Lasius neglectus

a polygynous, sometimes invasive, ant

Universitat Autònoma de Barcelona

Centre de Recerca Ecològica i Aplicacions Forestals
CREAF

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Authors:

Xavier Espadaler, Ecology Unit and CREAF, Universitat Autònoma de Barcelona, 08193 Bellaterra, Spain
Xavier.Espadaler@uab.es

Víctor Bernal, CREAF , Universitat Autònoma de Barcelona, 08193 Bellaterra, Spain
v.bernal@creaf.uab.es

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Cover photographs: a worker *Lasius neglectus*; lateral view (courtesy of Juan Jesús López); dead ants inside a plug

Contents

HISTORY AND MORPHOLOGY

History

The species was described in 1990 (Van Loon *et al.* 1990) although its presence in the garden of the Company for the Development of Fruit and Ornamental Production at Budapest was already known from the early seventies (Andrásfalvy, in litt.). In the morphological description it was compared with *Lasius alienus* and *L. brunneus*. Furthermore, it was shown to be allozymatically distinct (Boomsma *et al. 1990*). Its specific status was temporally not clear-cut (Seifert 1992) although at present this seems to be undisputed. Its origin is believed to be in Asia Minor or Turkey (Seifert 2000). *Lasius turcicus* is the sister species of *L. neglectus* (Steiner et al. 2004).

Morphology

Worker (Figs. 1 and 3): The species belongs in a group of *Lasius* that lack erect hairs on the scapes and on the extensor profile of hind tibiae.

Figure 1. *Worker lateral view*

Mandibular dentition (Fig. 2) is reduced as compared with *L. lasioides, L. alienus, L. psammophilus, L. paralienus* or *L. piliferus* although this is a difference of statistical character.

Figure 2. *Worker mandible. Seven denticles (rarerly eight) is the usual number.*

Figure 3. *Worker head frontal view*

Female (Figs. 4 and 5): Immediately recognizable within the European *Lasius* by its comparatively reduced size and proportionately smaller gaster, as compared with the thorax.

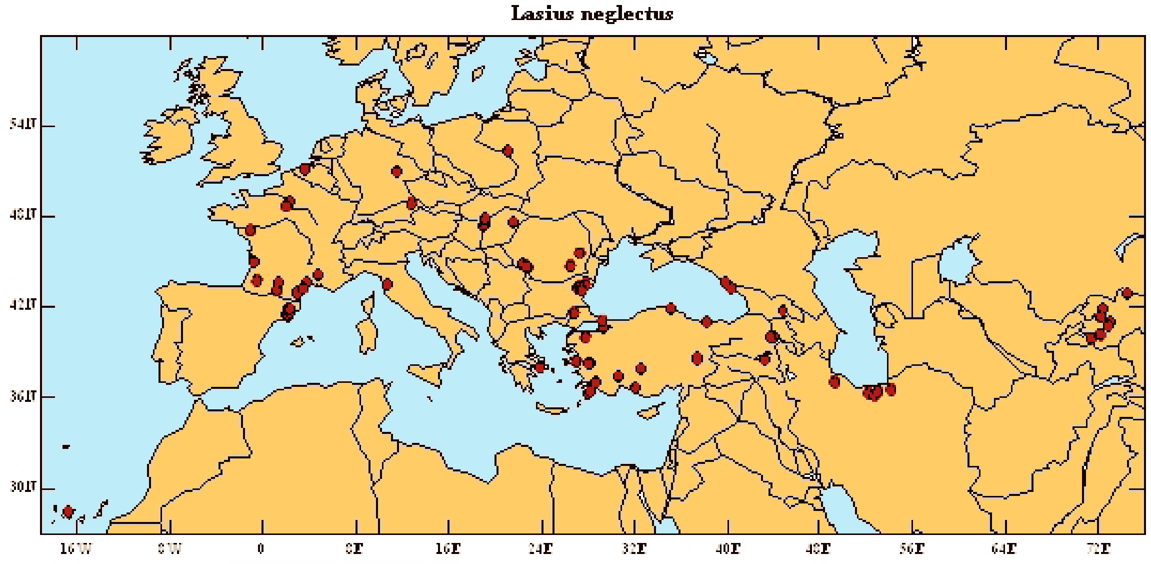
Figure 4. *Female frontal view*

Figure 5. *Cocoons of queens*

Male (Fig. 6): The smallest male within the European *Lasius* (s.str.) species.

Figure 6. *Male frontal view*

DISTRIBUTION



Known published localities (●) for Lasius neglectus *(n=108;October 2008). Coordinates are in degrees and decimal fractions of degrees. The specific identity of Turkish populations may be confirmed (C), definitely not confirmed (NC) or unknown (U).*

