

THE SPECIES OF ANTS OF THE GENUS *LASIUS* IN BRITAIN

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Wilson (1955) has recently published a monographic revision of the ant genus *Lasius*. The following account discusses the British species in the light of various nomenclatorial changes made by Wilson with particular reference to the synonymizing of *L. mixtus* Nylander with *L. umbratus* Nylander on the one hand and the recognition of *L. rabaudi* Bondroit as a distinct species on the other. In addition a simplified key to all castes is given together with brief notes on the distribution of the species in Britain as at present known.

During his revision Wilson has examined large collections of material from all over Europe, Asia and America with special attention to local and geographic variation over the whole range of each species. As a result several changes in species diagnoses and nomenclature have been made. Many varietal and trivial names and some species have been shown to be worthless and have been relegated to synonymy, while the really important diagnostic characters for each species have been clearly brought out. This is a definitive study of a kind badly needed to clear up the ever increasing complexity of ant nomenclature in Europe in particular and may well set the pattern for future studies in ant taxonomy.

A picture of the whole range of each species is built up by the examination of two or three individuals from each of a randomly selected nest series. A feature of great interest is the apparent development, in some cases, of convergent characters in one of a pair of similar species over parts of its range, where the other is absent. This is illustrated for example by *L. niger* L. which tends to develop fewer standing appendage hairs in those areas of Asia and America where its sibling hairless species *alienus* Foerst. is sparse or absent. The common European species *niger*, *alienus*, *flavus* and *umbratus* are apparently also widely distributed in N. America. According to Wilson, there is no basis for distinction between the Eurasian and American forms of these species, although with *alienus* at least there is a marked dissimilarity in nesting behaviour in the two hemispheres. This is in contrast to the position with members of the genera *Formica* and *Myrmica*. These are well represented in both Europe and America, but, so far as is known at present, there are no exact correspondences between the two continents with the possible exception of *Formica fusca* L. and a form of *Myrmica rubra* L. which may have been imported.

In line with many modern taxonomists Wilson regards the species as the only taxonomic unit having any objective status. The geographic race or subspecies can be defined within arbitrary limits, but these break down when the range of variation is studied over a wide area and, as with *Lasius*, genetically independent characters are found to vary discordantly in different

areas. Wilson therefore rejects the trinomen as leading to confusion and synonymizes, wherever possible, all races and varieties including the various supposed hybrids of Forel.

One of the commonest of these in the literature is *niger* var. *alieno-niger* Forel, which was erected to cover supposed hybrids between *niger* and *alienus*, but has been largely used by subsequent writers to include forms that were apparently intermediate in pilosity between the two species. In fact neither Staercke (1944), who examined Forel's specimens standing under that name, as well as much other material, nor Wilson ever found examples of nest series that could be said to be hybrid between the two species. Moreover it would probably be difficult to recognize such a hybrid did it occur, while in the whole of ant literature there are no records of natural cross-matings between like species nor any information on authentic hybrid populations even artificially contrived. In the writer's collection, ants formerly regarded as representing this variety have in most instances turned out to be *niger* with reduced appendage pilosity, rubbed, badly mounted specimens or more rarely *alienus* with one or two standing tibial hairs and he is indebted to Dr. W. L. Brown for attempting to sort out some of these specimens. Yarrow (1955) has fully discussed Forel's hybrid names in connection with ants of the *Formica rufa* group, where they have been the source of much confusion.

The case of *umbratus* var. *mixto-umbratus* Forel is very different in that a range of gradations between *umbratus* and *mixtus* do actually occur and are nearly as common as the extreme types, as was noted by many earlier writers including Donisthorpe (1927). After examining copious material Wilson has concluded ". . . there is no single character or combination of characters that can be used to separate *umbratus* and *mixtus* as species." The various characters that have been used to separate them, such as degree of pilosity, head width, or length/breadth ratio of funicular segments in both queen and worker caste, have been found to intergrade evenly and show a strong allometric trend with some degree of correlation with total body size.

