

# THE LYCOSIDAE AND PISAURIDAE (ARANEAE) OF THE NETHERLANDS

by

**J. T. WIEBES**

Rijksmuseum van Natuurlijke Historie

## INTRODUCTION

In this paper the species of spiders belonging to the families Lycosidae and Pisauridae, known from the Netherlands, are described and figured. In addition a number of species, which possibly may occur in the Netherlands though they have not yet been found here hitherto, are mentioned in the keys.

In order to make the keys useful also for identifying immature specimens, I have based these keys not only on the well-known differential characters in the adult sexual organs, but also, as far as possible, on characters derived from colour-pattern and chaetotaxy.

The system of notation, used to indicate the situation of the spines on palps and legs, is briefly stated as follows (Wiebes, 1956, pp. 408, 409): d, l', l'', v', and v'' indicate dorsal, prolateral, retrolateral, anterior ventral, and posterior ventral rows of spines respectively. The indices <sub>1</sub>, <sub>2</sub>, and <sub>a</sub> refer to the situation of the verticils on the parts of the legs concerned, <sub>1</sub> is the most basal verticil, <sub>a</sub> the apical one. Distinct verticils are placed in square brackets, pairs (consisting of an anterior and a posterior spine) in round brackets. Some parts of the joints sometimes bear two spines instead of the normal one; the notation is then with extra indices, <sub>a</sub>, <sub>b</sub>, or, in the apical verticil, with the additions, s (superior), or i (inferior).

The figures in this paper were made with the aid of a camera lucida. In order to figure the female epigynes, these chitinous plates were taken out, and cleared in a 10 % solution of caustic potash in water. Temporary preparations were made in alcohol (70 %), and the outlines were drawn as seen under an ordinary microscope.

Under each species I give a list of names, used in some important monographs on Lycosidae and Pisauridae. For further synonyms I refer to Bonnet's bibliography (Bonnet, 1945, 1955, etc.).

The lists of dutch localities are based on records by several authors and on newly identified specimens. I have tried to trace, as far as possible, the collections of authors who have published on dutch lycosids, in order to verify their records. The localities of specimens which I did not see myself

are indicated with the initials of the authors from which I borrow the records, viz., B. = Becker; B.-B. = Bouwman-Buis; C = Chrysanthus; J. = de Jong; K. = Kluyver; P. = Pinkhof; S. = Six; S.v.V. = Snellen van Vollenhoven; W. = Waage. These initials have not been added in cases where I myself have seen other specimens of the same species from that locality.

Van Hasselt obviously did not preserve all his collected material. His collection consists of a few specimens of each species, though he recorded many specimens from several localities. In the lists, all records borrowed from van Hasselt are indicated with his initials (v.H.), in an appendix (pp. 72-74) I give a list of the contents of his collection.

Many of the details on the ecology of some species, mentioned under "occurrence", are based on the results of an ecological research in Meijndel, the dune area of the "Gemeentelijke Duinwaterleiding van 's Gravenhage". The full results of this research will be published elsewhere (Wiebes, 1959<sup>b</sup>).

The materials on which this study is based consist of several collections, viz., the collection of the Rijksmuseum van Natuurlijke Historie, Leiden, enlarged by a large collection from Meijndel; the collection of the Zoologisch Museum, Amsterdam; the collection of the Natuurhistorisch Museum, Maastricht; and the private collections of the following persons, Father Chrysanthus O.F.M.Cap., Oosterhout; Mr. G. L. Spoek, Rotterdam; and Mr. J. Hulsebos, Dwingelo. My sincere thanks are due to the curators of the institutions mentioned above, Dr. L. van der Hammen, Mr. C. A. W. Jeekel, and Dr. E. M. Kruytzer respectively, and to the owners of the private collections, for their kind cooperation in making available all important material. With deep gratitude I acknowledge the help and unfailing interest of Dr. L. van der Hammen, who suggested the subject of this paper and gave me much help and instruction in the beginning of my study of the dutch Lycosidae. To Father Chrysanthus I am much indebted for the free access he gave me to his large collection of dutch spiders, and for the happy days he allowed me to stay in the beautiful monastery at Oosterhout.