Country	Locality	Coordinates	Reference
Belgium	Ghent	51.02N,3.44E	Dekoninck *et al.* (2002)
Belgium	Flémalle NEW	50.59N,5.45E	D. Ignace leg.(2008) P. Wegnez
Bulgaria	Albena	43.20N,27.07E	Seifert (2000)
Bulgaria	Bhot	43.40N,28.13E	K.S. Petersen leg. (2004)
Bulgaria	Balcik	43.41N,28.16E	K.S. Petersen leg.(2004)
Bulgaria	Kavarna	43.43N, 28.33E	Seifert (in litt.)
Bulgaria	Kronevo	43.34N,28.05E	K.S. Petersen leg.(2004)
Bulgaria	Senokos	41.82N,23.23E	K.S. Petersen leg.(2004)
Bulgaria	Tolbuhin	43.56N,27.83E	K.S. Petersen leg.(2004)
Bulgaria	Varna Minicipality	43.21N,27.91E	K.S. Petersen leg.(2004)
France	Aigues Mortes NEW	Aigues Mortes NEW	C. Lebas leg. (2008)
France	Douarnenez	48.09N,4.36W	J. Wagenknecht leg. (2007)
France	Fontvieille NEW	Fontvieille NEW	H. Darras leg. (2008) Galkowski
France	Gif-sur-Yvette	48.68N,2.13E	Seifert (in litt.)
France	Lauris NEW	43.73N,5.32E	C. Lebas leg. (2008)
France	Montpellier	43.63N,3.85E	Marlier *et al.* (2002)
France	Narbonne-Plage	43.16N,3.16E	J.-L. Marrou leg. (2006)
France	Orange	44.13N,4.8E	Seifert (2000)
France	Paris	48.89N,2.33E	Jolivet (1986) (as *L. alienus*)
France	Pertuis NEW	43.66N,5.49E	C. Lebas leg. (2008)
France	Port Leucate	42.89N,3.03E	Seifert (2000)
France	St. Aubin de Médoc	44.9N,0.71W	C. Galkowski (in litt.)
France	St. Macaire en Mauges NEW	47.12N,0.59W	M. Coutand leg.
France	Ste. Croix du Verdon NEW	43.76N,6.17E	C. Lebas leg. (2008)
France	Saint-Sever	43.76N+0.56W	C. Galkowski (in litt.)
France	Toulouse	43.62N,1.42E	Seifert (2000)
France	Tour de Vazel NEW	43.53N,4.66E	H. Darras leg. (2008) Galkowski
France	Vigoulet-Auzil	43.50N,1.46E	Seifert (in litt.)
Georgia	Pizunda	43.16N,40.34E	Seifert (2000)

Georgia	Sotchi	43.58N,39.85E	Seifert (2000)
Georgia	Tiflis	41.74N,44.85E	Seifert (2000)
Georgia	Tiflis - 5 km E	41.73N,44.82E	Seifert (2000)
Germany	Jena	50.93N,11.60E	Seifert (2000)
Germany	Oberhaus	48.58N,13.46E	P. Sturm leg. 2005 (Seifert det.)
Greece	Athens	37.97N,23.75E	Seifert (2000)
Greece	Epta Piges, in Rhodes	36.26N,28.13E	Seifert (in litt.)
Greece	Kolymbia, in Rhodes	36.25N,28.10E	Seifert (2000)
Greece	Rhodes	36.40N,28.19E	Seifert (2000)
Hungary	Budapest	47.48N,19.12E	Van Loon *et al.* (1990)
Hungary	Debrecen	47.52N,21.62E	Tartally (2000)
Hungary	Érd	47.37N,18.92E	Tartally (2000)
Hungary	Tahi	47.77N,19.10E	Tartally (2000)
Iran	Abpari forest	36.56N,52.13E	O. Paknia leg. 2005, Seifert det.
Iran	Amol city	36.47N,52.36E	O. Paknia leg. 2005, Seifert det.
Iran	Astaneh Ashrafieh	37.26N,49.94E	O. Paknia leg. 2005, Seifert det.
Iran	Babolsar	3770N,52.64E	O. Paknia leg. 2005, Seifert det.
Iran	Gorgan city	36.83N,54.43E	O. Paknia leg. 2005, Seifert det.
Italia	Volterra	43.40N,10.83E	Seifert (2000)
Kyrgyzstan	~ Austay	40.00,72.05E	Schultz & Seifert 2005
Kyrgyzstan	Batken	40.03N,70.82E	Schultz & Seifert 2005
Kyrgyzstan	Bishkek(=Frunze)	42.82N,74.49E	Seifert (2000)
Kyrgyzstan	Burgöndü	41.05N,72.21E	Schultz & Seifert 2005
Kyrgyzstan	Dschalal-Abad	40.92N,73.00E	Schultz & Seifert 2005
Kyrgyzstan	Eski-Nookat	40.16N,72.37E	Schultz & Seifert 2005
Kyrgyzstan	Kara Suu	40.70N,7289E	Schultz & Seifert 2005
Kyrgyzstan	Karasnaja Maja	40.48N,73.20E	Schultz & Seifert 2005
Kyrgyzstan	Koshkor-Ata	41.01N,72.29E	Schultz & Seifert 2005
Kyrgyzstan	Kyzyl-Kyya	40.14N,72.03E	Schultz & Seifert 2005
Kyrgyzstan	Osh	40.30N,72.48E	Schultz & Seifert 2005
Kyrgyzstan	Tash Kumyr	41.83N,72.41E	Seifert (2000)
Poland	Warsaw	52.27N,21.04E	Czechowska & Czechowski (1999)
Romania	Băile Herculeane	44.86N,22.42E	Markó (1998)
Romania	Bucharest	44.41N,26.10E	V. Bernal leg. 2004
Romania	Drobeta-Turnu Severin	44.62N,22.64E	K.S. Petersen leg.(2004)
Romania	Dubova	44.61N,22.25E	K.S. Petersen leg.(2004)
Romania	Iselnita	44.69N,22.36E	K.S. Petersen leg.(2004)
Romania	Orsova	44.72N,23.40E	K.S. Petersen leg.(2004)
Romania	Rimnicu Sarat, Buzau	45.36N,27.15E	L. Barbu leg. (2007)
Romania	Rogova	44.47N,22.80E	K.S. Petersen leg.(2004)
Romania	Vanju mara	44.42N,22.87E	K.S. Petersen leg.(2004)
Spain	Barberà	41.51N,2.13E	Rey & Espadaler (2005)
Spain	Barcelona	41.38N,2.15E	Espadaler & Rey (2001)
Spain	Begues	41.32N,1.92E	F. García leg. (2005)
Spain	Bellaterra	41.43N,2.10E	Espadaler & Rey (2001)
Spain	Cerdanyola	41.48N,2.14E	Rey & Espadaler (2005)
Spain	Icod, in Tenerife	28.36N,16.72W	Espadaler & Bernal (2003)
Spain	Les Planes	41.46N,2.08E	Espadaler & Rey (2001)
Spain	L'Escala	42.12N,3.12E	Herraiz & Espadaler (2007)
Spain	Lliçà de Vall	41.59N,2.24E	Rey & Espadaler (2005)
Spain	Matadepera	41.61N,2.30E	Espadaler & Rey (2001)
Spain	Piera	41.52N,1.75E	R. Vila leg. (2005)
Spain	Ripollet	41.50N,2.14E	Rey & Espadaler (2005)
Spain	Sant Cugat	41.50N,2.10E	Espadaler & Rey (2001)

