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***Loxosceles laeta* (Nicolet) (Araneae, Loxoscelinae), a venomous spider established in a building in Helsinki, Finland, and notes on some other synanthropic spiders**

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A population of *Loxosceles laeta* (Nicolet) has existed in the building of the Departments of Zoology and Genetics, University of Helsinki, since 1963. Dozens of specimens were found in a systematic search in September 1971. In addition, *Tegenaria atrica* C. L. Koch, *Physocyclus simoni* Berland, and *Herpyllus loricatus* (L. Koch) are reported from Finland for the first time.

Specimens of an exotic spider species have been found in the building of the Departments of Zoology and Genetics, University of Helsinki, ever since 1963. In 1971, the species was determined as *Loxosceles laeta* (Nicolet) (Fig. 1), a venomous spider (the determination was checked by Dr. P. Brignoli, of Italy). During the period 1963–1970, only one or two finds were made each year (none in 1967 or 1969), but in winter 1970–71 the spider became more numerous, so that at least 15 specimens were found accidentally during 10 months. A systematic search in September 1971 revealed that the whole ground floor of the building was infested. In a small kitchen room the spider was exceptionally abundant: a dozen specimens were removed from cupboards and drawers, but within a few days these were replaced by new ones apparently coming from spaces beneath and behind the cupboards. In another room, a clutch of newly hatched spiderlings was found.

Loxoscelces laeta is widely distributed in South and Central America (GERTSCH 1958, 1967). The species has proved capable of being transported by man and establishing populations far outside its normal range. Thus, it has recently

been reported from four widely separated points in North America (LEVI & SPIELMAN 1964, GERTSCH 1967, KEH 1970a). The first occurrence described by LEVI & SPIELMAN (1964) was almost identical with the present case. The spider had produced a dense population in the basement of a museum building in Cambridge, Massachusetts.

The figure of the vulva (rather variable in the species) of females found in Helsinki was similar to that of a specimen described by GERTSCH (1967) from Porto Alegre, Brazil (Plate 6, Fig. 9). Apples loaded not far from this point (Buenos Aires, Argentina) are regularly imported to Helsinki by ship, and some, in the original packing-cases, are brought into the Department of Zoology. This is the only clue as to how the species originally arrived in the building. However, according to the import company, during transport and storage the fruit is kept at ca. +2°C. I made some tentative experiments to see whether the spiders are able to survive such a low temperature. The test animals kept in a refrigerator were juveniles of various ages. The results were as follows:

No. of specimens	Temperature °C	Days	Result
1	+2 ± 1	2	alive
3	+4 ± 1	3	1 dead, 2 alive
2	+3 ± 1	5	1 dead, 1 alive
4	+3 ± 1	8	all dead
3	+3 ± 1 (100% R.H.)	7	all dead

The result shows that the temperature of +2°C is critical, but transport with fruit cannot be excluded, because cold resistance may be better at other stages (adults, eggs), and the temperature inside the packing cases may be a few degrees higher than in the storage room itself.

In the case described by LEVI & SPIELMAN (1964), the spiders were almost invariably found on the floors of basement rooms. Here in Finland it was usually found in cupboards and drawers up to one metre, but males were caught on desks, shelves, and walls behind pictures. All finds made in 1971 were in the ground floor and basement, but earlier two specimens had been found on the first floor. Females are rather sedentary, while males wander actively at night. Of 23 specimens found accidentally, 10 were adult males, but among several dozen caught by systematic search there were only two adult males, one of which was trapped in an empty glass jar (they cannot climb up a glass surface). LEVI & SPIELMAN also often found males away from their webs. They observed that *L. laeta* will eat all kinds of Arthropods available, and becomes very numerous itself while appearing virtually to eliminate all insects as well as other spiders. The common house spider *Tegenaria domestica* was not found by us in rooms occupied by *L. laeta*, but a small Linyphiid, *Lepthyphantes leprosus* (Ohlert), inhabited the same cupboards as *L. laeta*. Cannibalism is uncommon, according to LEVI & SPIELMAN, but when we shut several specimens in a jar, they soon attacked each other, and the larger ones killed and ate the smaller ones. Similarly, they attacked spiders of other species up to their own size, and the victims were