#### FAMILY LYCOSIDAE

Terrestrial spiders of large or medium size, general outlines as in fig. 17. Eyes in three rows, one anterior row of four small eyes, and one median and one posterior row of two larger eyes each, situated in the angles of a trapezium (fig. 51). Trochanteres of the legs ventrally with an apical notch (fig. 6). Claws of the tarsi with few teeth. Tibiae of male palps without any apophyses.

Lycosidae are hunting spiders. They do not make any web for the capture of their prey, but they hunt it on foot, hence the vernacular name of "wolf spiders". Females bear, in the period of reproduction, the egg-cocoon attached to the spinnerets. After the young spiders have hatched, they are carried on their mother's back for some days, before they become independent.

Key to the genera.

1. Median light band of carapace with darker markings . . . . . 2
- Median light band of carapace without any darker markings but for the fovea, or absent . . . . . 3
2. Dark markings in median light band of carapace consisting of two longitudinal bars behind the posterior eyes (fig. 24) 3. *Trochosa*, p. 18.
- Dark markings in median light band of carapace consisting of a V-shaped figure behind the posterior eyes (fig. 82) . 8. *Pirata*, p. 57.
3. Carapace with a well defined median light band . . . . . 4
- Carapace without a definite median light band . . . . . 7
4. Inner row of the chelicerae with two teeth. Clypeus one to one and a half times the diameter of a median eye of the anterior row . 5
- Inner row of the chelicerae with three teeth. Clypeus twice or more than twice as wide as the diameter of a median eye of the anterior row 6
5. Median light band of carapace with white pubescence, in sharp contrast with the black regions next to it . . . . . 2. *Xerolycosa*, p. 15.
- Median light band of carapace, though possibly with white pubescence, yet not sharply contrasted to the brown regions next to it 1. *Alopecosa*, p. 3.
6. Tibiae I with an oblique anterior row of four spines  $v_1'-v_2'-v_3'-l_2'$ . Light bands of carapace very broad (fig. 22) 5. *Hygrolycosa*, p. 33.
- Tibiae I with an oblique row of three spines  $v_1'-v_2'-l_2'$ . Median light band of carapace usually narrower, broad in one species only (*P. nigriceps*, fig. 84) . . . . . 6. *Pardosa*, p. 34.
7. Anterior row of eyes strongly procurved. Posterior spinners the longest. Only one dutch species with white palp-patellae . 7. *Aulonia*, p. 56.
- Anterior row of eyes straight or recurved (figs. 51-53). Posterior spinners not much longer than the other pairs . . . 4. *Arctosa*, p. 26.

