ZOOLOGISCHE MEDEDELINGEN

UITGEGEVEN DOOR HET

RIJKSMUSEUM VAN NATUURLIJKE HISTORIE TE LEIDEN

(MINISTERIE VAN CULTUUR, RECREATIE EN MAATSCHAPPELIJK WERK)

Deel 45 no. 24 15 september 1971

SOME NOTES ON THE OCCURRENCE OF THE GENUS PARDOSA (LYCOSIDAE, ARANEAE) IN SOUTHERN FRANCE, SPAIN AND CORSICA

by

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With one plate

In this paper a report is given on Lycosid spiders of the genus *Pardosa,* collected in southern France, Spain and Corsica. The animals were taken by hand and therefore the account is a qualitative one. Some other species of Lycosid spiders were also caught. The results will be given elsewhere. As the knowledge about the occurrence of species of *Pardosa* in the visited areas is rather scarce, it seems worthwhile to publish the data. The results are dealt with as to species, mostly on the basis of Simon (1937) and Tongiorgi (1966a and b). Occasionally data on species which were not collected but occur in great abundance in more northern areas are included (these data mostly are based on Wiebes, 1959). The material has been deposited at the Rijksmuseum van Natuurlijke Historie (Leiden).

Pardosa palustris (Linnaeus)

This species has not been found by us in the visited areas. This seems remarkable as the species occurs rather generally in northern areas (cf. Wiebes, 1959, and Locket & Millidge, 1951). Moreover, in some of the habitats which we visited, the species could be expected to be found because these habitats looked very much alike those in which the species is found in northern areas.

These data are in accordance with Tongiorgi (1966a: 283), who states: "The species is widespread, especially in cold climates. It lives on mountains, mostly in open and dry areas, i.e. meadows, pastures, heaths".

Pardosa agricola (Thorell)

The habitat of this species has been described as "sandy or stony banks of lakes and watercourses" (cf. Locket & Millidge, 1951; Wiebes, 1959; Tongiorgi, 1966a and b). In this habitat the species was collected in S. France, along the Drôme near Valence (Drôme) (28.IV.1965: 4 ♂♂, 16 ♀♀), and Cestas (Gironde) (28.V.1961 till 3.VI.1961: 6 ♂♂, 16 ♀♀, 1 ♀ c[1]), 1 juv.), as well as in Spain: Olague (Navarra) (8.VI.1961: 1 ♀). Tongiorgi (1966a: 284) mentions that the species is lacking in Italy, *P. torrentum* Simon, being a vicariant species in this country. At the same time some authors separate in northern regions *P. arenicola* (O.P.-Cambridge) from *P. agricola* (cf. Locket & Millidge, 1951), though others doubt its validity (Duffey, pers. comm.). As a whole the *P. monticola*-group morphologically seems to be rather difficult. The species mentioned above should be studied in more detail.

Pardosa agrestis (Westring)

This species was found in France in the neighbourhood of Valence (Drôme) (27.IV.1965). About 25 specimens, males as well as females, were collected. Near Les Minières (Vienne) (Le Poitiers, 25.V.1961: 3 ♀♀) some specimens were collected. Neither in Spain, nor in Corsica the species was found in the visited areas.

Pardosa bifasciata (C. L. Koch)

This species was found in one locality, in Spain, near Adradas (Soria) (9.VI.1961: 1 ♂, 4 ♀♀, 1 ♀ c).

Pardosa nigriceps (Thorell)

This species was not collected at all in the visited areas, though some of these closely resembled the habitat of this species in northern regions. At the same time no vicariant species could be found. The note of Tongiorgi (1966a: 293) that the species is possibly lacking in Italy seems to be in accordance with the fact that we could not collect it either in Spain or in Corsica.

Pardosa paludicola (Clerck)

P. paludicola was found only in a rather humid and swampy area north of Lyon (Ain) (29.IV.1965: 1 ♂, 4 ♀♀, 2 ♀♀ c; cf. Vlijm c.s., 1968).

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1) ♀ c = female with cocoon.

Pardosa lugubris (Walckenaer)

P. lugubris is known to have a palearctic distribution. It occurs mostly along the edges of deciduous forests. It was found in S. France: near le Pouzin (Ardèche) (28.IV.1965: 3 ♂♂, 2 ♀♀, 2 juv.), and Cestas (Gironde) (V. 1961: 1 ♂, 2 ♀♀, 2 ♀♀ c) and in Corsica: Forêt de Vizzavona (16.V.1963: 2 ♂♂, 1 ♀, 3 juv.), Forêt de l'Ospedale (10.V.1963: 22 ♂♂, 29 ♀♀, 20 juv.). The data on the life cycle of this species in Corsica differ from those in the Netherlands in that the final moult in Corsica occurs comparatively late (note the rather high numbers of juveniles, which all appeared to be subadults). In the Netherlands the final moult occurs in April. Probably in Corsica the development is retarded because the species occurs in mountains, the only place where deciduous forests are found. At the same time it should be mentioned that the distribution of this species can be compared to that of *P. palustris*, which also in southern areas is found only in the mountains.