It would thus appear that *umbratus* is morphologically an enormously variable species in all three castes, although Wilson does not give much attention to the similarly variable males. It will be a simplification to accept this synonymy on the evidence presented, but the matter is somewhat more controversial than with many recent nomenclatorial suggestions and should not pass without further comment. The extreme types of *umbratus* and *mixtus* are very dissimilar, at least as much so as any pair of similar but distinct species. Variability does not appear to occur in single colonies, which are usually very homogeneous even when apparently of intermediate type. Males, queens and workers from a *mixtus* colony show all the characters associated with this form consistently—reduced dentition, scarcity of eye hairs and shining body in the male, absence of standing hairs on tibiae and scapes and short funicular segments in the females. According to Wilson's study these characters are correlated with reduced body size in N. European populations. This certainly appears to be the case with males and queens, but not necessarily so with workers. The writer has examples of hairy workers from Sherwood Forest and from Surrey that are considerably smaller than *mixtus* from various sources in his possession.

Records of *mixtus* in the literature do not in general show any particular habitat preference as opposed to *umbratus*. Donisthorpe (*loc. cit.*), however, described *mixtus* colonies among Juniper in Surrey; the writer has found similar colonies associated with Juniper in Westmorland in 1954, in Glen Urquhart, Inverness-shire, in 1955, and has found this form more frequently on rough grassy hillsides than in woodland. A curious characteristic, mentioned by Donisthorpe (*loc. cit.*) but not discussed by Wilson, is that *umbratus*

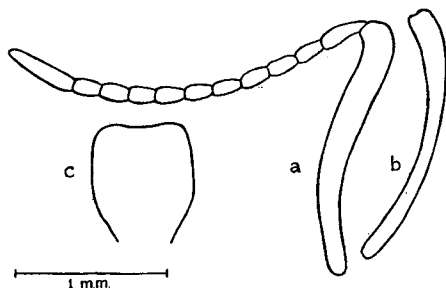


Fig. 1. *Lasius rabaudi* Bondroit, queen from Weybridge, Surrey, ex coll. Donisthorpe.

- (a) Antennal scape and funiculus seen from above.
- (b) Antennal scape seen from in front.
- (c) Outline of petiole seen from in front.

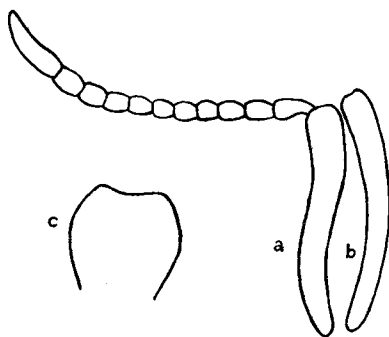


Fig. 2. *Lasius umbratus* Nylander, queen from Uffington, Lincs.

- (a) Antennal scape and funiculus seen from above.
- (b) Antennal scape seen from in front.
- (c) Outline of petiole seen from in front.

workers from different localities do not fight together but are immediately aggressive towards other species such as *flavus* and, also according to Donisthorpe, to *mixtus*. The writer has himself tested out this behaviour, but not as yet with *mixtus*. It is clear that, while the synonymy proposed by Wilson is unchallengeable, there is at least a hint of ecological and behavioural differences that should be further studied before entirely abandoning any distinction between the two forms.

Wilson also synonymizes *affinis* with *umbratus* on the argument that the petiole shape in *umbratus* is too variable to warrant any distinction between them. However, *affinis* was regarded by some of the older writers, including André (1881) and Forel (1920), as a form of the distinct species *bicornis*. An important characteristic referred to by André (*loc. cit.*), Donisthorpe (*loc. cit.*) and Stitz (1939) is the greater length of the dorsal gastric hairs on the workers as compared with *umbratus*. This is also a feature shared by *bicornis*. The writer has examples of such workers from France with *affinis* petiole shape but long gastric hairs and flattened scapes as described by Wilson for *bicornis*. These characters are beyond the range diagnosed by Wilson for *umbratus* and the specimens in question cannot be keyed to either *umbratus* or *bicornis*. The variety *affino-umbratus* Donisthorpe (1927) from specimens taken in Pembrokeshire is according to Donisthorpe's own description only a form of *umbratus* and is synonymized under that species by Wilson.