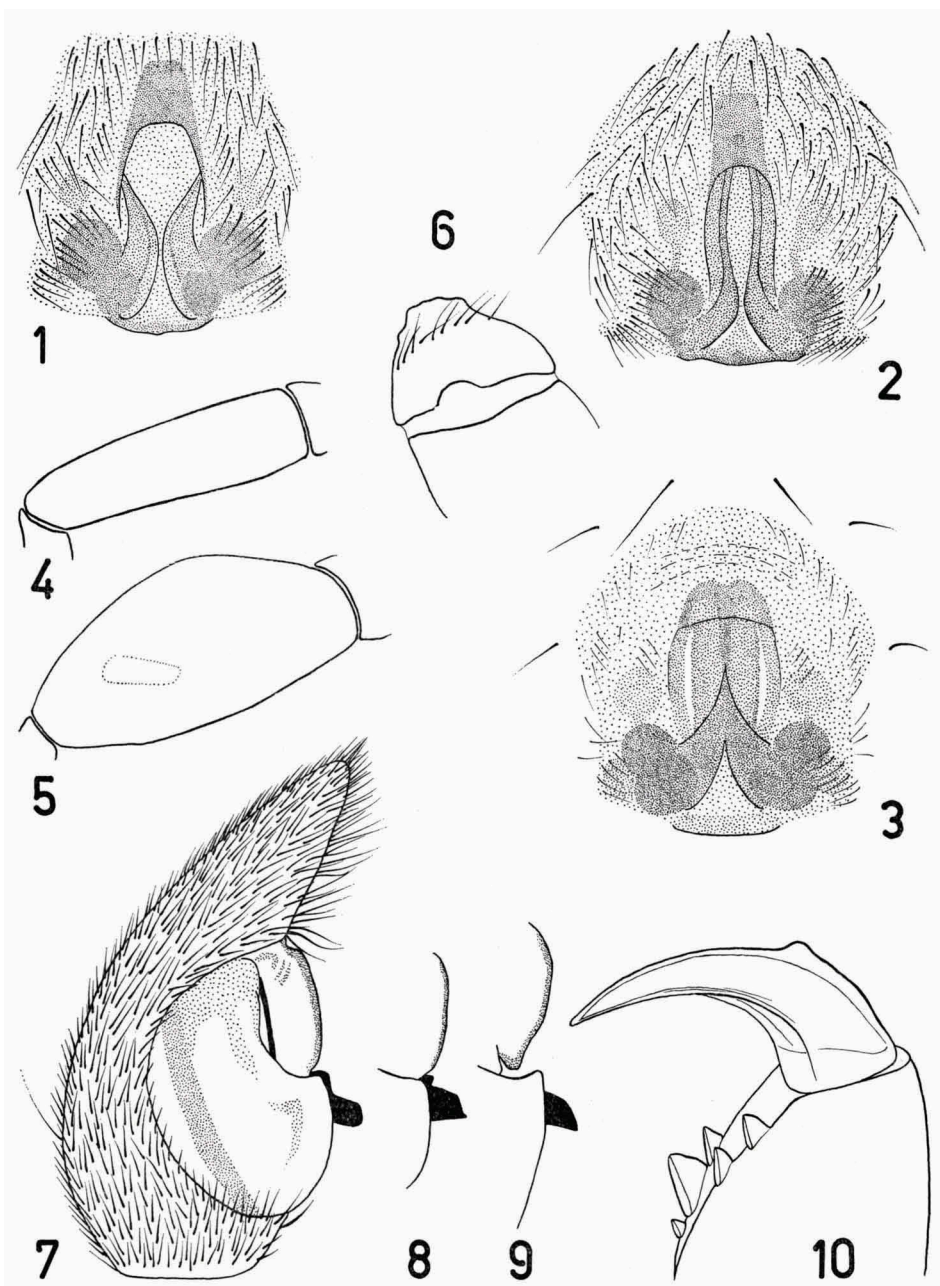
#### Genus 1. **Alopecosa** Simon

Simon, 1885<sup>g</sup>, p. 10 = *Tarentula* auct. 1)

Typus generis *Araneus fabrilis* Clerck (1757, pp. 86, 87, Pl. 4 fig. 2)

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1) In the use of generic names I follow Bonnet (1951).



Figs. 1-10, *Alopecosa*: 1-3, epigynes,  $\times 55$ : 1, *A. pulverulenta*, 2, *A. cuneata*, 3, *A. trabalis*; 4, 5, outlines of male tibiae I, prolateral aspects,  $\times 25$ : 4, *A. pulverulenta*, 5, *A. cuneata*; 6, trochanter and basal part of femur of *A. fabrilis*, ventral aspect,  $\times 50$ ; 7, tarsus of male palp of *A. cuneata*, prolateral aspect,  $\times 55$ ; 8, 9, median apophyses of male palpal organs, prolateral aspects,  $\times 55$ : 8, *A. pulverulenta*, 9, *A. trabalis*; 10, fang and top of chelicera of *A. fabrilis*, ventral aspect,  $\times 50$ .



Large spiders, with a distinct and characteristic colour-pattern on carapace and abdomen. Carapace: median light band broad (fig. 17), lateral bands absent or indistinct in some species, distinct in others. Abdomen: dorsal pattern consisting of a light longitudinal median band, widest at base and tapering towards spinners (fig. 17), or of a dark lanceolate stripe, followed by black chevrons, and accompanied by alternate black and white spots (fig. 26). Eyes relatively small, anterior row straight or slightly procurved. Clypeus narrow. Chelicerae with two teeth in the inner row (fig. 10). Legs: males of some species have the tibiae I swollen and black, or densely clothed with black hairs. Male palps in all species are much alike in ventral view, but the outlines of the median apophyses in lateral view show minute specific differences. More reliance, however, has to be placed on other characters; as the outlines of the median apophyses appear different when viewed from different positions, a slight deviation of the palp may make some details unrecognizable. Epigyne large, in most species with a characteristic median groove.