Spain	Sentfores, Vic	4.91N,2.22E	R. Vila leg. (2005)
Spain	Seva	41.80N,2.26E	Espadaler & Rey (2001)
Spain	Taradell	41.88N,2.30E	Espadaler & Rey (2001)
Turkey	Alanya (U)	36.56N,32.05E	Seifert (2000)
Turkey	Bayramiç (C)	39.48N,26.36E	Cremer (in litt.)
Turkey	Buçak (U)	37.40N,30.58E	Seifert (2000)
Turkey	Bulancak (U)	40.92N,38.14E	Seifert (2000)
Turkey	Darende (U)	38.54N,37.37E	Seifert (2000)
Turkey	Edirne – Mosque (C)	41.68N,26.55E	Cremer (in litt.)
Turkey	Edirne – Sanayi Sitesi (C)	41.39N,26.34E	Cremer (in litt.)
Turkey	Edirne – Vali Konagi (C)	41.06N,26.58E	Cremer (in litt.)
Turkey	Edirne – Muammer (C)	41.39N,26.35E	Cremer (in litt.)
Turkey	Halkapinar (NC)	37.31N,34.36E	Seifert (in litt.)
Turkey	Igdir (U)	39.92N,44.05E	Seifert (2000)
Turkey	Istanbul – Gülhane Park (C)	41.00N,28.98E	Cremer (in litt.)
Turkey	Kabali (U)	41.89N,35.08E	Seifert (2000)
Turkey	Kaymakçi (NC)	38.18N,28.13E	Cremer (in litt.)
Turkey	Konia (U)	37.83N,32.55E	Seifert (2000)
Turkey	Koycegiz (U)	36.95N,28.70E	Seifert (2000)
Turkey	Ödemis (NC)	38.20N,28.00E	Cremer (in litt.)
Turkey	Tuluzca (U)	40.00N,43.64E	Seifert (2000)
Turkey	Van (U)	38.43N,43.25E	Seifert (2000)
Turkey	Yalova (NC)	40.62N,29.28E	Cremer (in litt.)
Turkey	Yesilkoy (NC)	37.??N,37.??N	Seifert (in litt.)
Uzbekistan	river Aksu, Iordan	39.57N,71.45E	Schultz & Seifert (2005)

Present distribution is likely to have been mediated by human intervention (commerce and transport of goods, soil, potted plants). The isolated population from the Canary islands is a good example (Espadaler et al. 2007). Specifically, given the seemingly absence of nuptial flight, the dispersal capacity of this ant is very low. The local expansion is a very slow process and distances attained are two to five orders of magnitude smaller than minimum distances between known populations (Fig. 7)

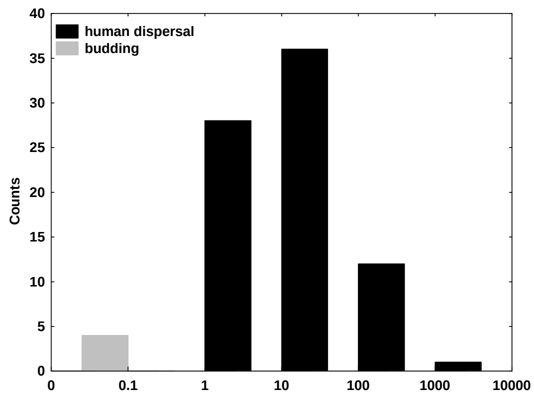


__Figure 7.__ Distribution of yearly local dispersal distances (grey) and long-dispersal events (black). X-axis units are km.

An analysis based on the first collection date (year) of non-native populations (up to June 2007) shows a regular increase over time, with a rate of two new localities discovered each year and from a new country every two years (Fig. 8). Samples dated earlier than 1990 (year of formal description) and coming from entomological collections, indicate already a growing trend.

