

A NEW POLYGYNOUS *LASIUS* SPECIES
(HYMENOPTERA ; FORMICIDAE)
FROM CENTRAL EUROPE

I. DESCRIPTION AND GENERAL BIOLOGY

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Reçu le 24 mars 1989

Accepté le 28 décembre 1989

SUMMARY

A new ant species *Lasius (Lasius) neglectus* spec. nov. is described from Budapest, Hungary. The workers are morphologically similar to *L. alienus*, but queens and males are clearly different and are much smaller. The species is polygynous, without apparent colony barriers, there are probably no nuptial flights, and intra-nidal mating has been observed; in this respect *L. neglectus* has several features in common with the polygynous Japanese species *L. sakagamii*. Workers forage in huge masses on aphids in tress. It is argued that the rather late discovery of *L. neglectus* might be due to its artificial introduction in Budapest from a yet unknown area. The status as a distinct species is further confirmed by allozyme data (BOOMSMA *et al.*, 1990, next paper).

RESUME

Une nouvelle espèce polygyne de *Lasius* (Hymenoptera; Formicidae) d'Europe centrale
I. Description et biologie générale

Une nouvelle espèce de fourmi *Lasius (Lasius) neglectus* spec. nov. est écrite de Budapest, Hongrie. La morphologie des ouvrières ressemble à celle de *L. alienus*, mais les femelles et les mâles sont clairement distincts, avec des tailles plus petites. L'espèce est polygyne, sans frontières de nids évidentes, les vols nuptiaux semblent absents ou en tous cas rares et des accouplements entre partenaires d'un même nid ont été observés. *L. neglectus* ressemble par ces caractères à l'espèce polygyne japonaise *L. sakagamii*. Les ouvrières recherchent en grand nombre les pucerons dans les arbres. Les auteurs postulent que la découverte récente de *L. neglectus* est peut-être due à son introduction artificielle à Budapest depuis une origine inconnue. Le statut spécifique de cette espèce est aussi confirmé par analyse d'allozymes (BOOMSMA *et al.*, 1990, article suivant).

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INTRODUCTION

In the early seventies one of the authors (AA) discovered in the garden surrounding the present Company for the Development of Fruit and Ornamental Production (Budapest, Hungary) an ant species, which he identified as the common *Lasius alienus* (FÖRSTER). However, since then the ant has become increasingly more numerous, expanding its range, virtually extirpating all other ant species from the area, causing problems in greenhouses and buildings. It also exploits aphids of any species in unusual huge masses on any available tree, involving thousands of workers running up and down tree trunks; colony boundaries gradually appeared to be non-existent. Eventually it was discovered that the species was polygynous, an otherwise rare phenomenon in the genus *Lasius*. Thus it became increasingly clear that this plague-ant population represented an unknown species, that might have been introduced to Hungary.

This paper describes the new species, based on material collected in the summer of 1988, and presents data on its presently known distribution and ecology. Data on allozyme variation at two marker-loci, confirming the species status and indicating aspects of the social structure are presented in the next paper (BOOMSMA *et al.*, 1990).

METHODS

Locality

The field work was done in the garden and direct vicinity of the Company for the Development of Fruit and Ornamental Production, in the districts Budatétény and Baross Gabor Telep, Budapest, Hungary (*fig. 1*). The distribution of *L. neglectus* spec. nov. was censused by inspecting trees along streets, parks and gardens for the presence of foraging workers. Ants were collected from nests and trees, and preserved in alcohol. Later several series of specimens were mounted. Data for *L. alienus* and *L. brunneus* (LATREILLE) presented in this paper are from workers collected just outside Budapest (*L. alienus*) and near the type locality of the new species (*L. brunneus*), with additional specimens (all castes) from elsewhere in western Europe in private collections and collections in the Institute of Taxonomical Zoology (Zoological Museum), Amsterdam, the Netherlands. Because *L. neglectus* is morphologically most similar to *L. alienus*, comparisons are mainly made with the latter species.

Measurements

For the data provided in *table 1* and *fig. 2-4*, a maximum of three randomly selected individuals per nest or sample site was used. Measurements are taken and presented following WILSON (1955): Head width (HW), maximum width of head when viewed in perfect full face, excluding eyes in queens and workers, including eyes in males; head length (HL), measured from the midpoint of the anterior border of the median clypeal lobe to the midpoint of the occipital border, when held in perfect full face; pronotum width (PW), measured from above at a right angle to the long axis of the alitrunk; scapus length (SL), maximum length excluding basal "neck"; derived from these measurements are cephalic ratio (HW/HL), and scape ratio (SL/HW).