The spiders of this genus build burrows from which they prey on other terrestrial arthropods. In the period of copulation adult males can be seen running about, obviously in search for the sedentary females.

#### Key to the species.

1. Dorsal abdominal pattern consisting of a light median band, widest at base and tapering towards spinners (fig. 17) . . . . . 2
- Dorsal abdominal pattern consisting of a dark lanceolate stripe and chevrons, accompanied by rows of alternate black and white spots (fig. 26) 4
2. Pattern of carapace very clear yellow, median and lateral bands broad, marginal dark bands absent or narrow. Sternum with an egg-shaped lighter region in the middle. Ridges in the median groove of the epigyne running very close together, proximal part of epigyne broad, with a median notch (fig. 3). Median apophysis of male palpal organs triangular in prolateral view (fig. 9). Large species . . . 4. *A. trabalis*, p. 9.
- Pattern of carapace more reddish, lateral bands narrower, or nearly absent. Lighter region of sternum never egg-shaped. Ridges in the median groove of the epigyne not very close to each other, proximal part of epigyne narrower, without any median notch. Median apophysis of male palpal organs quadrangular in prolateral view (fig. 7). Smaller 3
3. Lateral bands of carapace distinct in both sexes. Abdominal pattern distinct. Metatarsi II of adult males without retrolateral spines, except for the apical 1<sub>a</sub>". Ridges in the median groove of the epigyne running parallel (fig. 2). Male tibiae I swollen (fig. 5) . . . 1. *A. cuneata*, p. 7.

- Lateral bands of carapace indistinct, especially in male specimens. Abdominal pattern less distinct, with black dots and stripes next to the median band. Metatarsi II of adult males with retrolateral spines  $l_2''$ ,  $ls_a''$ , and  $li_a''$ . Ridges in the median groove of the epigyne strongly diverging (fig. 1). Male tibiae I not swollen (fig. 4). . . . . 2. *A. pulverulenta*, p. 8.
- 4. Dorsal surface of abdomen with two basal, orange-yellow spots next to the median stripe. Median light band of carapace strongly constricted, lateral bands indistinct and broken. Median apophysis of male palpal organs boot-shaped in prolateral view (fig. 13). Epigyne pentagonal, without median groove . . . . . 6. *A. cursor*, p. 14.
- Dorsal surface of abdomen without basal light spots. Median light band of carapace less strongly constricted, lateral bands never broken. Median apophysis of male palpal organs and epigyne different from those of the preceding species . . . . . 5
- 5. Ventral surface of abdomen light. Male tibiae I black, with thick dark pubescence. Legs clearly annulated on all segments except tarsi. Fangs of chelicerae with smooth outer margins. Median apophysis of male palpal organs with a spatulate appendix (fig. 15). Epigyne without median groove (fig. 11) . . . . . 5. *A. accentuata*, p. 12.
- Ventral surface of abdomen dark (lighter in very young spiderlings). Male tibiae I normal. Legs, in adult specimens, with dark blotches on femora only. Outer margins of the fangs with a small excrescence (fig. 10). Median apophysis of male palpal organs straight. Epigyne with a distinct median groove . . . . . 6
- 6. Dorsal abdominal pattern and lateral bands of carapace obscure. Sternum uniform dark brown. Median apophysis of male palpal organs slender and acuminate in prolateral view (fig. 14). Epigyne with a very narrow median groove (fig. 19) . . . . . 7. *A. inquilina*, p. 14.
- Lateral bands of carapace as well as dorsal abdominal pattern very distinct. Sternum with a lighter median stripe in the anterior region. Median apophysis of male palpal organs robust and blunt in prolateral view (fig. 16). Median groove of epigyne broad (fig. 18) . . . . . 4. *A. fabrilis*, p. 10.