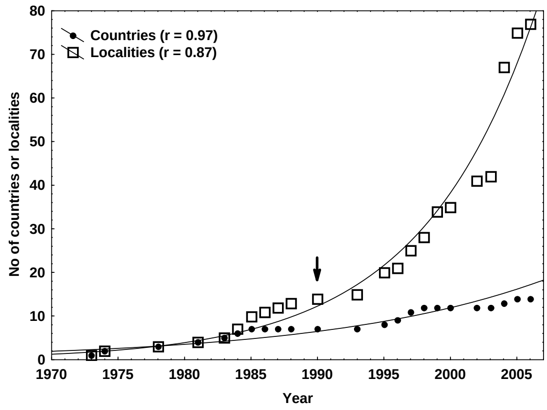


***Figure 8.** Relationship between the cumulative number of known countries and localities and time (year of collection for non-native populations). Arrow indicates year of formal description (1990).*

BIOLOGY

Life cycle. The scarce data noted below probably do not reflect the variation to be found between populations as northern as that from Warsaw (Poland) and those from southern Turkey. As compared with other *Lasius* species, the sexuals appear earlier in the year: as early as March, within heated buildings in Budapest (Andrásfalvy, in litt.). In three studied populations from NE Spain, activity throughout the year (Fig. 9) shows remarkably similar duration, beginning in early March until late November, when certain colonies in protected zones are still active.

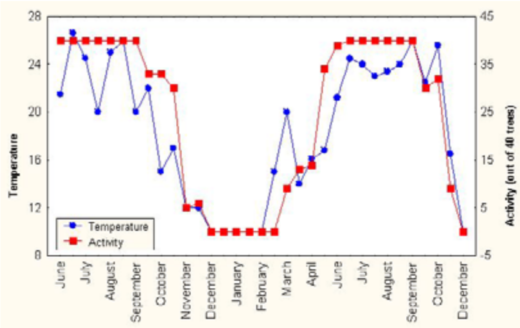


Figure 9. *Population: Seva, Spain. Fortnight data from June 2000 to December 2001. A single data available for November 2001.*

Daily activity. In two Spanish populations the ants remain active for 24 h/day from May to late October, with temperature controlling the daily cycle (Fig. 10).

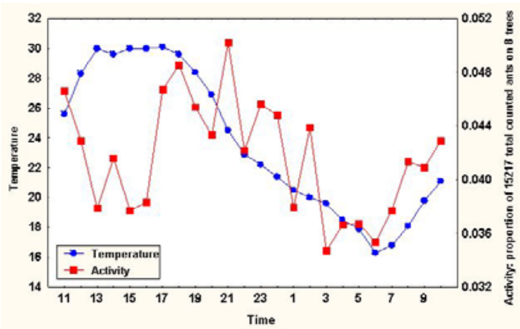


Figure 10. *Population: Seva, Spain. Data from June 2001. (Upcoming + downcoming ants)/2 in one minute.*

Food. This ant seems to be highly dependent on aphid honeydew. In North-east Spain, during the early season, when leaves are still lacking on deciduous trees or tree aphids are scarce, this ant constructs earth tents (Fig. 11) over small herbs protecting stem and root aphids.

Figure 11. *Population: Bellaterra, Spain. Earth shelters protecting aphids.*

In the full season ants visit aphids on different tree species in huge numbers and in rare instances individuals are seen carrying small prey (collembola, psocoptera). Ants are active throughout the entire day and aphid tending lasts for 24 h/day, from late April to late October, imposing a non-negligible cost on the energetic budget of individual trees. Preliminary quantitative measures indicate that ants can extract a mean of 250 cc honeydew per month on holm oak (*Quercus ilex*) and as much as 950 cc honeydew per month on poplar trees (*Populus nigra*). Tree species occupied in Spain :

Abies sp.
Acer artropurpureum L.
Acer negundo L.
Ailanthus altissima (Mill.) Swingle
Catalpa bignonioides Walter
Cedrus libani A.Richard.
Cedrus sp.
Citrus limon (L.) Blum.
Corylus avellana L.
Cupressus glabra Sudw.
Cupressus sp.
Phyllostachis sp.
Picea sp.
Pinus halepensis Mill.
Pinus pinea L.
Pinus silvestris L.
Platanus x hispanica Muenchh.
Populus tremula L.
Populus alba L.
Populus nigra L.
Prunus sp.
Prunus avium (L.)
Pyracantha sp.
Quercus ilex L.
Quercus pubescens Willd.
Quercus suber L.
Salix alba L.
Salix babylonica Rehd.
Tamarix gallica L.
Tilia platyphyllos Scop.
Ulmus minor Mill.

Sexuals physiological condition and behaviour. Nuptial flight seems to be absent. In a single instance alate males and queens were found in a spider net on a house wall (Seifert 2000: 178), although this is not a definite proof of flying behaviour. Except for this case, sexuals have never been detected flying out of the nest. Intranidal mating, thus, is probably the rule (Van Loon et al. 1990; Espadaler & Rey 2001).

Social structure. Depending on the populations, colonies are very difficult to delimit as they may coalesce and integrate a supercolony occupying continuous areas, as large as 17 ha. In urban areas the colonies are considerably split and may ocupy a single tree and up to 3600 ha. Finding many dealate queens (polygyny) in a nest is a key diagnostic characteristic of this species, the single polygynous European *Lasius* (s.str.). This biological aspect is very probably the best way to identify it, although it is advisable to verify with the morphology. The number of queens depends on colony size. Queen number, estimated by queens found under stones, is about 35500 in the supercolony of Seva. Using soil cores, worker number for that population in May 2002, was estimated as 1.12 x 10^8(Espadaler et al. 2004). The species merits the qualification of unicolonial. Internest and interpopulation relationships show the usual trait already known for unicolonial ants: a reduced level of agressiveness though some non-native populations show higher levels of aggression in lab tests. Laboratory tests on aggression should be refined to be fully applicable to this light-avoiding ant. *L. neglectus* is highly aggressive against three native Iberian *Lasius* species *(L. grandis* Forel, 1909, *L. emarginatus* (Oliver, 1792), and *L. cinereus* Seifert, 1992), expressed as a higher attack rate of *L. neglectus* and behavioural dominance throughout the aggressive encounters. Attacks of *L. neglectus* were performed fastest and most frequent against *L. grandis,* and also the highest antennation frequencies were observed in encounters between these two species. This could be due to the largest difference in body size, or due to a greater overlap in ecological niche between *L. neglectus* and *L. grandis* compared to the other two native species (Cremer et al. 2006).