Wilson distinguishes *rabaudi* Bondroit from *umbratus* on characters to be clearly seen only in the queen caste. The scape is said to be flattened so that the minimal mid-point width is less than 0.1 mm. At the same time the funicular segments of the antennae are at least 1.47 times as long as broad. The petiole outline is characteristically subquadrate. These features appear to overlap in the worker caste with the hairy form of *umbratus*, while the males are indistinguishable. According to Wilson the flattened scape in the queen caste is alone reliable but quite distinct from that of *umbratus* where the minimal mid-point width always exceeds 0.1 mm. Workers and queens of *rabaudi* have abundant standing hairs on the scapes and tibiae. In many respects *rabaudi* thus appears to form one extreme of the *umbratus* complex just as *mixtus* with its thicker semi-cylindrical hairless scape and broad funicular segments represents the other. The discontinuous variation of the scape character alone makes it possible to distinguish *rabaudi* as a separate species.

Wilson considers that *rabaudi* is probably a common palearctic species although hitherto seldom recognized and specimens have been so determined by him from Sweden, Holland, France, Austria, Switzerland, Jugoslavia and England (a queen labelled "Inghilterra Crawley" in the Finzi collection). Mr. J. A. Pontin has located more of Crawley's specimens in the Oxford University Museum and among them are series of queens, both unaccompanied and accompanied by males and workers from Surrey, Berkshire and Hampshire, which show all the *rabaudi* characters as described by Wilson. The writer is grateful to Mr. Pontin and to Professor G. C. Varley for the opportunity of seeing some of these specimens, all of which date to forty or more years ago. No recent specimens of English *rabaudi* are known at the present and much further information is required concerning the nesting habits and distribution of this species. *Rabaudi* does not appear to occur in the Midlands or N. Britain to judge from the writer's own collection and Pontin (personal communication) suggests that the species may be restricted to the heathlands of S. England.

Because of the great variation in characters in populations of *Lasius* from Eurasia and America as a whole Wilson's keys are somewhat involved and rely to a large extent on rather precise measurements. The couplet relating to *flavus* and *umbratus* on page 30 for example reads as follows:

"14. Either the genal margins of the worker seen in full face with standing hairs prominent above the ground pubescence; or else the longest hairs of the posterior half of the first gastric tergite (exclusive of the extreme posterior strip) are distinctly less than half as long as the maximum width of the hind tibia at its midlength. In the queen the head width is about the same as the width of the thorax just anterior to the tegulae or greater.
 *umbratus* (Nylander) or *rabaudi* (Bondroit)

Genal margins of worker seen in full face lacking standing hairs; the longest hairs of the posterior half of the first gastric tergite (exclusive of the extreme posterior strip) at least half as long as the maximum width of the hind tibia at its midlength. In the queen the head width is much less than the width of the thorax just anterior to the tegulae. *flavus* (Fabricius)".

It will be noted that Wilson here uses an important diagnostic character, namely the relative length of the semi-erect hairs on the back of the abdomen. This appears to have been ignored by earlier writers and much facilitates the ready distinction between *umbratus* forms lacking standing appendage hairs and large workers of *flavus* which are sometimes superficially rather similar.



