

Lasius neglectus (Hymenoptera: Formicidae) – a widely distributed tramp species in Central Asia

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Abstract

Departing from the assumed origin in Asia Minor or the Middle East, *Lasius neglectus* VAN LOON, BOOMSMA & ANDRÁSFALVY, 1990 has spread both to the west and to the east during the last decades. From 1998 to 2004 we collected 41 samples of *L. neglectus* at 17 different sites in Kyrgyzstan and Uzbekistan; of those, 15 are new. The ant appears to be widespread in the Fergana Valley and in the capital of Kyrgyzstan, Bishkek. This paper lists the findings of *L. neglectus* and describes the habitats in which the ants were found. The presence of *L. neglectus* in bordering countries is discussed.

Key words: *Lasius neglectus*, Formicidae, tramp species, dispersal, invasive biology, Central Asia

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Introduction

The invasive garden ant (*Lasius neglectus* VAN LOON, BOOMSMA & ANDRÁSFALVY, 1990) is a recently described tramp species (PASSERA 1994, TSUTSUI & SUAREZ 2003). Since the species description 15 years ago (VAN LOON & al. 1990) from its first detected introduced population in Budapest (Hungary), the ant has been found in many locations across Europe and the Middle East (MARKÓ 1998, CZECHOWSKA & CZECHOWSKI 1999, ESPADALER 1999, SEIFERT 2000, TARTALLY 2000, CZECHOWSKA & CZECHOWSKI 2003, ESPADALER & BERNAL 2003, TARTALLY & al. 2004). The presumed origin of this species is West Asia, probably Asia Minor (SEIFERT 2000). Currently at least 50 sites have been identified in Europe and West Asia (material deposited in the collection of Staatliches Museum für Naturkunde Görlitz and data from the web page of ESPADALER & BERNAL 2005). For Central Asia, SEIFERT (2000) published two sites known in Kyrgyzstan at that time.

In cooperation with the Academy of Sciences Bishkek (Kyrgyzstan) and the Academy of Sciences Almaty (Kazakhstan), the University of Greifswald has carried out scientific expeditions in the Tianshan Mountains since 1998. The aim of these expeditions is a survey of selected fauna in this mountain range. Initial results on the ant fauna were published in SCHULTZ (2001).

Already in the first expedition to Kyrgyzstan in 1998, we were able to find *Lasius neglectus* at two sites in the capital Bishkek and in Tasch-Kumyr in the Fergana Valley (SEIFERT 2000). During the following years the species was frequently found and appears to be widespread in the urban surroundings in the Fergana Valley. Until 2004, one of the authors (R. S.) collected *L. neglectus* at 15 new locations (each location at least 0.5 km from the other), both in Bishkek and the Fergana Valley. This paper provides insight into the ecology of *L. neglectus* in Central Asia.

Material and Methods

The first author participated in scientific expeditions to Central Asia from 1998 to 2001 and 2004, the second author in 2000 and 2001. The expeditions always took place from mid-July to early August. They led to all parts of Kyrgyzstan and bordering areas of Kazakhstan, Uzbekistan and Tadzhikistan. Each year different geographic areas were visited. In addition, the first author participated in an expedition into the west part of China (Xinjiang) in August - September 2004.

During the three- or four-week expeditions, ants were collected at many places. Different members of the expedition were responsible for collecting different insect groups, and not all sites were optimal ant habitats. The minimum sampling period at every new location was usually one hour. During this time, ants were collected by locating the nest entrances, turning stones and looking for ant trails on the soil surface, trees and other plants.

The ants were preserved in 70 % ethanol. When possible a new vial was used for each nest. The latitude, longitude and altitude of each location were determined by GPS. On return to Germany the ants in each vial were counted and three to four specimens were mounted for determination. If more than one species were collected in one tube, these were separated according to species. This material is now in the collections of the first author at the Department of Zoology of the University of Greifswald or in the Hymenoptera collection of the Staatliches Museum für Naturkunde Görlitz.