Nesting habits. The areas occupied furnish a wide array of possible nesting sites: under stones (Fig. 12), temporal refuges with aphids at the base of herbs, amid rubbish (Fig 13).

Figure 12. *Population: Bellaterra, Spain. Nests under tiles.*

Figure 13. *Population: Seva, Spain. Rubbish provides excellet nesting opportunities!*

Nesting habitat. Non-native populations of this ant are strictly related to human-modified habitats -ranging from purely urban habitats in streets with heavy traffic (Fig. 14) to city gardens (Fig. 15), urban woods (Figs. 16, 17), small towns (Fig. 18) -or semi-urban areas.

Figure 14. *Population: Barcelona, Spain. One or more trees may be occupied. Ants inhabit the limited space with soil at the base of trees.*

Figure 15. *City garden in Debrecen, Hungary. Photograph by Gergely Szövényi.*

Figure 16. *Population: Debrecen, Hungary. Photograph by Gergely Szövényi.*

Figure 17. *Population: Taradell, Spain.*

Figure 18. *Population: Taradell, Spain. Every tree had trails of ants attending aphids.*

Colony expansion. The graphic (Fig. 19; lower fig.) shows the slow expansion process of one supercolony, that seems to be much helped by the progresive urbanization of lots. This development usually implies the cutting and burning of all natural vegetation but trees. The planting of grass and continuous irrigation that follows favours the establishment of the ants. The exact date of infestation in this population is unknown but aprox. 1985 is the first year in which nuisances at home were first noted. This slow local expansion rate has also been found at other populations (Espadaler et al. 2007).

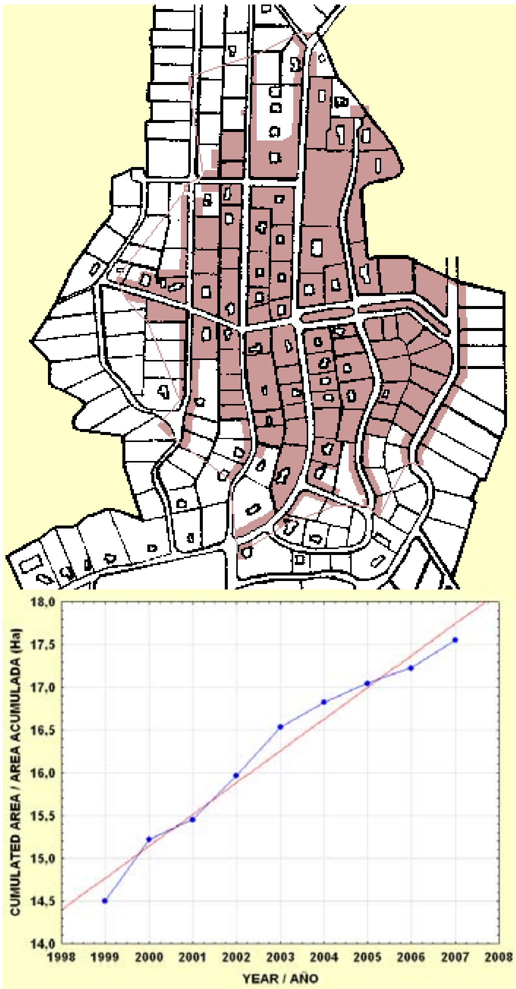


Figure 19*.* *Supercolony expansion process (Seva, Spain). The expansion rate looks constant but this is an effect of too few data points available. Colour indicates infested area (up to 2007).*

See also a map showing the area of the Debrecen supercolony (data from 1998, 2000, and 2002. The presence of different ant species' nest entrances was mapped. The expansion of *L. neglectus* was variable in space and time. It seems that *L. neglectus* spreads fastest on paths, and does not spread rapidly in shady and cool areas occupied by coniferous bushes. The data suggest that the relative *L. niger* (L., 1758) is more impacted by the invasion of *L. neglectus* than *Tetramorium* cf. *caespitum* (L.,1758). Moreover, *Liometopum microcephalum* (Panzer, 1798) and *Lasius fuliginosus* (Latreille, 1798) were able to defend their territory (Tartally 2006).

A recent experimental research by Ugelvig & Cremer (2007), using *L. neglectus* from four populations (Bellaterra, Jena, Seva, Volterra) is the first demonstration of contact immunity in social Hymenoptera. Social contact with individual workers that were exposed to a fungal parasite (*Metarhizium anisopliae* var. *anisopliae*) provided a clear survival benefit to non-treated ants, upon later contact with the same parasite. Behaviour was also affected: brood care was absent in infested ants whereas naive nestmates increased brood-care activities. The collective behavioural and physiological prophyllaxis work to promote the immunity of the society and to counteract the high risk of disease transmission.