Distribution of *Lasius fuliginosus* Latreille 

The difficulty of certain distinction between workers of the two species is alluded to by O'Rourke (1950) but can now be simply resolved by examining the worker in question in profile when the very short hairs particularly of the *mixtus* form contrast with the much longer abdominal hairs of *flavus*. For other members of the British *Lasius* the keys of Donisthorpe are adequate enough and more easily followed. As already pointed out there is unfortunately no way of keying out *rabaudi* males and workers from *umbratus* and queens are essential. Since *rabaudi* has standing appendage hairs, however, there can be no confusion between it and the *mixtus* form of *umbratus*.

The British species and their synonyms after Wilson are as follows:

1. *Lasius (Lasius) niger* Linnaeus
Syn. *Lasius niger* var. *alieno-niger* Forel
2. *Lasius (Lasius) alienus* Foerster
3. *Lasius (Lasius) brunneus* Latreille
4. *Lasius (Cautolasius) flavus* Fabricius
5. *Lasius (Chthonolasius) umbratus* Nylander
Syn. *Lasius mixtus* Nylander
Lasius umbratus var. *mixto-umbratus* Forel
Lasius umbratus var. *affino-umbratus* Donisthorpe
6. *Lasius (Chthonolasius) rabaudi* Bondroit
7. *Lasius (Dendrolasius) fuliginosus* Latreille

Keys to the British Species

Keys to the Males

1. Mandibles with five more or less distinct teeth. *umbratus* or *rabaudi*
Mandibles with single large apical tooth. 2
2. Head strongly emarginate, colour shining black *fuliginosus*
Head not or slightly emarginate, colour brownish-black. 3
3. Scape and tibiae with outstanding hairs. *niger*
Scape and tibiae hairless. 4
4. Frontal furrow indistinct. *flavus*
Frontal furrow distinct. 5
5. Frontal furrow strongly marked, wings smoky. *brunneus*
Frontal furrow less distinct, wings clear. *alienus*

Keys to the Workers

1. Colour shining black, head cordate. *fuliginosus*
Colour otherwise, head rounded to emarginate. 2
2. Colour yellow, eyes small. 3
Colour pale brown to blackish brown, eyes large. 5
3. Scape and tibiae with standing hairs. *umbratus* or *rabaudi*
Scape and tibiae hairless. 4
4. Hairs on upper surface of gaster long. *flavus*
Hairs on upper surface of gaster very short. *umbratus*
5. Scape and tibiae with standing hairs. *niger*
Scape and tibiae hairless. 6
6. Frontal area distinct. *brunneus*
Frontal area indistinct. *alienus*

Keys to the Queens

1. Head at least as broad as thorax at widest point. 2
Head narrower than thorax. 4
2. Colour shining black, scale rounded *fuliginosus*
Colour brownish, scale emarginate. 3
3. Scape conspicuously flattened, funicular segments longer than broad.
. *rabaudi*
Scape otherwise, funicular segments more or less cup-shaped. . *umbratus*

- | | |
|---|-----------------|
| 4. Underside of body yellowish, frontal furrow indistinct | <i>flavus</i> |
| Colour otherwise, frontal furrow more or less distinct | 5 |
| 5. Scape and tibiae with standing hairs | <i>niger</i> |
| Scape and tibiae hairless | 6 |
| 6. Frontal area clearly defined, wings smoky | <i>brunneus</i> |
| Frontal area indistinct, wings clear | <i>alienus</i> |