Results

So far, 41 samples of *Lasius neglectus* have been collected from 17 sites in Central Asia (Tab. 1, Fig. 1). The ant was found in Bishkek and its suburbs. *L. neglectus* was also found around the Fergana Valley in every town and suburb where a thorough search was possible. Although the ex-

peditions focused on natural habitats, *L. neglectus* could be found only in the human environment.

In Bishkek, *Lasius neglectus* was first found in mid-July 1998 on a walnut tree in a suburban garden. A sample from this nest was taken on 3 August 1998 (Tab. 1: no. 2). The ants were regularly seen in this and neighbouring gardens on different plants and trees up until 2004, although the number of ants declined during the six years. Nests were found below stones and in tree-stumps. In 2004, *L. neglectus* was collected on road-side trees (elms and oaks) 3.9 and 4.8 km from this garden (Tab. 1: no. 5 and 6). These sites are 900 m from each other. Time constraints prohibited checking for potential connections between these colonies. In previous years, *Lasius*-ants, with the typical mass running behaviour of *L. neglectus*, had been seen in different parts of the city. The species could not be confirmed because they were not collected.

In the Fergana Valley, *Lasius neglectus* was first collected on 20 July 1998, running along an ant trail on the supporting beam of a loggia in Tasch-Kumyr (Tab. 1: no. 1). In the following year, *L. neglectus* was found on road-side trees in Dshalal-Abad and Kara Suu (Tab. 1: no. 3 and 4). Both sites were unpaved places near the bazaar, strongly used by humans, with little or no vegetation. The ants were running on the tree trunks, which were occasionally covered with a white paint to protect them against insects. In 2004, *L. neglectus* was carefully searched for in the Kyrgyz parts of the Fergana Valley, here, it was found not only in the densely populated city centres, but also in suburban gardens, parks and fruit plantations.

Some of the findings in 2004 were in the Alai Mountains and their foothills south of the Fergana Valley. These, however, were also associated with towns and villages. *Lasius neglectus* was found at altitudes as low as approx. 600 m a.s.l. (Fergana Valley, lowest part of the visited area; Tab. 1: no. 15) to a maximum of 1610 m a.s.l. in the village of Iordan in the Uzbek enclave of Schachimardan (39° 58' N; Tab. 1: no. 17).

Lasius neglectus could not be found in Kazakhstan, Tadzhikistan, the Uzbek part of the Fergana Valley, or in China. In 2001 an expedition led from Almaty into the Saisan Basin. Searches were conducted for the ant in Almaty and every town and village along the way. In 2004 the Xinjiang province in China was visited. Careful searches were conducted in Urumqi, in towns and villages of the Tarim Basin and in the Tianshan Mountains. The species was not found. During the trips through Kyrgyzstan, bordering regions of Uzbekistan (1999: Uzbek parts of the Fergana Valley around the town Kara Suu, 2004: enclave Sarikanda) and Tadzhikistan (2004: enclave Tschorku) have to be crossed. No *L. neglectus* were found there.

Discussion

Lasius neglectus has been found in areas of Europe, the Middle East, and Central Asia (see ESPADALER & BERNAL 2005). The ant probably also occupies suitable habitats (settlements and their anthropogenic surroundings) between these areas. This species is assumed to spread through the transportation of organic material (VAN LOON & al. 1990, ESPADALER & REY 2001, TARTALLY & al. 2004). Our distributional data from both West and Central Asia show a preference for lower altitudes. However, transport to urban habitats in elevations above 1000 m was confirmed for five

locations. The upper altitudinal limit found for Central Asia is in full agreement with findings from Asia Minor. The data show that *L. neglectus* at 39° 58' N ranges up to 1610 m (Iordan / Uzbekistan, Tab. 1: no. 17), at 38° 30' N up to 1750 m (20 km E Van / Turkey) and at 37° 18' N up to 2000 m (22 km SE Halkapinar / Turkey). When considering a temperature change of -0.61 °C per degree of higher latitude and a change of -0.63 °C per 100 m increase of elevation, all these sites should have almost equal air temperatures, with predicted mean January temperatures between -4.5 and -6 °C (WALTHER & LIETH 1964, see also SEIFERT 2000). Up until now, *L. neglectus* has not been found in Almaty (Kazakhstan), where the mean January temperature is -8.8 °C, or Urumqi (China), with -15.8 °C (MÜLLER 1996). Perhaps January temperatures below -7 °C are critical for this species.