PEST STATUS

Effects on other ants and arthropods in human-influenced habitats

Through their geographical distribution, the distinct populations live in a wide range of conditions, from strictly urban habitats - streets with heavy traffic to semi-urban sites, mildly degraded habitats or seemingly undisturbed localities. A common feature to all such places is the presence of trees, on whose aphid populations the ants depend.
Some of those populations have attained pest status, affecting man or other biological components. Those populations can properly be qualified as invasive (=an agent of change, threatening native biological diversity). Other populations are still merely established and seem to have a more limited expansion as they have yet to be reported as pernicious; this may correspond to the lag phase found in many invaders. Perhaps this is only due to lack of knowledge or, alternatively, climate has, indeed, a limiting effect on the dispersal or expansion processes. From its description, it is known that in the areas occupied by this species, other surface-foraging ant species (Fig. 20) have vanished or have very reduced populations.

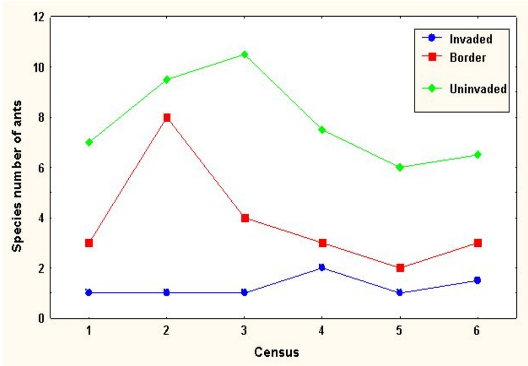


Figure 20. *Population: Seva, Spain. Species of ants in pitfall traps and baits. Monthly censuses. Census 1: April 2001.*

Other arthropod groups (Fig. 21) also seem to be affected in positive (=enhanced presence; aphids), negative (=lesser density; lepidoptera larvae) or neutral ways.

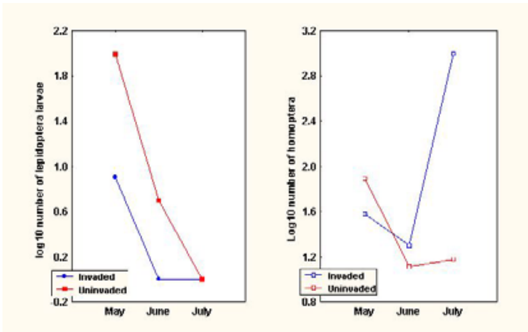


Figure 21. *Population: Seva, Spain. Aphid numbers are enhanced (right figure) in the invaded zones although lepidoptera larvae diminish in numbers (note log scale). Sampling methods: beating trays. Year: 2001.*

Effects at home

Not all populations seem to be invasive. In some of these, ants do not invade buildings or houses, and opt to nest outside, in public gardens, at the base of trees (Figs. 22) or in the cracks (Fig. 23) in cemented areas or sidewalks.

Figure 22. *Base of trees, population: Taradell. Soil is accumulated at the base, providing shelter for the ants.*

Figure 23. *Population: Budatétény, Budapest, Hungary. Photograph by Gergely Szövényi.*

In certain populations (Seva, Taradell, and Matadepera in Spain, or Paris, in France), ants enter buildings and occupy diverse components of the construction. Insecticide spray may produce impressive results (Fig. 24).

Figure 24. *Killing ants by insecticide spray.*

They seem to be attracted to electrical fields, causing failure and damage by shorting or by occupying electrical plugs (Fig. 25), connexion boxes (Fig. 26) or electro-mechanical devices, such as automatic blinds.

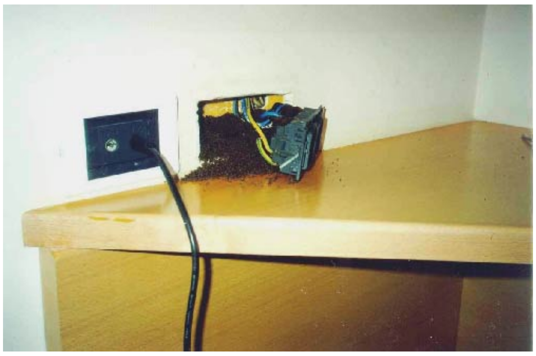


Figure 25. *Population: Matadepera, Spain. Photography by Montserrat Jorba (Matadepera).*

Figure 26. *Population: Seva, Spain. White irregular shape indicates accumulation of dead ants.*

CONTROL TRIALS

Here we report on field trials (Rey & Espadaler, 2005) that have been applied to a heavily invasive population of *Lasius neglectus* (Seva, Spain: 41.80N,2.26E) in which ants have been known, and recently reported, to invade houses and gardens from as early as 1985. 73 properties were affected, 45 with buildings. The surface of premises is variable. Mean values are: 500 m^2 total area, 200 m^2 constructed, some 50 trees plus bushes and green. *Prunus laurocerasus* or *Thuja* sp. are usually planted at the limits. Preliminary treatments had been tested in 1999 (one of the premises) and 2000 (four premises). As results were satisfactory, an informative meeting was officially prepared and a complete agreement was reached for treatment in 2001. The following year, some proprietors declined and their properties were not treated. Treatments (see details below) involved actions aimed at:

i) **killing ant food sources**. Efitax® (alfa-cypermethrin 4%) and Confidor® (imidacloprid 20%) were used to kill aphids by fogging tree canopies.

ii) **limiting access of ants to their food sources**. Fendona® (alfa-cypermethrin 6%) was applied to tree trunks.

iii) **impeding access to the interior of houses**. Baythion® (Foxim 50%) was used for a perimeter treatment in which insecticide was injected around the house, injections being spaced some 30 cm.

iv) **killing ants already present in houses**, by baiting with Blattanex® (Foxim 0.08%).