#### *Alopecosa cuneata*-group.

This group, represented in our country by three <sup>1)</sup> species, viz., *A. cuneata*,

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<sup>1)</sup> Waage (1938, p. 181) recorded a fourth species, *A. aculeata* (Cl.), from Sint Pietersberg. This species, known from Eastern Europe, is, according to Dahl (1927, pp. 25, 26, figs. 55-58), distinguishable from *A. trabalis* by minute differences only, viz., sternum without egg-shaped lighter median region, median apophysis of male palpal

*A. pulverulenta*, and *A. trabalis*, is characterized by the acuminate median longitudinal band on the dorsal surface of the abdomen. Sometimes it is difficult to distinguish the species; the epigynes of *A. cuneata* and *A. pulverulenta* are very much alike, and the male palpal organs of the three species differ only slightly. Adult males of *A. cuneata* are easily recognized by the swollen tibiae I, recognition of males of *A. pulverulenta* and *A. trabalis* is to a large extent to be based on the pattern of the carapace and on size. Also some differences are present in the chaetotaxy of metatarsi I and II in male specimens: in *A. cuneata* the retrolateral spines  $1_1''$ - $1_2''$  are lacking, males of *A. pulverulenta* and *A. trabalis* usually have  $1_2''$  present on metatarsi II, and in some specimens of *A. pulverulenta*, also on metatarsi I.

Dutch species.

1. *Alopecosa cuneata* (Cl.)

*Araneus cuneatus* Clerck, 1757, pp. 99, 100, Pl. 4 fig. 11; *Lycosa cuneata* Becker, 1882<sup>a</sup>, pp. 99, 100, Pl. 8 fig. 2; de Lessert, 1910<sup>c</sup>, pp. 487, 488; Simon, 1937, pp. 1099, 1103, 1134, figs. 1713, 1714, 1723; *Tarentula cuneata* Dahl, 1908<sup>f</sup>, pp. 331, 333, 334, 352-354, fig. 53; Dahl, 1927, pp. 23, 24, 76, figs. 50-52; Palmgren 1939<sup>b</sup>, pp. 23, 24, figs. 17, 18; Holm, 1947, pp. 18, 19, Pl. 3 figs. 30, 31, Pl. 9 fig. 16; Locket & Millidge, 1951, pp. 274, 275, figs. 122D, 133B, E.

Length: ♀ 6.8-9.1 mm, ♂ 5.2-6.4 mm. Carapace (fig. 17) narrow, olive-brown, with distinct reddish brown median and lateral bands. Median light band with a line of dark hairs running from fovea to eye area. Eye area black, with many white hairs, especially in males. Abdomen: dorsal surface (fig. 17) greyish brown, with a very distinct longitudinal light band. This band is reddish brown in the basal part, and bordered by black. The whitish outer border, which is very distinct in male specimens, extends to the spinners. Ventral surface of abdomen yellow-brown. Chelicerae olive-brown, darker toward apices. Mandibulae and labium light brown. Sternum dark brown, with a lighter median region. Legs brown, in male specimens with dark femora, or femora with faint dorsal blotches. Tibiae I of adult males swollen and dark (fig. 5). Chaetotaxy: metatarsi I and II without retrolateral spines, except for one single apical spine  $1_a''$ . Male palp: median apophysis of

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organs without small indentations at the apex (I cannot, however, see these indentations in *A. trabalis* either!), epigyne with very dense pubescence. As seen from Dahl's fig. 58, the lateral light bands of the carapace are lacking. Waage's identification of *A. aculeata* needs confirmation, probably confusion took place with either *A. trabalis* or *A. pulverulenta*. I likewise distrust the record of Kluyver (1933, p. 136) of an immature specimen of *A. aculeata* captured by a sparrow as food for its young.

palpal organs rectangular in prolateral view (fig. 7), not acuminate. Epigyne (fig. 2): the two chitinous ridges in the median groove run almost parallel (this requires careful comparison with *A. pulverulenta*). Cocoon greyish white, nearly spherical, 4.5 mm in diameter, containing approximately 75 eggs.

Dutch records. *Lycosa clavipes* Six, 1858<sup>b</sup>, p. 298 (de Bilt); Snellen van Vollenhoven, 1859, p. 61; van Hasselt, 1883<sup>b</sup>, p. xxxiii (Wageningen); *Lycosa cuneata* van Hasselt, 1879<sup>a2</sup>, p. xxv (Mook); Becker, 1879<sup>f</sup>, p. xl (prov. Utrecht, Holland, Limburg); 1882<sup>a</sup>, p. 100 (Utrecht, Maastricht, between Hilversum and Amersfoort); *Tarentula cuneata* van Hasselt, 1886<sup>a</sup>, p. 84 (de Bilt, Driebergen, Amersfoort, Wageningen, Nijmegen, Arnhem, Voorst, Scheveningen, Loosduinen; prov. Limburg); Kluyver, 1933, pp. 105, 136 (Wageningen); Chrysanthus, 1954<sup>a</sup>, p. 40 (Odiliënberg).