The trails of *Lasius neglectus* were usually found on the trunks of roadside trees in the centre of the towns. The nests were at the base of the trees or under stones. These habitats are strongly anthropogenic and sometimes without any vegetation except for the trees. *L. neglectus* was also discovered in gardens, fruit plantations and parks. All these places are usually sunny to semi-shady. As already described by VAN LOON & al. (1990), huge numbers of workers are present on the trees, probably tending and feeding on aphids. Although *L. neglectus* was found only on deciduous trees in Central Asia, no clear preferences for a certain tree species was determined. However, in Belgium, Germany, Hungary, Georgia, and Spain, they were also found on coniferous trees (ESPADALER & BERNAL 2005, S. Cremer pers. comm., A. Tartally pers. comm., B. Seifert unpubl.).

Huge colonies of *Lasius neglectus* strongly impact the biotic environment, replacing other ants (VAN LOON & al. 1990, SEIFERT 2000). In Central Asia, only a few other ant species occur in the direct surroundings of *L. neglectus* and they seem to be dependent on more vegetation. Around the Fergana Valley these species are *Formica subpilosa* RUZSKY, 1902, *Crematogaster subdentata* MAYR, 1877 and *Messor* sp. In Bishkek these are *Formica cunicularia* LATREILLE, 1798, *Formica lusatica* SEIFERT, 1997 and also *Crematogaster subdentata*. In one of the most southern locations, an apricot grove on the river Isfaran Say south of Kyzyl-Kyya (Kyrgyzstan), *L. neglectus* was found on the tree trunks or feeding on drying apricots, but also underneath stones. Nearby, *Cataglyphis aenescens* (NYLANDER, 1849), *Tetramorium* cf. *caespitum* (LINNAEUS, 1758) and *Messor* cf. *structor* (LATREILLE, 1798) nested in the soil or under stones. In the case of one large *L. neglectus* colony in Bishkek (Tab. 1: no. 2), no other ants were found in the area.

It is difficult to estimate how long *Lasius neglectus* has been in Kyrgyzstan. TARBINSKY (1976, 1996) does not mention this species. Even though it was not formally described at that time, the typical behaviour would have had to be noticeable. In his monograph about the ants of Kyrgyzstan, the only work describing the distribution and ecology of the Kyrgyz ants, TARBINSKY (1976) listed five species of *Lasius*: *L. niger* (LINNAEUS, 1758), *L. flavescens* FOREL, 1903, *L. alienus* (FÖRSTER, 1850), *L. flavus* (FABRICIUS, 1781), and *L. carniolicus* MAYR, 1861. According to our sampling, Tarbinsky has potentially collected three species here under the name "*Lasius alienus*": *L. alienus*, *L.*

Tab. 1: Locations where *Lasius neglectus* was found in Central Asia; dates, coordinates, altitudes (alt.), and number of samples (n.s.) are given. Kyrg. = Kyrgyzstan.