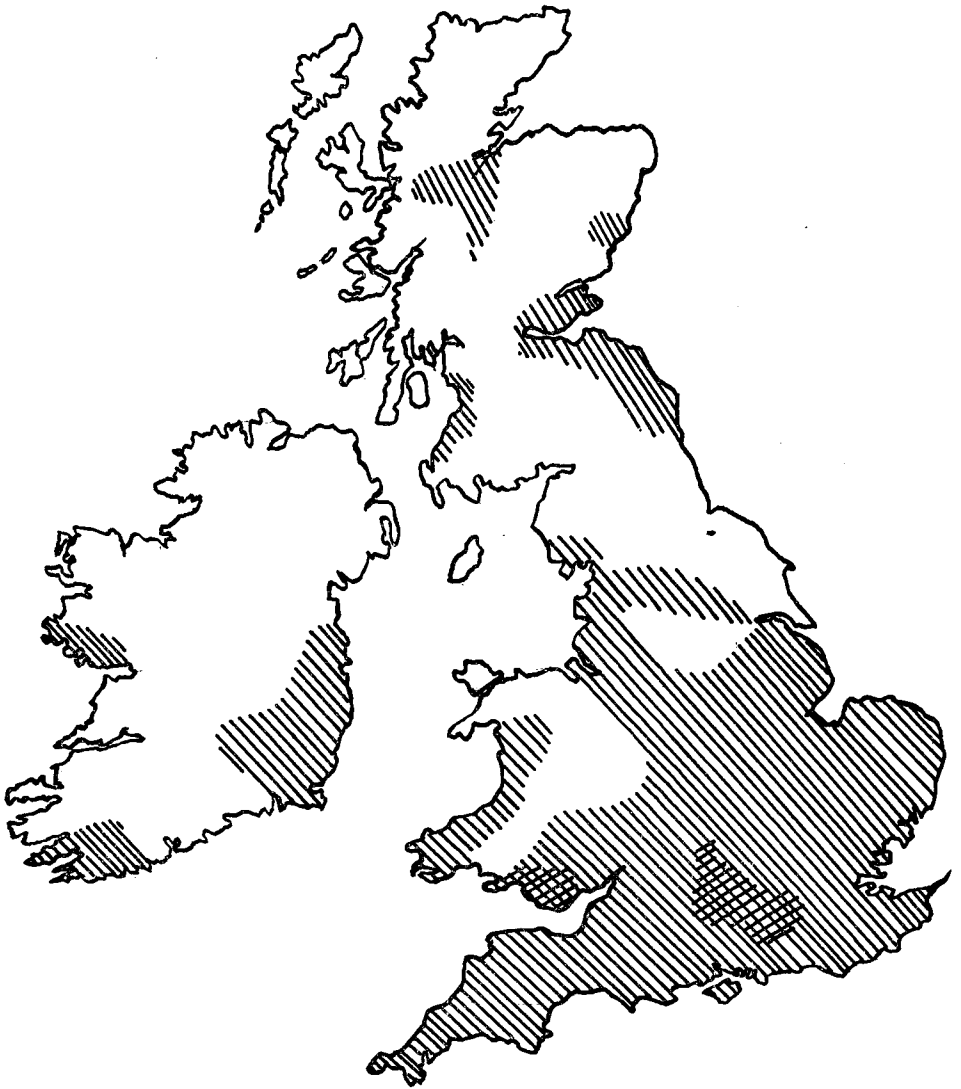
Notes on the Species

L. niger is widely distributed from Sutherlandshire southward. In the Scottish Highlands the species is restricted to river valleys and the sides of lochs such as Oyckell, Sutherland, Garve Ross and Loch Ness. It becomes common on the coasts of S. Scotland and N. Ireland and is abundant and generally distributed throughout England, Wales and S. Ireland. This is one of the first species to colonize man-disturbed areas such as felled woodland and quarries. It is frequently populous in gardens, invading glasshouses, kitchens and larders during the summer months. It is an aggressive and active species nesting in the soil, under stones and in tree stumps.

L. alienus occurs sporadically as far north as SW. Scotland but is characteristic of dry uplands and heaths in S. Britain. Examples of habitats where the species is locally dominant are parts of the Malverns and Cotswolds, many areas of dry sandy heath in S. England and the coasts of S. England and S. Wales. It is recorded from a few coastal areas in Ireland and does not appear to occur inland in England further north than Northamptonshire and Warwickshire. It is less aggressive and conspicuous than *niger* and tolerates drier situations, nesting in the soil, in turf banks but not in tree stumps.