Distribution: Europe and Siberia. Dutch localities: Noord-Holland: Zandvoort; Zuid-Holland: Meijndel, Scheveningen (v.H.), Loosduinen (v.H.); Utrecht: between Hilversum and Amersfoort (B.), Bilthoven, Utrecht (B.), de Bilt (S., v.H.), Driebergen (v.H.), Amersfoort (v.H.); Gelderland: Wilp, Voorst (v.H.), Hoge Veluwe, Barneveld, Wageningen (v.H., K.), Arnhem (v.H.), Nijmegen (v.H.); Limburg: Mook (v.H.), Odiliënberg, Sint Pietersberg, Maastricht (B.), Eysden.

Occurrence. Common in open places with short herbage. Adult males from March till May, adult females from April till in October. Period of copulation in May.

## 2. *Alopecosa pulverulenta* (Cl.)

*Araneus pulverulentus* Clerck, 1757, pp. 93, 94, Pl. 4 fig. 6; *Lycosa pulverulenta* Becker, 1882<sup>a</sup>, pp. 96-98, Pl. 8 fig. 1; de Lessert, 1910<sup>c</sup>, pp. 488, 489; Simon, 1937, pp. 1100, 1103, 1134, 1135, figs. 1717, 1724; *Tarentula pulverulenta* Dahl, 1908<sup>f</sup>, pp. 331, 332, 334, 354-357, fig. 54; Dahl, 1927, pp. 24, 25, 76, figs. 53, 54; Palmgren, 1939<sup>b</sup>, pp. 24-26, figs. 14-16, 23, map 3; Holm, 1947, p. 18, Pl. 3 fig. 33, Pl. 9 fig. 15; Locket & Millidge, 1951, p. 274, figs. 133A, E.

This species is very much like *A. cuneata*, some differential characters are:

Length: ♀ 6.8-9.0 mm, ♂ 6.1-7.2 mm. Carapace dark brown, with reddish brown markings. Lateral bands distinct in female specimens, very faint in males. Abdomen: pattern of dorsal surface much like that of *A. cuneata*, but less distinct. Median lanceolate stripe accompanied by series of black dots and streaks. Sternum black-brown, with a lighter median band. Legs brown, femora of females annulated, some faint annulations occur on male femora III and IV. Femora I and II, and tibiae I, of adult males very dark. Male

tibiae I not swollen (fig. 4). Chaetotaxy: male metatarsi II usually with  $l_2''$ , in some specimens  $l_2''$  is present on metatarsi I. Apical spine  $1a''$  on metatarsi I usually single, sometimes, however, this spine is divided into  $1s_a''$ ,  $1i_a''$ , metatarsi II with retrolateral apical spines  $1s_a''$ ,  $1i_a''$ . Male palpal organs almost indistinguishable from those of *A. cuneata*, median apophysis, fig. 8. Epigyne (fig. 1): the chitinous ridges in the median groove do not run parallel, but diverge strongly. Cocoon greyish white, nearly spherical, 4.5 mm in diameter, containing approximately 50 eggs.

Dutch records. *Lycosa cuneata* Six, 1858<sup>b</sup>, p. 298 (Driebergen); *Lycosa pulverulenta* Becker, 1879<sup>f</sup>, p. xl (prov. Utrecht); 1882<sup>a</sup>, p. 98 (Maastricht, Breda, between Maartensdijk and de Bilt); *Tarentula pulverulenta* van Hasselt, 1886<sup>a</sup>, p. 83 (prov. Drente; Amersfoort); Kluyver, 1933, p. 136 (Wageningen); Chrysanthus, 1955<sup>a</sup>, p. 16 (Wellerlooi); *Tarentula trabalis* <sup>1)</sup> Chrysanthus, 1957, p. 31 (Wellerlooi).