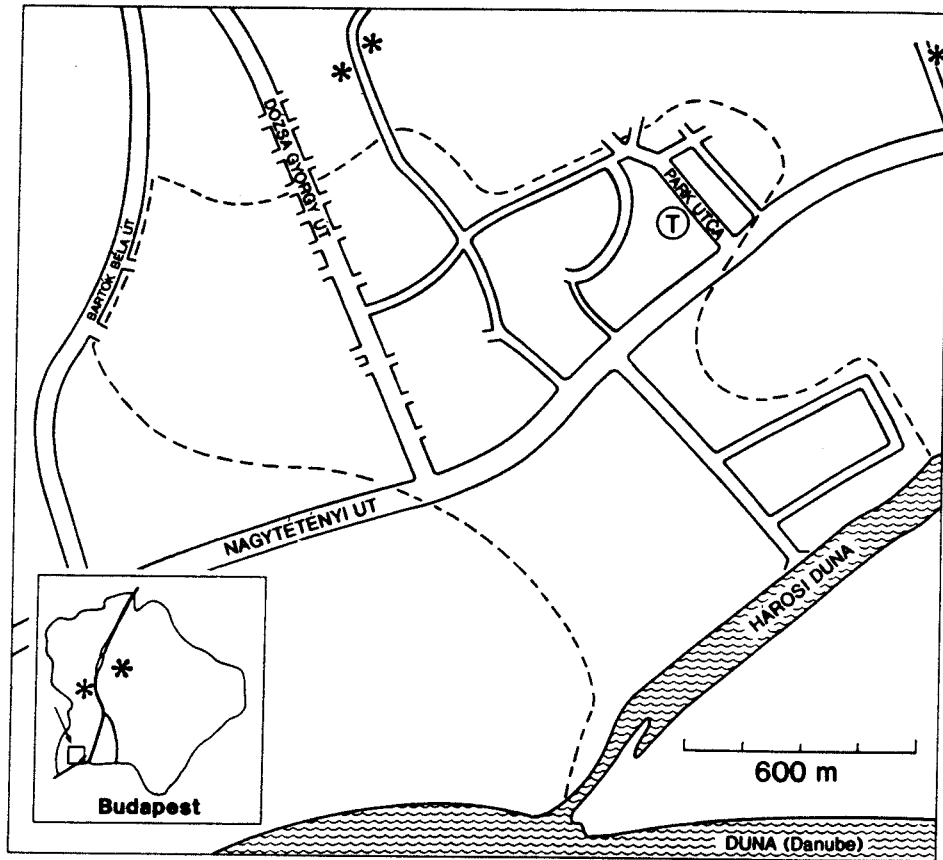


Fig. 1. — Distribution in 1988 of *Lasius neglectus* in Budapest. Legend: * isolated locality (3 just outside main range, 2 on the inset in the centre of the city); — — — estimated border of distribution; T = type locality.

Fig. 1. — Distribution en 1988 de *Lasius neglectus* à Budapest. Légende : * localité isolée (3 juste au dehors de la distribution principale, et 2 sur la carte du centre de la ville); — — — frontière estimée de la distribution; T = localité typique.

RESULTS

Lasius (Lasius) neglectus spec. nov.

Diagnosis

(comparisons are made with *L. alienus* from western and central Europe).

WORKER

Similar to *L. alienus*, but slightly smaller on average and by range (table I; fig. 2); body colour slightly paler brown. Clypeus not or only slightly keeled (*L. alienus* with slight but still rather more clearly defined keel on clypeus). Mandible nearly always with 2 basal teeth (fig. 5A), only very exceptionnally with 3 teeth (*L. alienus* has 3 basal teeth, fig. 5E). Scapes and fore tibiae completely without standing hairs. Standing hairs on alitrunk clearly shorter than in *L. alienus* (cf. fig. 5B and 5F).

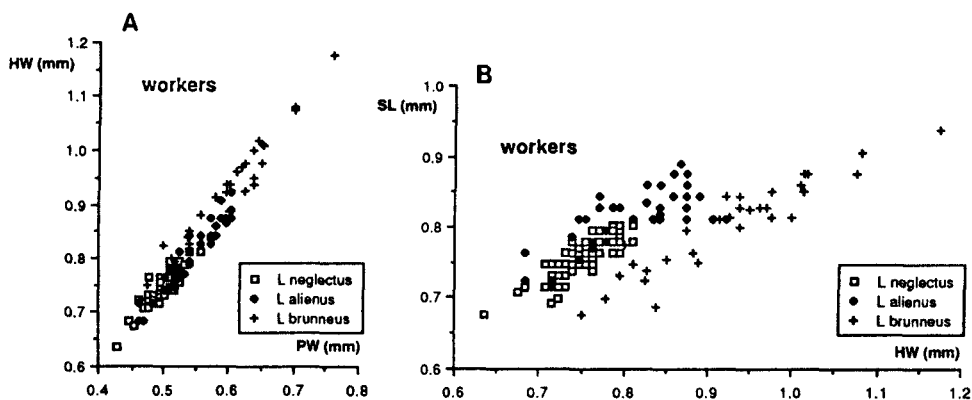


Fig. 2. — Correlation of morphological variables in workers: (A) between HW and PW, (B) between SL and HW.

Fig. 2. — Corrélation des variables morphologiques chez les ouvrières : (A) entre HW et PW, (B) entre SL et HW.

QUEEN

Much smaller than *L. alienus* (table I; fig. 3). Body colour dark brown, legs and scapes paler brown. Body clearly darker and less reddish brown than *L. alienus*. Scapes and fore tibiae without standing hairs. Head and alitrunk covered with standing hairs. Wings hyaline, not infuscated.

MALE

Much smaller than *L. alienus* (table I; fig. 4). Body colour dark brown, legs paler brown. Body clearly darker and less reddish brown than *L. alienus*. Scapes and fore tibiae without standing hairs. Head and alitrunk sparsely covered with standing hairs. Wings hyaline, not infuscated. Subgenital plate without protruding lobes (cf. fig. 5C and 5G). Sagitta with 10-17 teeth (cf. fig. 5D and 5H). (See also drawings of other *Lasius* species in BERNARD, 1968 and KUTTER, 1977).