no.	date	region	location	latitude	longitude	alt.	n.s.
1	20.07.1998	Kyrg., West Tianshan	Tasch-Kumyr (suburb), loggia	N41°21'30"	E072°11'50"	625 m	1
2	03.08.1998	Kyrg., Chuj Valley	Bishkek (suburb), garden, walnut tree	N42°53'35"	E074°38'10"	750 m	3
3	19.07.1999	Kyrg., Fergana Valley	Dshalal-Abad, road-side tree	N40°55'45"	E073°00'06"	750 m	1
4	28.07.1999	Kyrg., Fergana Valley	Kara Suu, road-side tree	N40°42'34"	E072°53'46"	800 m	1
5	15.07.2004	Kyrg., Chuj Valley	Bishkek, road-side tree in front of health ministry	N42°52'54"	E074°35'26"	750 m	2
6	15.07.2004	Kyrg., Chuj Valley	Bishkek, road-side tree	N42°52'40"	E074°34'54"	750 m	1
7	17.07.2004	Kyrg., Alai	village Eski-Nookat, road-side tree	N40°16'07"	E072°37'08"	1290 m	1
8	23.07.2004	Kyrg., Alai	Batken, road-side trees	N40°03'44"	E070°49'20"	1040 m	9
9	28.07.2004	Kyrg., Fergana Valley	Kyzyl-Kyya, road-side tree near bazaar	N40°16'09"	E072°08'01"	970 m	3
10	28.07.2004	Kyrg., Fergana Valley	Kyzyl-Kyya, suburb, road-side tree	N40°14'34"	E072°03'25"	980 m	1
11	28.07.2004	Kyrg., Alai	river Isfayran Say, Apricot grove and river terrace near Austay	N40°00'22"	E072°05'35"	1300 m	6
12	30.07.2004	Kyrg., Fergana Valley	Kyzyl-Kyya, suburb, road-side tree	N40°14'35"	E072°03'26"	970 m	1
13	30.07.2004	Kyrg., Fergana Valley	Osh, city centre, park, soil surface	N40°30'54"	E072°48'18"	1030 m	1
14	31.07.2004	Kyrg., Fergana Valley	Karasnaja Maja north of Usken, garden, soil surface	N40°48'52"	E073°20'03"	990 m	6
15	31.07.2004	Kyrg., Fergana Valley	Koshkor-Ata, road-side tree near bazaar	N41°01'55"	E072°29'01"	610 m	1
16	31.07.2004	Kyrg., Fergana Valley	river Mayly-Suu, Burgöndü near Mombekov, walnut tree	N41°05'01"	E072°21'10"	680 m	1
17	20.07.2004	Uzbekistan, Alai	Uzbek enclave Schachimardan, river Aksu, village Iordan, poplar tree	N39°57'53"	E071°45'36"	1610 m	2

neglectus, and *L. uzbeki* SEIFERT, 1992. Tarbinsky described habitats and distribution in detail but did not mention a mass occurrence of "*Lasius alienus*" from urban areas. As a citizen of Bishkek, he undoubtedly would have noted this pest ant. We therefore conclude that *Lasius neglectus* probably did not occur in Kyrgyzstan before 1976 or was still in the latent (initial) stage of population development. On the other hand the colonies in a garden in Bishkek and in Tasch-Kumyr were well established in 1998 and had thus probably been there for more than two years. *Lasius neglectus* populations are known to have existed for 10 to 15 years after initial introduction before explosive population development drew attention to them (VAN LOON & al. 1990, DEKONINCK & al. 2002, T. Giraud pers. comm.). In 1998 we did not search as intensively as in 2004, but even then the species was apparently widespread in Bishkek. Ant density in the garden in 1998, however, had clearly declined. One explanation is that the garden was not tended and became overgrown: *L. neglectus* retreated as it became more shady and cool.

In the garden in Bishkek, alate males and queens were observed in a spider's web, suggesting occasional flying (Tab. 1: no. 2, see also SEIFERT 2000). Nonetheless, the long-term expansion is thought to involve human transport of organic material (VAN LOON & al. 1990). Mating flight and dispersal by flying have never been observed (VAN LOON & al. 1990, ESPADALER & REY 2001). *Lasius*

neglectus is now a well-established species in Central Asia. We assume that the ant has expanded along the trade routes coming from Georgia and Turkey. It should therefore also be present in the areas between the Near East and Central Asia. Although no thorough search has yet been conducted, we also expect the species to widely inhabit the Uzbek Fergana Valley. Further to the east, *L. neglectus* has not yet been found, but it is probably only a matter of time until the species establishes itself in China, Japan and other countries of East Asia.