Products used in treatments. Values for quantities and time are means.

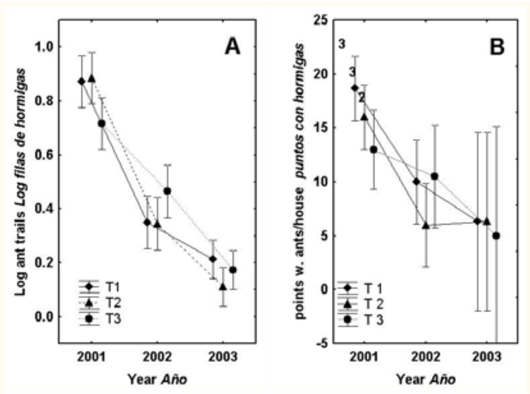


Figure 27. *Ant trails on tree trunks (A) and perimeter points with ants per house (B) in 3 treated zones (T1, T2, T3; n=30 trees per zone; 17-20 points per house) before any treatment (2001) and after treatments of 2002 and 2003.*

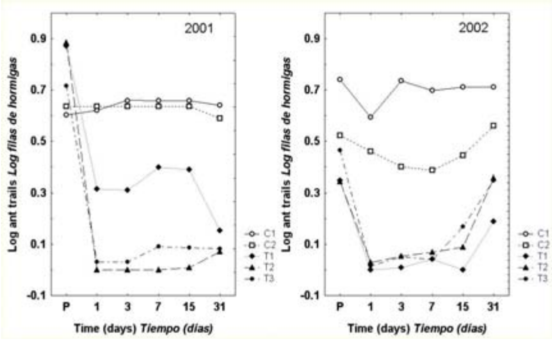


Figure 28. *Ant trails on tree trunks before the treatment (P) and after 1, 3, 7, 15 and 31 days. C1, C2: cotrols; T1, T2 and T3: treated areas.*

INTERACTIONS WITH OTHER ANIMALS

Ant guests

1. Crustaceans

1.1. *Platyarthrus schoblii* (Isopoda, Oniscidea) (Fig. 29A)

This tiny (2-4 mm), whitish woodlouse, is known from the Azores, the north Mediterranean and Black Sea coasts. It inhabits the nest of several species of ants in the genera *Formica, Lasius, Linepithema* and *Messor*. It was recently found outside of that region, in Hungary, within the nests of *Lasius neglectus*. For a summary update of its distribution and biology see Tartally et al. (2004) at http://www.oegef.at/MN_61-66.pdf.

1.2. *Platyarthrus hoffmannseggii* Brandt, 1833 (Isopoda, Oniscidea) (Fig. 29B)

Product	Dose	System	Time	Quantity (aprox.)
Fendona®	100 cc/15 l	Trunk spray	3 min/tree	600 cc/tree
Baythion®	100 cc/100l	Soil injection	3 sec/injection	500 cc/injection
Efitax® and Confidor®	100 cc/100 l	Fogging tree canopies	3 min/tree	4 l/tree

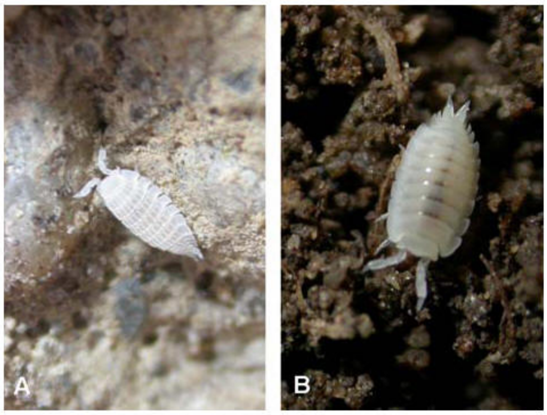


Figure 29. P. schoblii (A), P. hoffmannseggii (B) *are found in the nest galleries of several ant species.*

This woodlouse is widely distributed in Europe. It has been recently detected in nests of *L. neglectus* in Belgium (Dekoninck et al. 2007), showing that this ant is able to host also local woodlouse species.

2. Coleoptera

2.1. *Clytra laeviuscula* Ratzeburg, 1837 (Chrysomelidae) (Fig. 30)

A few larvae were found inside the nest of *Lasius neglectus* at Sant Cugat (Barcelona, Spain) nesting at the base of a poplar tree (*Populus nigra*), close to the railway. One male eclosed at the laboratory.Those larvae are supposed to eat ant eggs and larvae.

Figure 30. *Male and female* (Image from http://culex.biol.uni.wroc.pl/cassidae/European%20 Chrysomelidae/clytra%20laeviuscula.htm).

2.2. *Amphotis marginata* (Fabricius, 1781) (Nitidulidae)

Figure 31. *Adult of* A. marginata (Image from www.zin.ru/Animalia/Coleoptera/rus/ampmarhe.htm).

One beetle was recovered in the nest of *Lasius neglectus* at an outpost of the extensive Seva (Barcelona, Spain) supercolony. It feeds by forcing regurgitation in returning laden workers. If attacked, the beetle crouches down and is protected by its peculiar cuticular flanges.