Pardosa amentata (Clerck)

In the Netherlands *P. amentata* is the most common species of the genus. Where it occurs generally no other species will be found. It can be called a very eurytopic species, following man everywhere the latter disturbs natural habitats. This situation is comparable with that in Poland (pers. comm. of Petrusewicz, who said to have the same experience with the species in Poland). In southern France the same can be said. Though we did not sample *P. amentata*, we used its occurence as an indication for "an unnatural man-made habitat".

In Corsica and Spain no specimens of this species were collected at all. In Corsica its niche seems to be taken by *P. proxima*, which occurs as the most abundant species. Possibly in Spain the same phenomenon occurs: *P. amentata* is lacking from collections of Spain and *P. proxima* is the most abundant species.

Pardosa prativaga (L. Koch)

Tongiorgi (1966a) mentions *P. prativaga* (L. Koch) as well as *P. riparia* (C. L. Koch) and *P. femoralis* Simon to be valid species. In our opinion *P. femoralis* and *P. riparia* could easily be the same species. Some authors (Roewer and Simon) separated also *P. montivaga* (= *P. prativaga fulvipes*) and *P. kervillei* from *P. prativaga*.

All these names possibly are caused by the fact that *P. prativaga* (sensu lato) is highly variable in its morphological characteristics (cf. Den Hol-

lander, 1970). Some preliminary observations on the courtship behaviour of *P. prativaga* and *P. prativaga fulvipes* showed that the behaviour of these species was so identical, that we indeed suggest that they should be taken as one species, though some differences occur.

The above mentioned species should be studied not only from a morphological point of view, but also a comparative analysis of their behaviour and ecology should be endeavoured. In this study it would be worthwhile to include studies into the genetics of the investigated populations.

P. prativaga (sensu lato) was collected north of Lyon (Ain) (29.IV.1965: 43 ♂♂, 34 ♀♀), le Pouzin (Ardèche) (28.IV.1965: 13 ♀♀, 4 ♀♀ c), near Valence (Drôme) (28.IV.1965: 1 ♂, 4 ♀♀) and Cestas (Gironde) (28.V. 1961: 1 ♀, 1 ♀ c).

In Corsica specimens were found near the river Zingajo (17.V.1963: 2 ♂♂, 5 ♀♀, 1 ♀ c), Etang de Palo (16.V.1963: 3 ♂♂, 1 ♀).

Pardosa pullata (Clerck)

P. pullata was collected in S. France north of Lyon (Ain) (29.IV.1965: 1 ♀), near Luxueil (Drôme) (26.IV.1965: 3 ♂♂, 4 ♀♀), in Spain, near Tornavacas (Cáceres) (22.VI.1961: 1 ♀ c), Zapardiel (Avila) (23.VI.1961: 2 ♂♂, 4 ♀♀, 2 ♀♀ c); in Corsica no specimens were found. Simon (1932) also gives no data for this species in Corsica.

We like to point out that *P. pullata* and *P. prativaga* sometimes occur in mixed populations. Locket (pers. comm.) observed hybrids between the two species (cf. Locket & Millidge, 1951). We started to study this hybridization experimentally as well as in natural populations (cf. Den Hollander, 1970, 1971).

Pardosa luctinosa Simon

Tongiorgi (1964) published an interesting short note on this species, demonstrating that it has a Sarmatian distribution. The habitat of this species is described as: saline marshes, e.g., a Salicornietum. We can partly confirm the conclusions of Tongiorgi's paper. The species was collected in an area with *Salicornia* spec. in Corsica: Pianottoli (14.V.1965: 2 ♂♂, 11 ♀♀).

On the other hand the species also was found in Spain in an open, dry area, far away from the sea (las Correderas (Jaen): 14.VI.1961: 1 ♀). Simon (1937) described the species from the interior of Corsica (Corte and Vizzavona). Tongiorgi (1964) has some doubts about these data. The observation of the species in las Correderas indicates that the habitat of the species possibly is more wide spread than "saline marshes".

