in the names used in his paper are desirable. The species and forms affected are tabulated below.

	ROSS	MAYR	SUMMARY
<i>tscheki</i> , <i>f. radiatus</i>	Summer emergence Year I of gall	= <i>radiatus</i> Mayr	= <i>nervosus</i> Htg. (= <i>radiatus</i> Mayr)
<i>tscheki</i>	Spring emergence Year II of gall	= <i>nervosus</i> Htg.	= <i>nervosus</i> Htg.
<i>nervosus</i> , <i>f. albipes</i>	Summer emergence Year I of gall	= <i>albipes</i> Htg.	= <i>albipes</i> Htg.
<i>nervosus</i> , <i>f. tristis</i>	Spring emergence Year II of gall	= <i>tristis</i> Mayr	= <i>albipes</i> Htg. (= <i>tristis</i> Mayr = <i>tscheki</i> Mayr)
<i>nervosus</i>	Spring emergence Year II of gall	= <i>tristis</i> Mayr	= <i>albipes</i> Htg. (= <i>tristis</i> Mayr)
„	Winter or early spring emergence from <i>T. renum</i> Htg.	= <i>varius</i> Htg.	= <i>albipes</i> Htg. (? = <i>varius</i> Htg.)

I have not seen specimens of *varius* Htg. from the Mayr collection, but the Ross specimens fit Mayr's description of the form bred from *Trigonaspis megaptera f. renum* Htg., which is by Mayr's own admission, little distinct from *albipes* and stands close to *tristis* or *nervosus*.

The above in no way disagrees with Ross's conception of the species, but only with his use of the names *nervosus* and *tscheki*. Those using Ross's paper would be inconvenienced if it were found necessary to change the names, to which they had become accustomed, after a period of years; and it is solely with the object of minimizing this inconvenience that the above evidence is presented at the present stage.

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