Acknowledgements

We sincerely thank Mike Vaughan (Saarbrücken, Germany) and Michael Stachowitsch (Vienna, Austria) for improving the language. We are especially grateful to Sylvia Cremer (Copenhagen, Denmark) and András Tartally (Debrecen, Hungary) for providing literature and helpful comments. Tatiana Giraud (Paris, France) informed of interesting observations. An anonymous referee gave useful comments and advices. The expeditions were funded by the German Academic Exchange Service (DAAD).

Zusammenfassung

Ausgehend vom angenommenen Ursprung in Kleinasien oder dem Nahen Osten hat *Lasius neglectus* VAN LOON, BOOMSMA & ANDRÁSFALVY, 1990 in den letzten Jahrzehnten eine Ausbreitung sowohl nach Westen als auch nach

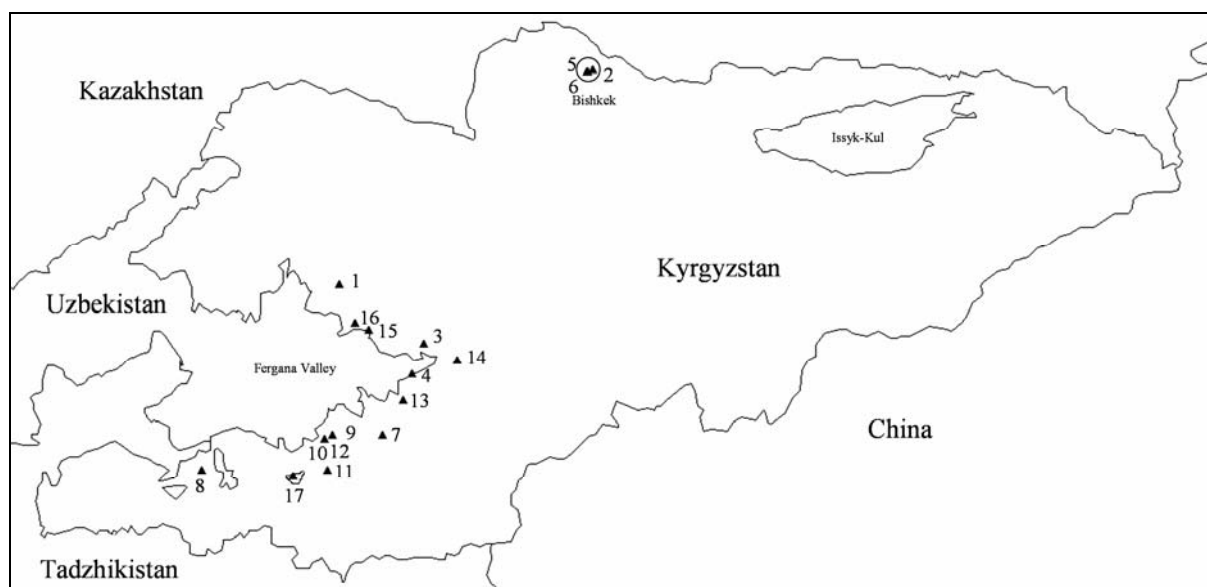


Fig. 1: Kyrgyzstan and bordering areas. Locations of *Lasius neglectus* samples are indicated and numbered as in Tab. 1.

Osten vollzogen. Von 1998 bis 2004 konnten 41 Proben von *L. neglectus* an 17 unterschiedlichen Stellen in Kirgistan und Usbekistan gesammelt werden, von denen 15 Neunachweise sind. Die Ameise scheint im Ferganatal und in der kirgisischen Hauptstadt Bishkek weit verbreitet zu sein. Diese Arbeit listet die Funde von *L. neglectus* auf und beschreibt die Habitate, in denen die Ameisen gefunden wurden. Das Vorkommen von *L. neglectus* in angrenzenden Ländern wird diskutiert.

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