3. Orthoptera

3.1. *Myrmecophilus (Myrmecophilus) acervorum* Panzer, 1799 (Gryllidae) (Fig. 32)

The small, blind crickets, were found in the nest of *L. neglectus* from three populations in Barcelona province: Bellaterra (one female, 2.iv.2003; one male, 16.vi.2004), Seva (one male, one female, 30.iv.2003) and Begues (one juvenile, 20.x.2005). Another possible name to apply is *M. myrmecophilus* but its status as a good species is still unsettled

Figure 32. Myrmecophilus *crickets are to be found within the nests of many ant species. Female (inset: ovipositor).*

4. Collembola

4.1. *Cyphoderus albinus* Nicolet, 1842 (Cyphoderidae) (Fig. 33)

This springtail has been recently found in nests of *L. neglectus* in Belgium (Dekoninck et al. 2007). The species is a common occurrence within nests of European ants.

Figure 33. *Springtail* (Image from http://www.geocities.com/~fransjanssens/taxa/collembo.htm)

Other interactions

1. Aphids

1.1. Aphids tended by *Lasius neglectus* in Spain. The ants have been recorded from >20 tree species in Spain; therefore, it is likely that the aphid species involved are also varied. Here are a few examples.

***Figure 31**. Greenish aphids on a young, lateral shoot of* Quercus ilex.

***Figure 32**. Tending blackish aphids on the thistle* Cirsium eriophorum*.*

***Figure 33.** Tending* Lachnus roboris *(Lachnidae) on a branch* Quercus ilex*. This enormous aphid is an important honeydew source for* Lasius neglectus *at the populations of Bellaterra and Seva.*

2. Birds

2.1. *Lasius neglectus* – and other ant species- as prey for birds

In February and March 2000, and along the sideways of some non urbanized lots, we observed that the soil was excavated all along. A bird was seen at that level and thereafter droppings (Fig. 34) were recovered from the same area. Here are and this is what they contained (Figs. 35, 36). Birds in the Picidae are known to feed extensively on ants but we cannot tell for sure the bird we saw belonged in that family. Mean number of individual ants per g dry mass of excrement is 1880 (n=3 fragments). Dry mass of two complete excrements is 0.36g and 0.72g, that is, they would contain 680 and 1360 ants.

***Figure 34**. Bird droppings recovered in the area occupied by the supercolony of Seva.*

Figure 35. *Close-up view of content*

Figure 36. *Heads and other debris of one* Camponotus, *three* Crematogaster scutellaris *and a dozen* Lasius neglectus.

ECTOPARASITES

1. Laboulbeniales

Laboulbeniales (Fungi) are an infrequent find when growing on ants. Herraiz & Espadaler (2007) report *Lasius neglectus* as a new host for *Laboulbenia formicarum*, which is also a new mycological addition for continental Europe (Fig. 37). The fungus was known hitherto mainly from North America and from an extraneous locality in Madeira. Heavily infested ants were foraging normally on *Tamarix gallica* (salt cedar trees) planted along a seaside walk at L'Escala, in North-East Spain (Fig. 38). The infestation is spatially much extended (540 m), probably because of the supercolonial social structure of the host ant. Workers of eleven additional ant species from the same locality were collected but none was infested. A further recent locality for this unexpected pair is Douarnenez (France; J. Wagenknecht leg.). This fungus does not seems to harm the hosts: ants forage as usual, without any visible alteration in behaviour. It is a very rare event that two separately introduced organisms -the fungus from America, the ant from Asia- meet and interact. In this case the interaction seems to boil down to any negative effect for the ant. Obviously, it should be seen as positive for the fungus.

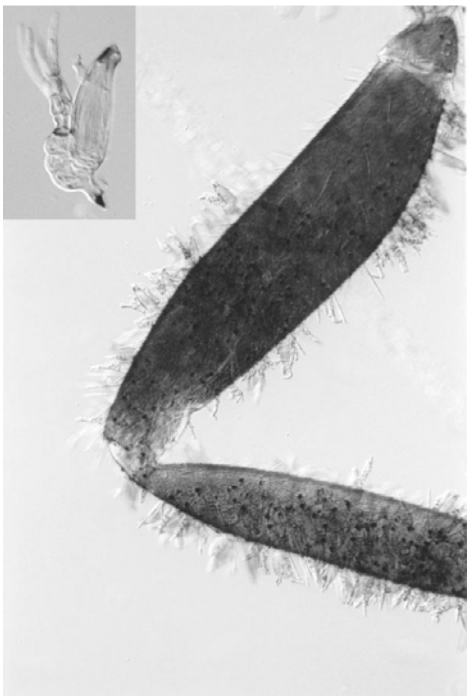


***Figure 37**. Leg of* Lasius *showing many thalli of the fungus all over the femur and tibia. Inset: mature thallus of* Laboulbenia formicarum *(image by S. Santamaria).*

Figure 38. *Seaside walks along the beach at L'Escala (42º 7'N, 3º 7'E). Ants were nesting at the base of salt cedar trees and foraging up on tree trunks.*

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Are you aware of any other locality?

Please, contact us to have it included in the map and table. Thank you very much for your help.

Do you need confirmation of specific identity?

To collect specimens use a small paint brush dipped into 75% alcohol to grab a worker and transfer to a plastic vial containing 75% alcohol. Add a label with location, date, collector, and habitat details. Add your e-mail, if possible.

Send to:

Xavier Espadaler
Ecology Unit
Faculty of Sciences
Universitat Autònoma de Barcelona
08193 Bellaterra
Spain

E-mail: xavier.espadaler@uab.es