L. brunneus has been recorded from Bedfordshire (Chambers, 1955), Oxfordshire and Buckinghamshire (Pontin, personal communication). It is not uncommon in Windsor Great Park and in parts of Worcestershire and Gloucestershire (Collingwood, 1954). It is a tree inhabiting species nesting in mature oak trees in this country but also occasionally in trees of other species and in coppices. The species appears to be restricted to the S. Midlands and the Thames valley but will probably be found to have a wider range over S. England. Although colonies are populous, it is a fugitive ant and may easily escape detection. Marriage flights occur in June at least a month or more earlier than the other species of this sub-genus.

L. flavus occurs as far north as Berriedale in Caithness and is abundant in the Loch Ness area and on the coasts of Banffshire and Aberdeenshire, but does not become widespread inland until the S. Highland belt in S. Perthshire. Further south it is extremely common and is probably the most abundant ant in Britain. The species is characteristic of old pastures and grassy hillsides where it builds the well-known earth mounds, but is also not infrequent in woodlands nesting in tree stumps and along rides. Macrergates and pterergates are not uncommon with this ant, which is the most polymorphic of the whole genus. Large dark coloured workers and smaller paler workers are usually present together in well established colonies.



Distribution of *Lasius umbratus* Nylander



Distribution of *Lasius rabaudi* Bondroit



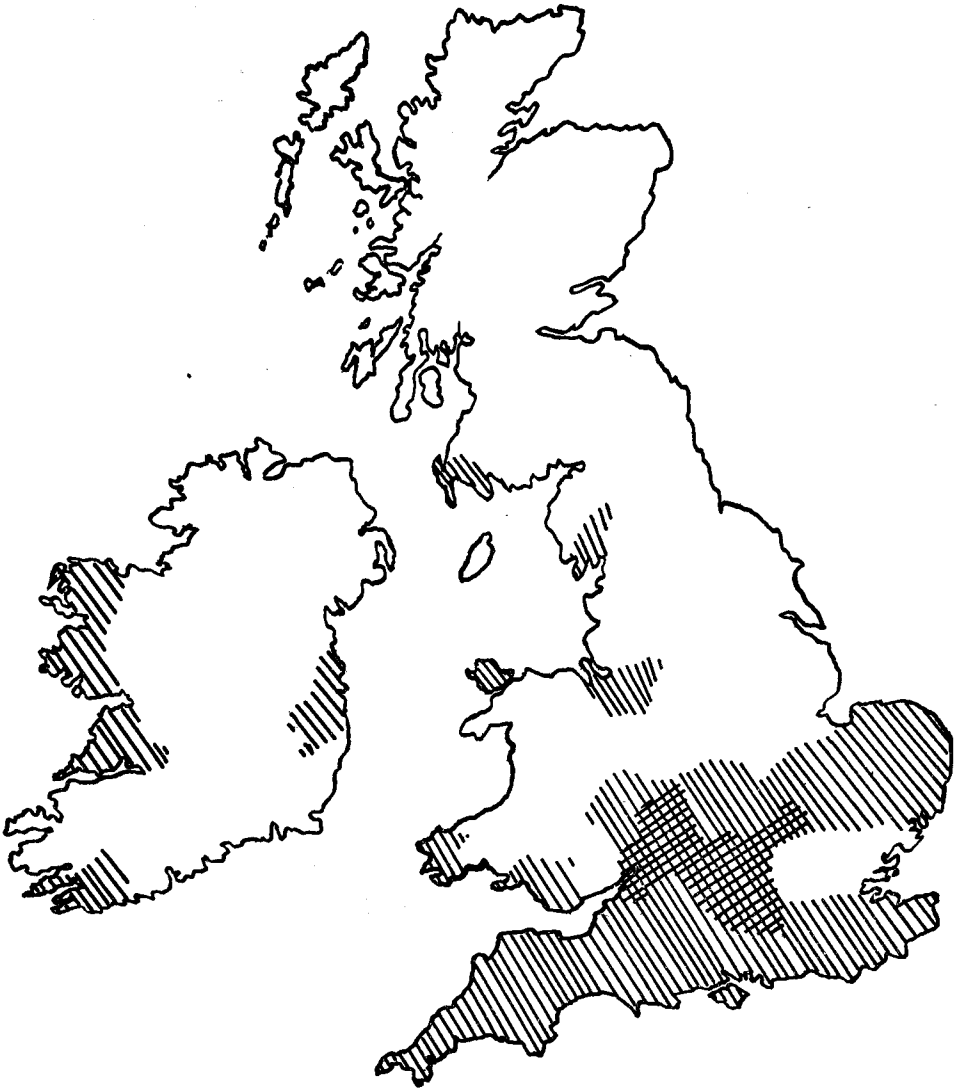
In all the above species fresh colonies are formed by single fertilized queens alone. Occasionally two or more queens are found in the same nest having probably started the colony together but single queens are the rule. At the end of the season any remaining unfertilized queens or those that have strayed back after a marriage flight are destroyed by the workers even in queenless colonies.