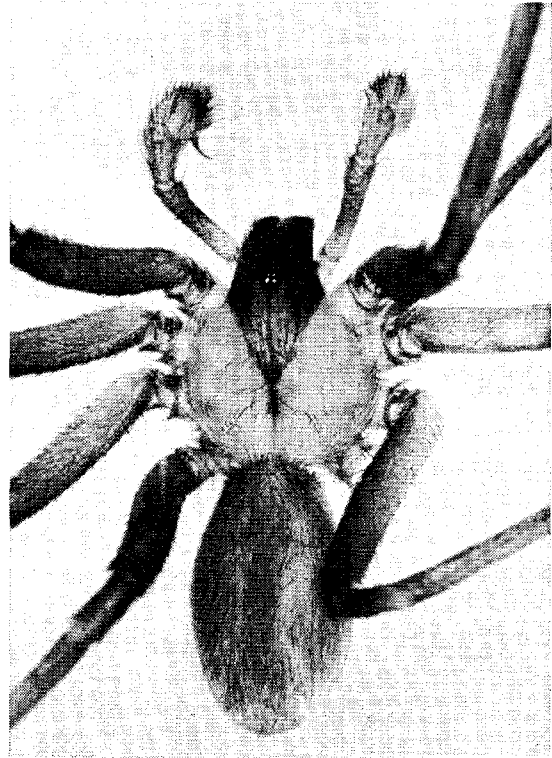


Fig. 1. *Loxosceles laeta* ♂. — Photo: P. Vesterinen & V. Huhta.

instantly paralysed by the bite. On the other hand, *L. laeta* proved to be fairly insensitive to the venom of its own species: when a young female was bitten twice by another specimen of similar size, it was only partially paralysed, and gradually recovered.

L. laeta was not found elsewhere, although news about the venomous spider aroused considerable public interest, and more than a hundred spiders found indoors were brought to the Department of Zoology for identification. I also searched for it, without success, in the basement of the block of flats opposite the Department, on the other side of the street. The occurrence reported by LEVI & SPIELMAN was also confined to a single building, while in California the species spread into several blocks in a business district (KEH 1970a). In both these cases, evidence suggests that the popula-

tions may have existed for several years before detection. As the species comes from tropical and subtropical areas and moves only at night, active wandering outdoors and from one house to another can be considered unlikely in Finnish conditions. On the other hand, I consider it unlikely that the Zoological Department building in Helsinki is the only place in Europe where it is to be found.

In all, about 70 species of the genus *Loxosceles* are known, most of them living in the tropics and subtropics. Fifteen years ago, two species were reported to be venomous (*L. laeta* and *L. reclusa*, see GERTSCH 1958), but later experience and tests with laboratory animals have proved that at least 5 more species are potentially dangerous. It is best to assume that the venoms of all species of the genus are toxic to man (GERTSCH 1967, CUTLER & CUTLER 1971). *L. laeta* is a considerable public health problem in South America, where 35 deaths have been attributed to the species (GORHAM 1968, according to KEH 1970a). Systemic effects of the bite are rare, but when they do occur are often fatal. The usual symptom is a necrotic cutaneous lesion of considerable gravity, taking several weeks or even months to heal (see e.g. GERTSCH 1958, 1967). The effects on laboratory animals of envenomization by *Loxosceles* spiders have been described by several authors, e.g. LEVI & SPIELMAN (1964), DENNY *et al.* (1964), CUTLER & CUTLER (1971). However, *L. laeta* is very reluctant to bite a warm-blooded animal. LEVI & SPIELMAN did not succeed in provoking it to bite guinea-pigs. In South America, most bites take place when the victim is in bed or putting on clothes in the morning. Spiders that remain trapped in folds of clothes may then respond by biting (GERTSCH 1958, 1967). The unwillingness to bite, the timidity and secretive habits of the species make an accident very unlikely.

LEVI & SPIELMAN (1964) showed that DDT, dieldrin, and chlordane are inefficient in the control of *L. laeta*, whereas it is very susceptible to lindane. However, indoor use of this in-

secticide is prohibited. I made an experiment with the common household insecticide "Cooper's Fly Bomb", a pyrethrine aerosol preparation, but this also proved inefficient; a dose of even 30 times the amount mentioned in the instructions killed only three of the five test animals. Recent evidence suggests that diazinon or dichlorvos (DDPV) might be useful in the control of *Loxosceles* spiders (KEH 1971b).

Note: There is an error in GERTSCH's (1958) figures 69 - 71: the text refers to the right palpus, but in fact the figures represent the left one, Fig. 69 thus being a prolateral instead of a retrolateral view.