Table I. — Measurements of *Lasius neglectus*, *L. alienus* and *L. brunneus*. Maximally 3 individuals per colony are included. Average (avg), standard deviation (sd), sample size (n), and range (min-max) are given. HW = head width, HL = head length, PW = pronotum width, SL = scapuslength, all in mm.

Tableau I. — Mesures de *Lasius neglectus*, *L. alienus* et *L. brunneus*. On a mesuré un maximum de 3 individus par colonie. Moyenne (avg), déviation standard (sd), nombre d'individus (n), et valeur minimale et maximale (min-max) sont donnés (toutes en mm). HW = largeur de la tête, HL = longueur de la tête, PW = largeur du pronotum, SL = longueur du scape.

WORKERS	HW	HL	HW/HL	PW	SL	SL/HW
<i>L. neglectus</i>						
avg	0.75	0.82	0.91	0.50	0.75	1.01
sd	0.03	0.03	0.02	0.02	0.03	0.03
n	63	63	63	63	63	63
min	0.64	0.72	0.89	0.43	0.68	0.96
max	0.81	0.88	0.99	0.56	0.80	1.06
<i>L. alienus</i>						
avg	0.81	0.87	0.93	0.55	0.81	1.01
sd	0.06	0.05	0.03	0.04	0.04	0.05
n	36	36	36	36	36	36
min	0.68	0.75	0.88	0.46	0.72	0.88
max	0.92	0.97	1.02	0.60	0.89	1.12
<i>L. brunneus</i>						
avg	0.93	0.95	0.96	0.60	0.80	0.87
sd	0.10	0.07	0.02	0.07	0.06	0.04
n	31	16	16	31	31	31
min	0.75	0.84	0.93	0.48	0.68	0.80
max	1.18	1.07	1.01	0.76	0.94	0.97
QUEENS	HW	HL	HW/HL	PW	SL	SL/HW
<i>L. neglectus</i>						
avg	1.34	1.20	1.12	1.54	1.03	0.77
sd	0.03	0.03	0.02	0.07	0.02	0.02
n	17	17	17	17	17	17
min	1.27	1.16	1.08	1.41	0.99	0.72
max	1.39	1.24	1.17	1.68	1.07	0.81
<i>L. alienus</i>						
avg	1.61	1.42	1.13	1.93	1.20	0.75
sd	0.05	0.03	0.03	0.04	0.03	0.03
n	13	13	13	13	13	13
min	1.56	1.38	1.09	1.84	1.15	0.70
max	1.70	1.46	1.20	1.98	1.23	0.79
<i>L. brunneus</i>						
avg	1.64	—	—	1.61	1.11	0.68
sd	0.03	—	—	0.05	0.03	0.02
n	9	—	—	9	9	9
min	1.58	—	—	1.53	1.08	0.65
max	1.69	—	—	1.68	1.15	0.71
MALES	HW	HL	HW/HL	PW	SL	SL/HW
<i>L. neglectus</i>						
avg	0.71	0.62	1.15	0.62	0.46	0.65
sd	0.04	0.03	0.02	0.04	0.02	0.03
n	23	23	23	23	23	23
min	0.68	0.59	1.10	0.59	0.41	0.56
max	0.80	0.68	1.19	0.72	0.51	0.70
<i>L. alienus</i>						
avg	0.89	0.72	1.24	0.89	0.59	0.66
sd	0.04	0.03	0.03	0.03	0.03	0.02
n	12	12	12	12	12	12
min	0.81	0.67	1.19	0.83	0.54	0.61
max	0.95	0.77	1.29	0.94	0.62	0.70
<i>L. brunneus</i>						
avg	1.10	—	—	0.99	0.68	0.62
sd	0.04	—	—	0.04	0.03	0.02
n	9	—	—	9	9	9
min	1.05	—	—	0.93	0.65	0.58
max	1.15	—	—	1.04	0.73	0.64