Pardosa wagleri (Hahn)

This species was collected in S. France, near Valence (Drôme), along the border of the Rhône, between pebbles and stones (28.IV.1965: 6 ♂♂, 10 ♀♀, 1 juv.), and along the Drôme (28.IV.1965: 1 ♂, 2 ♀♀). No data for Corsica and Spain.

Pardosa proxima (C. L. Koch)

P. proxima has its northern boundary in England (one locality, cf. Locket & Millidge), and the Netherlands (one locality, cf. Vlijm c.s., 1968). In southern areas it is one of the most common species of the genus. More than half of all specimens of *Pardosa*, collected during the trips into Spain and Corsica belonged to this species (Corsica: Étang de Palo, near Rocapina, Pianottoli, Ajaccio beach, Bonifacio; Spain: Jerte, Tornavacas, Aldeo del Cano (Cáceres), Parada (Salamanca), Helechar (Bajadoz), Rio Quarrizas, St. Elena (Jaen), Simancas (Valladolid), Olague (Navarra) and Villarta de St. Juan (Ciudad-Real); France, near Lyon (Ain)).

The species especially was found in green meadows, with a rather high ground-water level.

Tongiorgi (1966a: 307) mentions the occurrence of *P. proxima* together with *P. hortensis*. He also remarks about *P. proxima* in Italy: "The individual variety of *P. proxima* is great even within the same population. For example, I have collected on the edges of Fiume Centa (Albenga, 30.IV. 1958) a female specimen that has an epigynum identical to that of *P. proxima*, but the median band of the carapace is anteriorly dilated and the lateral bands are continuous and very wide. All legs are yellow without annulations. Some authors have attempted to distinguish also, in Italy, the subspecies *P. proxima poetica* Simon and *P. proxima tenuipes* (L. Koch) from the typical form *P. proxima proxima* (C. L. Koch). Since the two subspecies in question do not display a geographical separation in the Italian peninsula, and in fact they have been found together, I believe that they represent different aspects of variability of *P. proxima*. Nearly all the specimens I have examined belong to the typical form. The femora of the first pair of legs of males are generally very dark and sometimes even black".

We agree with the observations of Tongiorgi. We also found a high variety in epigyneal structures in this species (see plate 1). However we should like to give some comments as to this phenomenon.

Normally it is stated that a species will demonstrate a greater variability under conditions in which competition with other species is small (cf. Svärdson, 1949). On the other hand a rather small variability within the species

will be found where two, rather comparable, species will meet. In short: variation will be small under interspecific competition, whereas variation will be wide under intraspecific competition.

Now in the case of *P. proxima,* we found a high variability (observed in morphological characteristics: we did not study behavioural aspects) in those localities in which the species was found together with *P. hortensis.*

This suggests that interbreeding of the two species may occur.

Pardosa hortensis (Thorell)

P. hortensis reaches its northern boundary in England and the Netherlands (cf. Locket & Millidge, 1951; Wiebes, 1959; Vlijm c.s., 1968). *P. hortensis* was collected rather infrequently. The species seems to be lacking in Corsica (cf. Simon, 1937, where it is not recorded for Corsica), and southern France. We only found the species at Cestas (Gironde) (4.VI. 1961: 1 ♀). The data from Spain are rather scanty: Estella (Navarra) (8.VI.1961: 2 ♀♀), Olague (Navarra) (8.VI.1961: 1 ♀), las Correderas (Jaen) (16.VI.1961: 1 ♂, 1 ♀, 2 juv., 1 ♀ c.).

This last needs some comment. *P. hortensis* was found here together with a female of *P. luctinosa,* and a rather great number of *P. proxima* (10 ♂♂, 12 ♀♀, 9 ♀♀ c, 20 juv.). The differences in epigynes between *P. proxima* and *P. hortensis* are rather few (cf. Locket & Millidge, 1951). Differences in the structures of the male palp are even more difficult to ascertain (cf. Locket & Millidge, 1951, see also Tongiorgi, 1966a).

Therefore, in our opinion, mixed populations of *P. proxima* and *P. hortensis* should be studied in detail, as interbreeding may occur.

Pardosa strigillata Simon

P. strigillata was collected near the river Travigano in Corsica (17.V. 1963: 2 ♂♂, 7 ♀♀) and near Miomo in Corsica (20.V.1963: 1 ♀, 2 juv.). From our data we doubt if *P. strigillata* replaces *P. hortensis* in Sardinia (cf. Tongiorgi, 1966a: 309), as the two species occur in rather different habitats (for *P. hortensis,* cf. Wiebes, 1959, and Locket & Millidge, 1951).