The spiders caught during the search for *L. laeta* included some interesting species:

As many as six specimens of *Tegenaria atrica* C. L. Koch (Agelenidae) were found at separate points in Helsinki:

- 1 ♂ 28. IX. 1971 The west harbour (K. Rumpunen)
- 1 ♂ 3. X. 1971 Sorvaajankatu (M. Laurila)
- 1 ♂ 5-8. X. 1971 Hernesaari (Anonymus)
- 1 ♂ 5-8. X. 1971 Katajanokka (H. Dahl)
- 1 ♂ 11. X. 1971 Pitäjänmäki (P. Termonen)
- 1 ♀ 28. X. 1971 Katajanokka (H. Dahl)

T. atrica has not previously been reported from Finland, but its occurrence is by no means surprising, since the species has a wide distribution in Europe. All the finds were made in industrial, storage, and port districts, or in dwelling-houses in the immediate vicinity of these, which suggests a recent invasion, but, on the other hand, so many reports within one month show that the species is permanently established in the city.

The female on 28 Oct. was caught in the same flat as the male three weeks earlier. I kept it in a glass jar at room temperature. It turned out to be fertilized, and laid several batches of eggs (11-12. XII., 3. I., 17. I., 29-30. I., 10. II., 20. II., 16. III., 1-3. IV.). The period of egg-laying is in accordance with the observations of MIKULSKA & JAKUNSKI (1968) in Poland. The spiderlings hatched ca. one month later.

Note: There are errata in the descriptions of LOCKET & MILLIDGE (1953, pp. 10–11): *T. atrica* C. L. Koch should read *T. saeva* Blackw., and *T. larva* Simon, in turn, *T. atrica* C. L. Koch (LOCKET, personal communication).

In the search for *Loxosceles*, several specimens, males and females, of *Physocyclus simoni* Berland (Pholcidae) were found in a cellar room of Nervanderinkatu 1, Helsinki, on 4. X. 1971. Probably the distribution of the species in Europe is wider than previously believed. MÄKISALO (unpublished) has found three specimens in Tampere, Finland (1968, 1969, and 1971). It has recently been reported from Poland (DZIABASZEWSKI 1967), and unpublished finds are known from Sweden and Norway (LEHTINEN, personal communication). According to LOCKET & MILLIDGE (1951), *P. simoni* is found in Great Britain exclusively in dry wine cellars, and the find of DZIABASZEWSKI was also made in a cellar, where a dense population existed.

On 10 Nov. 1971, Mrs. Kirsti Ahti sent from Kouvola (southeastern Finland) a Gnaphosid spider, which was reported to have bitten a man's finger, which swelled up. The species was *Herpyllus loricatus* (L. Koch), which has not previously been found in Finland. PALMGREN (1943) reported it from the south coast of the Kola peninsula (*Scotophaeus locatus*, p. 98). The range of the species extends from Western Europe to Siberia (REIMOSER 1937). The specimen was an adult male, the palpus being identical with that figured by PALMGREN (1943), but, in addition, it had a partially developed epigyne, although without any internal structures. Several similar spiders were seen in the same old building, and on 5 March 1972 an adult female was captured.

Three specimens of *Lepthyphantes collinus* (L. Koch) were collected in Helsinki: 1 ♂ 26. IX. 1971 (P. J. Matikainen), 1 ♀ 6. X. 1971 (A. Mikkonen), and 1 ♂ 29. IX. 1972 (Y. Väisä-

nen). LEHTINEN (1964) reported the species for the first time from Turku, and KOPONEN (unpublished) found one male in Hamina on 29. VIII. 1970. The genitalia of both sexes differ from the figures presented by WIEHLE (1956), and according to THALER (personal communication) the taxonomy of the species perhaps requires further investigation.

Other spiders received for identification included the following species, most of them found indoors purely accidentally:

- Clubiona phragmitis* C. L. Koch
- Micrommata virescens* (Clerck)
- Misumena vatia* (Clerck)
- Xysticus cristatus* (Clerck)
- Trochosa ruricola* (Degeer)
- Tegenaria domestica* (Clerck) (very common)
- Steatoda bipunctata* (L.) —,—
- S. castanea* (Oliv.) —,—
- Teutana grossa* (C. L. Koch) (1 ♂ 5. XI. 1971, Helsinki)
- Meta segmentata* (Clerck)
- M. merinae* (Scopoli) 1 ♀ 27. IX. 1971, Helsinki)
- Araneus diadematus* Clerck
- A. quadratus* Clerck
- A. cornutus* Clerck
- Zygiella atrica* (C. L. Koch)
- Erigone atra* (Blackw.)
- Macrargus rufus* (Wider)
- Lepthyphantes nebulosus* (Sundev.)
- L. leprosus* (Ohlert)
- Linyphia triangularis* (Clerck)

The fact that such a small collection included three new species shows that the synanthropic spider fauna of Finland is very imperfectly known, and several more species would probably be found if a more thorough investigation were made.

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