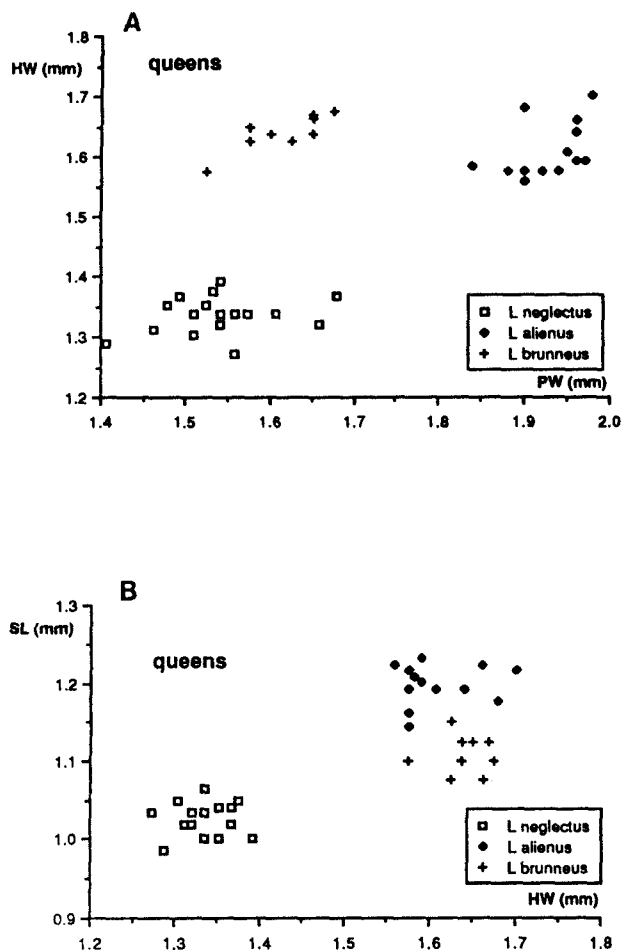


Fig. 3. — Correlation of morphological variables in queens: (A) between HW and PW, (B) between SL and HW.

Fig. 3. — Corrélation des variables morphologiques chez les femelles: (A) entre HW et PW, (B) entre SL et HW.

The species is further characterized by the fact that it is polygynous, by its pattern of allozyme variation (BOOMSMA *et al.*, 1990), and by the huge numbers of workers involved in tending and feeding on aphids and scale insects in trees (much more conspicuous than in other *Lasius* s. str. species, even *L. brunneus*).

Using recent keys (e.g. AGOSTI and COLLINGWOOD, 1987 for workers, KUTTER, 1977, BERNARD, 1968), all castes of *L. neglectus* would be identified as *L. alienus*. It should be noted that *Lasius*-“species 1” in AGOSTI and COLLINGWOOD (1987) refers to workers of yet another species, collected in eastern Austria by J.J. BOOMSMA; it is a very dark *alienus*-like species, but again with a distinct allozyme pattern (BOOMSMA *et al.*, 1990). It was also

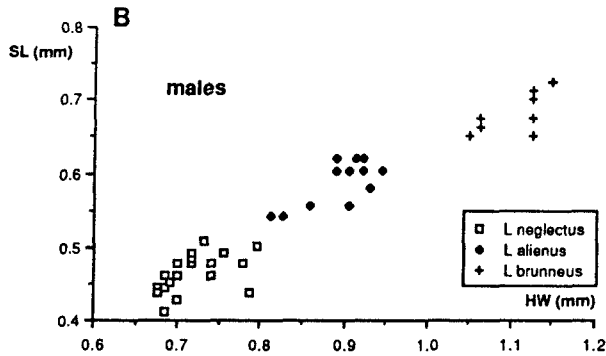
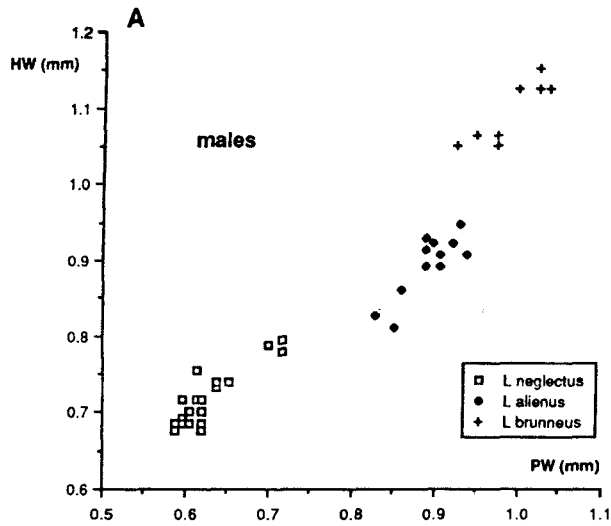


Fig. 4. — Correlation of morphological variables in males: (A) between HW and PW, (B) between SL and HW.

Fig. 4. — Corrélation des variables morphologiques chez les mâles : (A) entre HW et PW, (B) entre SL et HW.

found in 1988 in Budapest. Awaiting the collecting of sexuals, this species will be further dealt with in a later paper.

Description

WORKER

Body length 2.5-3.5 mm; further measurements in *table I*.

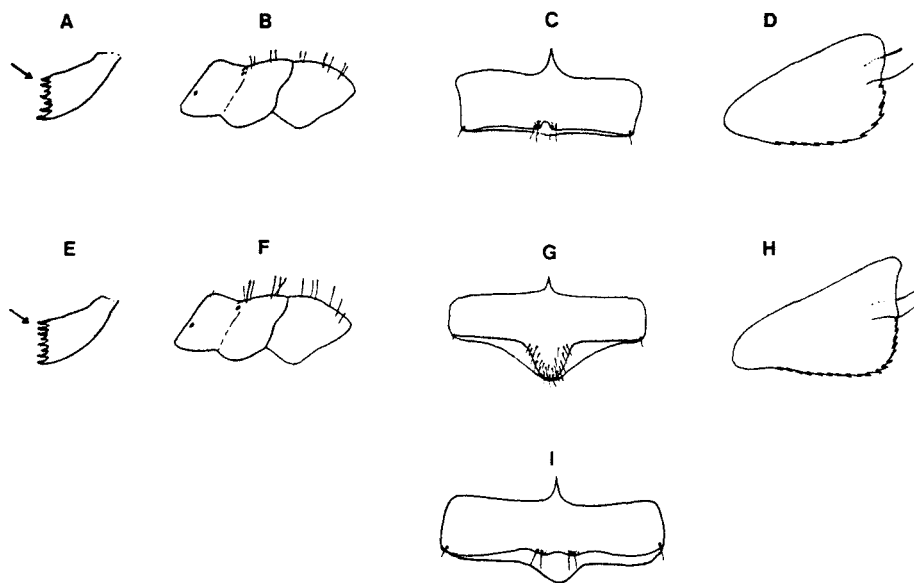


Fig. 5. — *Lasius neglectus*. (A) mandible of worker; (B) alitrunk of worker; (C) subgenital plate of male; (D) sagitta of male; (E-H) same for *L. alienus*; (I) subgenital plate of «*barbara*»-male.