L. umbratus is widely distributed in England, Wales, Scotland and S. Ireland but, although taken as far north as Inverness-shire, is not common in N. Britain and nowhere abundant in this country. Nests frequently occur within the base of hollow trees or under deep stones. Occasionally earth mounds are thrown up but there is no consistency in this feature and because of its subterranean habits the species tends to escape observation. The queens have relatively massive heads and slender bodies compared with *flavus* and the *niger* group of species and there is some evidence from a few scattered observations and somewhat artificial experiments that they are unable to found fresh colonies unaided but do so by securing adoption with either *niger* or *alienus*. The writer has found freshly dead queens of *umbratus* in and about the nests of both *alienus* and *niger* on several occasions. It must be admitted, however, that the evidence for the colony founding behaviour of this group of species is scanty and further observation is desirable. In this connection it is perhaps worth mentioning that Wilson failed to secure the experimental adoption of American *umbratus* queens by various of the *niger* group of species and the writer has come across colonies of the similar hairless *mixtus* form in N. Britain in *flavus* territory where *niger* appeared to be absent. Both forms of *umbratus* have the same range in Britain.

L. rabaudi probably has similar habits to *umbratus* but little is known concerning this species as yet. As mentioned above the only known British specimens are from Surrey, Berkshire and Hampshire.

L. fuliginosus is the most conspicuous species of the genus, immediately recognizable by its large size and shining black colour. It is local but widely distributed in England from N. Lancashire, SW. Yorkshire and N. Lincolnshire southward. It also occurs in the Isle of Man, S. Wales, S. Ireland but not Scotland. It nests in trees but also occasionally in hedgerows, walls and in the ground, making large carton nests. Colonies tend to remain in possession of a site for a large number of years and frequently consist of intercommunicating nests covering a small area of woodland, each nest linked by workers moving in slow files over the ground. Such a colony has been observed by the writer intermittently for over twenty years in a Surrey woodland. The species sometimes starts fresh colonies through the adoption of fertilized queens by *umbratus* workers and mixed colonies of the two species have been reported on several occasions both in Britain and elsewhere. Once established a colony will perpetuate itself by branch nests.

Donisthorpe (1927), although somewhat anecdotal and fragmentary, gives much interesting and reliable information on the habits of the ants of this genus and his work should still be consulted for detailed observations on the British species.



Distribution of *Lasius alienus* Foerster 
Distribution of *Lasius brunneus* Latreille 

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Appendix

Since this paper was written examples of *L. rabaudi* from Porthcawl and Horton in Glamorganshire taken by Mr. H. M. Hallett have been found in the National Museum of Wales and in the Leicester City Museum. The writer is grateful also to Mr. K. E. J. Barrett for an example from Surrey taken as recently as 1954.