Pardosa morosa (L. Koch)

P. morosa was collected at the borders of the Rhône near Valence (Drôme) (27.IV.1965: 2 ♂♂, 3 ♀♀, 3 ♀♀ c), and along the Drôme (Drôme) (28.IV.1965: 1 ♂) mixed with a population of *P. wagleri* (cf. Simon, 1937).

This confirms the ideas of Simon (1937) and Dahl (1908) about the occurrence of the two species together.

Acknowledgements

The author wishes to thank Dr. J. T. Wiebes who collected the greater part of the material from Spain, and advised on the manuscript. Part of the material (from Spain and Cestas) was obtained on loan from the Rijksmuseum van Natuurlijke Historie, Leiden. The author is also indebted to students and staffmembers of the Department of Biology, Free University at Amsterdam for their help in the collecting of spiders in southern France and in Corsica. Miss. J. R. Sijsma gave valuable help in the sorting of the material.

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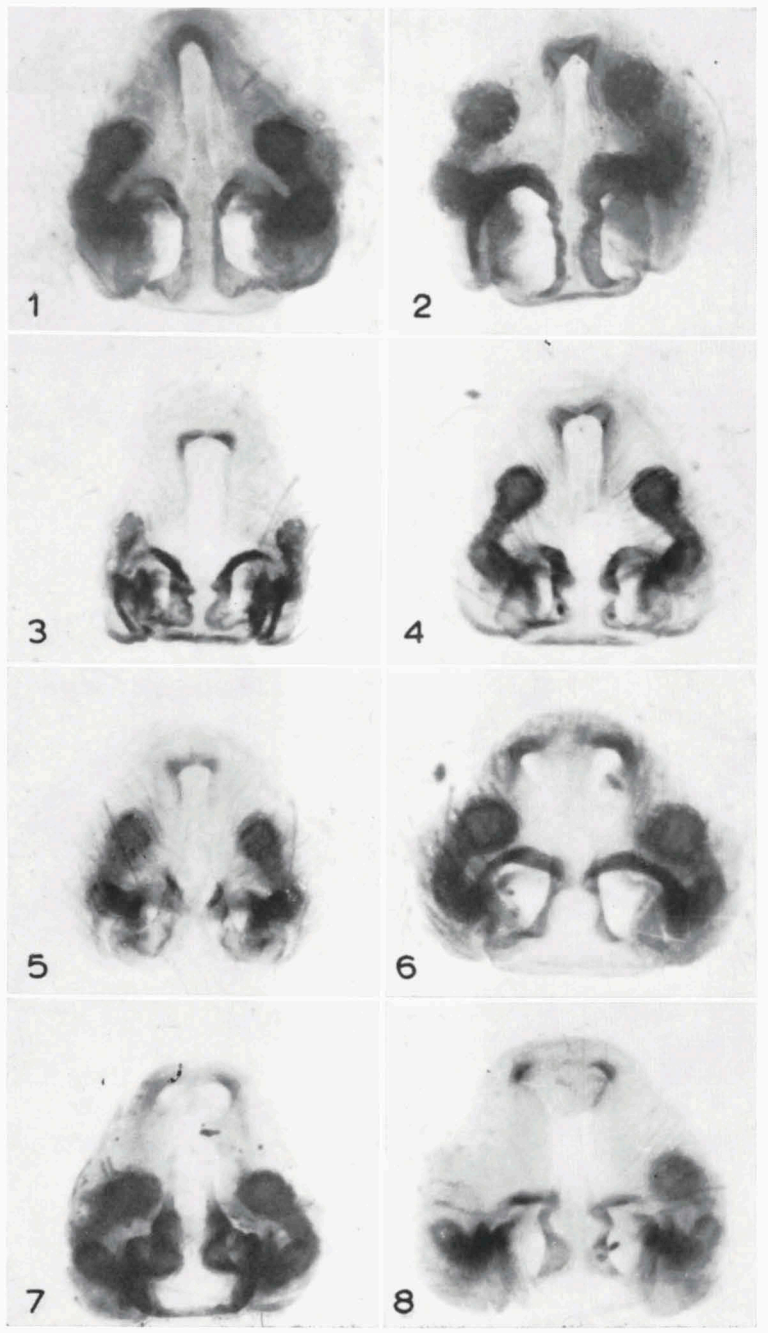

Fig. 1-8. Epigynes. 1-4, *Pardosa proxima,* St. Elena (Jaen), 7.vi.1961; 5, do., Cestas (Gironde), 28.vi.1961; 6-7, *P. hortensis,* 28.v.1961 (6) and 3.vi.1961 (7); 8, intermediate specimen, Las Correderas (Jaen), 12.vi.1961.