Fig. 5. — *Lasius neglectus*. (A) mandibule de l'ouvrière; (B) thorax de l'ouvrière; (C) plaque sous-génitale du mâle; (D) sagitta du mâle; (E-H) les mêmes pour *L. alienus*; (I) plaque sous-génitale du mâle de «*barbara*».

Colour: body brown, unicolorous (sometimes head and gaster only slightly darker than alitrunk). Antennal scapes pale brown, funiculus gradually darkening towards tip. Legs: coxae and femora brown (like body), tibiae and tarsi paler brown, contrasting with the rest of the body.

Hairs: head, alitrunk and gaster covered with standing hairs, rising above the general pubescence, but especially on alitrunk short; scapus and fore tibiae without standing hairs, pubescent only; middle and hind tibiae may have an occasional standing hair.

Head: surface as alitrunk; occipital border, when viewed in perfect full face, more or less straight, neither clearly convex nor concave; frontal groove indistinct; ocelli small, indistinct on mounted specimens, but clearly visible on specimens preserved and viewed in alcohol; clypeus not or only very slightly keeled; maxillary palp rather long, three terminal segments equal in length; mandible with two basal teeth (*fig. 5A*; only very rarely three teeth).

Alitrunk: surface rather smooth, only finely reticulate, not very sculptured.

Petiolus: similar to *L. alienus*, dorsal border in frontal view slightly emarginate, in profile slightly thicker on anterior side than *alienus*.

QUEEN

Body length c. 6 mm; other measurements see *table I*.

Colour: body dark brown to blackish brown, unicolorous or gaster only slightly lighter brown; when viewed in alcohol, the body appears brighter brown. Antennal scapes yellowish brown, funiculus gradually darkening towards tip. Legs: coxae and femora brown, slightly paler than body, tibiae and tarsi yellowish brown.

Hairs: head, alitrunk and gaster covered with standing hairs rising above the general pubescence; scapus and tibiae without standing hairs, pubescent only.

Head: surface as alitrunk; occipital border, when viewed in perfect full face more or less straight, or only slightly concave; head width narrower than maximum width of thorax; clypeus not keeled.

Alitrunk: surface varying from rather smooth, only finely reticulate, to strongly sculptured (this may vary within nests); wings completely hyaline, only veins brown or yellowish brown.

Petiolus: similar to *L. alienus*; rather narrow in profile, in frontal view rather broad and dorsal border clearly emarginate.

MALE

Body length 2.5-3.5 mm; other measurements see *table I*.

Colour: body dark brown to blackish brown, unicolorous or gaster slightly duller and paler brown. Antennal scapes dark brown, as head, funiculus yellowish brown (not gradually darkening towards tip). Legs: coxae, femora and tibiae brown, slightly paler than alitrunk, tarsi yellowish brown.

Hairs: head, alitrunk and gaster sparsely covered with standing hairs, rising above the general pubescence; scapus and tibiae without standing hairs, pubescent only.

Head: surface as alitrunk; occipital border convex, sometimes plane of two posterior ocelli just projecting from border, occipital corners curving into sides of head; clypeus not keeled; mandible of "niger-type" (cf. WILSON, 1955).

Alitrunk: surface rather smooth, only finely reticulate, not strongly sculptured; wings completely hyaline, veins hardly coloured.

Petiolus: similar to *L. alienus*; rather short and thick in profile, in frontal view dorsal border slightly emarginate.

Gaster: subgenital plate without protruding lobes (fig. 5C).

Genitalia: sagitta with 10-17 teeth.

Type designation

HOLOTYPE:

Winged queen (mounted), garden of the Company for the Development of Fruit and Ornamental Production, Park utca, Budatétény (Budapest), Hungary, 24 June 1988, leg. A.J. VAN LOON.

PARATYPES:

(From the same nest as the holotype): 6 queens, 3 males and 4 workers (all mounted); other paratypes: 2 queens (mounted) from nest 5, same locality, 7 July 1988; 4 queens, 23 males, and many workers and pupae (all preserved in alcohol) from nest 3, same locality, 1 July 1988. The holotype and the paratypes are deposited in the collection of the Institute of Taxonomical Zoology (Zoological Museum), Amsterdam (ZMA). Other specimen series are deposited at the Rijksmuseum van Natuurlijke Historie, Leiden, the Netherlands (nest 5), and at the Natural History Museum, Budapest, Hungary (nest 8, 12 and 16). Remaining specimens from the type-nest, both mounted and preserved in alcohol, are in the private collection of A.J. VAN LOON.

Derivation of name

The new species is named after its rather late discovery, apparently being unnoticed for some time. We would like to add the following remarks: Two *Lasius* taxa, synonymized with *L. alienus* by WILSON (1955), have been reported from approximately the same Budapest districts: *L. alienus* var. *pannonica* RÖSZLER, 1942 (RÖSZLER, 1942, *fide* STARCKE, 1944), and *L. alienus lasioides* (EMERY, 1869) (EMERY, 1869; see also WILSON, 1955). Reasons why these names are considered to refer to other ants, and thus *not* to be available for the present species, are as follows: Judging from the description from RÖSZLER, workers and queens of *pannonica* are quite distinct from those of *L. neglectus*, despite their similar size. Type-material of *pannonica* could not be studied, as the types were lost during World War II (cf STARCKE, 1944; WILSON, 1955). *L. alienus lasioides* was described by EMERY from Naples, Italy. Later rather heterogenous material from several European localities was attributed to this name, and descriptions from various authors differ highly (cf. ZIMMERMANN, 1934; STITZ, 1939; StÄRCKE, 1944). The original description of Emery states that the queens have clearly infuscated wings, which are clearly not so in *L. neglectus*. Material from Budapest, identified as *lasioides* by StÄRCKE (1944), clearly differs from *L. neglectus* (StÄrcke collection, Rijksmuseum van Natuurlijke Historie, Leiden, The Netherlands); it may be the same taxon as the dark "*alienus*"-like, allozymatic distinct form mentioned above (species 1 in AGOSTI and COLLINGWOOD, 1987 and BOOMSMA *et al.*, 1990).

L. niger lasioides var. *barbara* SANTSCHI was described from northern Africa (SANTSCHI, 1921), and synonymized with *L. alienus* by WILSON (1955).

We have studied the mounted lectotypes and other specimens (workers only) from the Santschi-collection (Naturhistorisches Museum, Basel, Switzerland) and some alcohol-preserved material (all castes, collected by Dr. H. CAGNIANT in Algeria, June 1965). Although only few specimens could be examined, we consider *barbara* distinct from *L. neglectus* on account of the following characters:

Workers: Slightly but consistently larger than *L. neglectus* in all measurements. Mandibles and hairs on alitrunk as in *L. neglectus* (see description).

Queens: Similar in size to *L. neglectus*. When viewed laterally, the petiolus has a broader basis, thus appearing shorter and thicker than in *L. neglectus*.

Males: Larger than *L. neglectus* in all measurements. Same petiolus difference as in queens. Subgenital plate superficially similar to *L. neglectus*, but posterior edge distinctly more curved (cf. fig. 5C and 5I). Sagitta with 12-18 teeth. Both the mounted dry specimens and the alcohol-specimens of *barbara* are now clearly lighter and browner than west- and central-European *L. alienus* (and *L. neglectus*!), contrary to statements made by SANTSCHI (1921) in the original description ("nearly black"), and contrary to WILSON (1955: "darker than *alienus*"). Although coloration in preserved specimens may be lost to some degree as time proceeds, this discrepancy is remarkable.

Measurements

Measurements of *L. neglectus*, and the related *L. alienus* and *L. brunneus*, and correlations between body size variables are presented in tables I and II and figures 2-4. The morphological similarity of the workers of *L. neglectus* to *L. alienus* is evident from these data. Although *L. neglectus* is smaller on average, ranges overlap and the principle axes of correlation between HW and PW are very similar (table II, see also fig. 2A). More scatter was found in the correlation between SL and HW, but the correlation axes of *L. neglectus* and *L. alienus* are still very close (fig. 2B, the SL/HW ratio in table I and data in table II), the divergence being caused mainly by two outlying points. *L. brunneus* is clearly separated by its broader head (cf. SL/HW ratio in table I and fig. 2B).

The queens and males of all three species are distinctly separated in the correlation diagrams (fig. 2 and 3), as is also obvious from the data in table I.

Distribution and ecology

At present, *L. neglectus* is only known from Budapest. The boundaries of the 1988 distribution in the surroundings of the type locality are shown

Table II. — Product-moment correlation (SOKAL and ROHLF, 1981) between morphological variables in workers of *L. neglectus*, *L. alienus*, and *L. brunneus*. Given are the correlation coefficient (r), the equation of the principle axis, and 95% confidence limits to the slope of the principal axis.

Tableau II. — Corrélation (SOKAL et ROHLF, 1981) entre variables chez les ouvrières de *L. neglectus*, *L. alienus* et *L. brunneus*. Le coefficient de corrélation (r), l'équation de la droite de corrélation, et les limites de confiance à 95 % de l'inclinaison de l'axe principal sont donnés.

	principal axis	r	95% conf. limits
HW against PW			
<i>L. neglectus</i>	HW = 1.52 PW - 0.01	0.88	1.32 - 1.76
<i>L. alienus</i>	HW = 1.48 PW + 0.01	0.95	1.31 - 1.67
<i>L. brunneus</i>	HW = 1.51 PW + 0.02	0.98	1.30 - 1.64
SL against HW			
<i>L. neglectus</i>	SL = 0.83 HW + 0.13	0.84	0.70 - 0.98
<i>L. alienus</i>	SL = 0.66 HW + 0.26	0.81	0.50 - 0.86
<i>L. brunneus</i>	SL = 0.63 HW + 0.22	0.93	0.55 - 0.73

in figure 1, and were estimated to cover an area of ± 2 km². It is mainly a suburban habitat of houses with gardens, apartments and office blocks, streets bordered by trees, and small parks, with hardly any natural or semi-natural vegetation. Some isolated occurrences just outside this area are indicated on the map as well. These are likely to be the result of human transport of potted plants from the research institute, containing *neglectus*-queens. Another isolated locality, further away, is situated in the garden of the Budapest Historical Museum, on the southern side of the Várhegy (Castle District), in the centre of Budapest (fig. 1). Workers were found in massive numbers on only one tree and around decorative potted laurel trees; these laurel trees used to be hibernated in the greenhouses of the research institute, and are thus believed to have been the vectors by which *L. neglectus* reached this new locality, where it is certainly not very abundant yet. A second remote and isolated locality has been found in eastern Budapest (Petervárád utca and surroundings). How *L. neglectus* reached this locality is at present unknown.

At and around the type locality, nests have been found in various places, mostly under stones, in rocky soils and under and in man-made structures like houses, pavement edges, but also in grassy slopes, among tree-roots, and even in barren solid soil. No clear mounds were found. Colony boundaries appeared to be diffuse or non-existent. The polygyny of *L. neglectus* was demonstrated by digging in easily accessible nests: in this way several dealated active queens were usually found in the same burrow. On 24 June 1988 two copulas were observed in one nest, showing that intra-nidal mating

occurs. Also freshly dropped wings of queens were regularly found within nests, suggesting the immediate re-adoption of intra-nidally inseminated queens. Although the alate sexuals were sometimes present on or just below the soil surface, a clear nuptial flight was never observed, neither in 1988 nor in the previous 15 years. (A. Andrásfalvy, unpublished records and interviews with inhabitants of the area). From 10 July onwards no winged sexuals were found anymore.

L. neglectus appears to be a very opportunistic species occupying all available nest space and monopolizing virtually all trees for tending and harvesting aphids. Especially in the centre of its distribution, near the type locality, virtually all other ant species have disappeared during the last 15 years. The former ant-fauna in the garden of the research institute included at least the following species: *Messor structor*, *Tetramorium* spec., *Diplo-rhoptum fugax*, *Lasius niger*, *Formica cinerea*, *F. rufibarbis* and *Polyergus rufescens*. In 1988 only two small nests of *M. structor*, two of *Tetramorium*, two of *D. fugax*, and one nest of *L. umbratus* were found, and some foraging workers of *F. cinerea* and/or *rufibarbis* and *Camponotus piceus*. Near the edges of the distribution, and in older, somewhat more diverse small parks within the main range, other species were found as well: *L. niger*, *L. emarginatus*, *L. brunneus*, *F. rufibarbis* and/or *cinerea* (regularly), and *Prenolepis nitens*, *L. fuliginosus*, *Plagiolepis pygmaea*, *Camponotus vagus*, *C. truncatus* and *Dolichoderus quadripunctatus* (more rarely).

DISCUSSION

Polygyny in the genus *Lasius* sensu stricto is rare, and has only been demonstrated before for a Japanese species, *Lasius sakagamii* YAMAUCHI et HAYASHIDA (YAMAUCHI and HAYASHIDA, 1970; YAMAUCHI *et al.*, 1981). However, *L. sakagamii* is a very hairy species, more similar to *L. niger* than to *L. alienus*, and accordingly, the two polygynous *Lasius* species seem unlikely to be closely related species. Although not studied in detail here, the polygyny syndrome of *L. neglectus* and *L. sakagamii* appears to be remarkably similar: intra-nidal mating, retention of newly emerged queens in the nests, enormous diffuse colonies, and domination of the habitat (cf. YAMAUCHI *et al.*, 1981, see also BOOMSMA *et al.*, 1990). There are however also clear differences between them: queens and males of *L. sakagamii* are not extremely small, probably because at least part of the sexuals perform a nuptial flight; *L. sakagamii* occurs near river-banks and in dry river-beds and in rather open, dry, sparsely vegetated habitats, whereas *L. neglectus* appears to be readily adapted to man-made and urban habitats and behaves as a plague species; furthermore, the dependence on aphids in trees as the main food source is obvious in *L. neglectus*, whereas this was only observed occasionally

in *L. sakagami* (cf. YAMAUCHI *et al.*, 1981). This comparison suggests, therefore, that parallel evolution towards polygyny might have occurred within the subgenus *Lasius*.

The present distribution in Budapest resulted from and probably is still influenced by human transport through potted plants. Natural dispersal of newly emerged queens through nuptial flight probably is of very little importance, or even non-existent, as no nuptial flights have been recorded so far. Nevertheless natural dispersal occurs through expansion of and budding from the initial colony; this process, and the resulting domination of the habitat may be enhanced by the polygynic social organization, i.e. many queens per nest, starting to produce workers very soon after emergence and subsequent intra-nidal mating, and high numbers of workers having easy access to new nest sites and food resources. Probably, the absence or larger trees to accommodate the aphids is an important factor limiting the distribution in more plain, grassy and herbaceous areas. As a pest species, dominating local habitats, *L. neglectus* seems comparable to introduced fire ants, *Solenopsis invicta* BUREN and related taxa, and the Argentine ant *Iridomyrmex humilis* (MAYR). The spread of such pest ants depends largely on their ability to disperse by nuptial flight. In monogynous fire ants both sexes are involved in flights throughout the year, which expands the area of infestation by several km each year (MARKIN *et al.*, 1971). Argentine ants, on the other hand, have a much more limited dispersal, as the newly maturated queens are inseminated in their nest of origin and do not normally take part in any dispersal flight afterwards (KELLER & PASSERA, submitted). The lack of recorded nuptial flights in *L. neglectus*, the significant inbreeding coefficient, see BOOMSMA *et al.*, 1990) and the still very limited distribution area of 2 km² suggest that *L. neglectus* is at least as limited in its dispersal as the Argentine ant.

Considering the polygynous social structure and the numerous workers involved in foraging, it is amazing that *L. neglectus* has not been discovered earlier. This may be partly explained by the close morphological similarity of the worker caste to *L. alienus*, perhaps preventing myrmecologists to look into nests any further. Alternatively, *L. neglectus* may be a recently introduced species in Budapest, which is consistent with its sudden discovery 15 years ago. The fact that it has been transferred since from the area near the type-locality to the centre of the city, shows that the species can be introduced quite easily. Following this introduction hypothesis and considering the fact that the western European and Mediterranean ant fauna are rather well known, the most likely source area of *L. neglectus* seems to be eastern Europe or western Asia. If this hypothesis is true, discovery of other localities is to be expected, and must certainly be looked for, considering the nuisance of this ant to humans and its severe impact on existing ant communities.

ACKNOWLEDGEMENTS. — We thank C. BARONI-URBANI, B. BOLTON, W.L. BROWN Jr., T.M. VAN DER HAVE, L. KELLER, and E.J. VAN NIEUKERKEN for commenting on an earlier draft of the manuscript. H. CAGNIANT gave additional comments on the manuscript and kindly supplied specimens of *Lasius alineus* var. *barbara*. M. BRANCUCCI and the Naturhistorisches Museum, Basel, Switzerland, kindly provided the type-specimens of *Lasius alienus* var. *barbara* under their care. The field work of A.J. VAN LOON was supported by the Uyttenboogaart Eliassen Foundation for the Advancement of Entomological Science, and J.J. BOOMSMA is supported by a C. and C. Huygens stipendium of the Netherlands Organisation for Scientific Research (N.W.O.).

References

- AGOSTI D., COLLINGWOOD C.A., 1987. — A provisional list of the Balkan ants (Hym. Formicidae) with a key to the worker caste. II. Key to the worker caste, including the European species without the Iberian. *Mitt. Schw. Ent. Ges.*, 60, 261-293.
- BERNARD F., 1968. — *Les Fourmis* (Hymenoptera Formicidae) *d'Europe occidentale et septentrionale. Faune d'Europe et du Bassin Méditerranéen*, 3. Masson, Paris.
- BOOMSMA J.J., BROUWER A.H., VAN LOON A.J., 1990. — A new polygynous *Lasius* species (Hymenoptera; Formicidae) from central Europe. II. Allozymatic confirmation of the species status and social structure. *Insectes Soc.*, 37, 363-375.
- EMERY C., 1869. — Enumerazione dei Formicidi che rinvenngonsi nei contorni di Napoli. *Ann. Acad. Asp. Natur. Napoli*, 2, 1-27.
- KELLER L., PASSERA L., SUBMITTED MS. — *Mating behaviour strategy of the Argentine ant Iridomyrmex humilis* (Mayr): *why do queens only seldom take part to a nuptial flight?*
- KUTTER H., 1977. — Hymenoptera Formicidae. *Insecta Helvetica*, 6, Zürich.
- MARKIN G.P., DILLIER J.H., HILL S.O., BLUM M.S., HERMANN H.R., 1971. — Nuptial flight and flight ranges of the imported fire ant, *Solenopsis saevissima richteri* (Hymenoptera: Formicidae). *J. Georgia Entomol.*, 6, 145-156.
- SANTSCHI F., 1921. — Nouvelles fourmis paléarctiques. *Bol. Soc. Esp. Hist. Nat.*, 21, 165-170.
- SOKAL R.R., ROHLF F.J., 1981. — *Biometry*, 2nd ed. W.H. Freeman, San Francisco.
- STARCKE A., 1944. — Retouches sur quelques Fourmis d'Europe. III. Autres *Lasius*. *Ent. Ber.*, 11, 153-158.
- STITZ H., 1939. — Die Tierwelt Deutschlands, 37. Hautflügler oder Hymenoptera I: *Ameisen oder Formicidae*. Jena.
- WILSON E.O., 1955. — A monographic revision of the ant genus *Lasius*. *Bull. Mus. Comp. Zool., Harvard Coll.*, 113, 1-199.
- YAMAUCHI K., HAYASHIDA K., 1970. — Taxonomic studies on the genus *Lasius* in Hokkaido, with ethological and ecological notes (Formicidae, Hymenoptera). II. The subgenus *Lasius*. *Journ. Fac. Sci., Hokkaido Univ., Ser. VI, Zool.*, 17, 510-519.
- YAMAUCHI K., KINOMURA K., MIYAKE S., 1981. — Sociobiological studies of the polygynic ant *Lasius sakagamii*. I. General features of its polydomous system. *Insectes soc.*, 28, 279-296.
- ZIMMERMANN S., 1934. — Beitrag zur Kenntnis der Ameisenfauna Süddalmatiens. *Verh. Zool. Bot. Ges. Wien*, 84, 1-65.