Distribution: palearctic region. Dutch localities: Noord-Holland: Urk; Zuid-Holland: Nieuwkoop; Utrecht: Bilthoven, between Maartensdijk and de Bilt (B.), Amersfoort (v.H.), Driebergen (S.); Groningen: Schiermonnikoog; Drente (v.H.); Overijssel: Enschede, Herikerberg; Gelderland: Wageningen (K.), Wooldse Veen; Noord-Brabant: Breda (B.), Oisterwijk, Baarle-Nassau, Tilburg, Borne; Limburg: Wellerlooi, Heerlen, Rijckholt, Schinnen, Houthem, Maastricht (B.), Sint Pietersberg, Eysden, Cotessen.

Occurrence. Rather common in meadows and in glades in woods. Adults in April and May, females continue till in August. Period of copulation in May, female with cocoon in May.

### 3. *Alopecosa trabalis* (Cl.)

*Araneus trabalis* Clerck, 1757, pp. 97, 98, Pl. 4 fig. 9; *Lycosa trabalis* Becker, 1882<sup>a</sup>, pp. 95, 96, Pl. 7 fig. 6; de Lessert, 1910<sup>c</sup>, pp. 486, 487; Simon, 1937, pp. 1100, 1102, 1103, 1134, figs. 1716, 1722; *Tarentula trabalis* Dahl, 1908<sup>f</sup>, pp. 332, 333, 350-352, fig. 56; Dahl, 1927, pp. 26, 27, 76, figs. 59-62; Palmgren, 1939<sup>b</sup>, p. 77; Holm, 1947, p. 17, Pl. 3 figs. 27, 28, Pl. 9 fig. 13.

Much like *A. cuneata*, some differential characters are:

Length: ♀ 10.2-12.3 mm, ♂ 8.0-9.6 mm. Carapace olive-brown, with very broad yellow median and lateral bands. Marginal dark bands in females

<sup>1)</sup> I regret having misidentified this specimen in 1956 with *A. trabalis*. Although the male palpal organs are very similar to those of *A. trabalis*, the total dimensions and the colour-pattern of the carapace are distinctly different. There is no doubt now, that the specimen, in 1957 recorded as *T. trabalis*, belongs to *A. pulverulenta*. A similar specimen, in its palpal organs almost inseparable from *A. trabalis*, is that from Oisterwijk.

indicated by some blotches only, usually present in males, but narrow. Sternum brown, with egg-shaped lighter central region. Legs: femora of female specimens yellow, with darker blotches on dorsal and ventral surfaces, other joints brown, without distinct markings. Male femora I and II, and tibiae I olive-brown, other joints yellow-brown. Chaetotaxy as in *A. pulverulenta*. Male palp: median apophysis triangular in prolateral view (fig. 9). Epigyne (fig. 3): proximal part broader than in *A. cuneata*, and with a median notch, the ridges in the median groove run very close together.

Dutch records. *Trochosa trabalis* Six, 1858<sup>b</sup>, p. 298 (Driebergen, Noordwijk); *Lycosa trabalis* Becker, 1879<sup>f</sup>, p. xl (prov. Utrecht, Holland, Zeeland); 1882<sup>a</sup>, p. 96 (Maastricht); *Tarentula trabalis* van Hasselt, 1886<sup>a</sup>, pp. 83, 84 (Wageningen, Nijmegen, Walcheren, Veenhuizen, Maastricht); 1893<sup>e</sup>, p. xxxii (Oisterwijk); *Tarantula trabalis* Waage, 1938, p. 181 (Sint Pietersberg); *Tarentula aculeata* Chrysanthus, 1954<sup>a</sup>, p. 40 (Lerop).

Distribution: Europe, Asia Minor. Dutch localities: Zuid-Holland: Noordwijk (S.); Zeeland: Walcheren (v.H.); Utrecht: Driebergen (S.); Drente: Veenhuizen (v.H.); Gelderland: Hoge Veluwe, Wageningen (v.H.), Nijmegen (v.H.); Noord-Brabant: Oisterwijk (v.H.); Limburg: Herkenbos, Lerop, Sint Pietersberg (W.), Maastricht (B., v.H.).

Occurrence. Rare in humid meadows and in glades in woods. Adult females in June and September, adult males in May. Subadult specimens in autumn and in early spring.

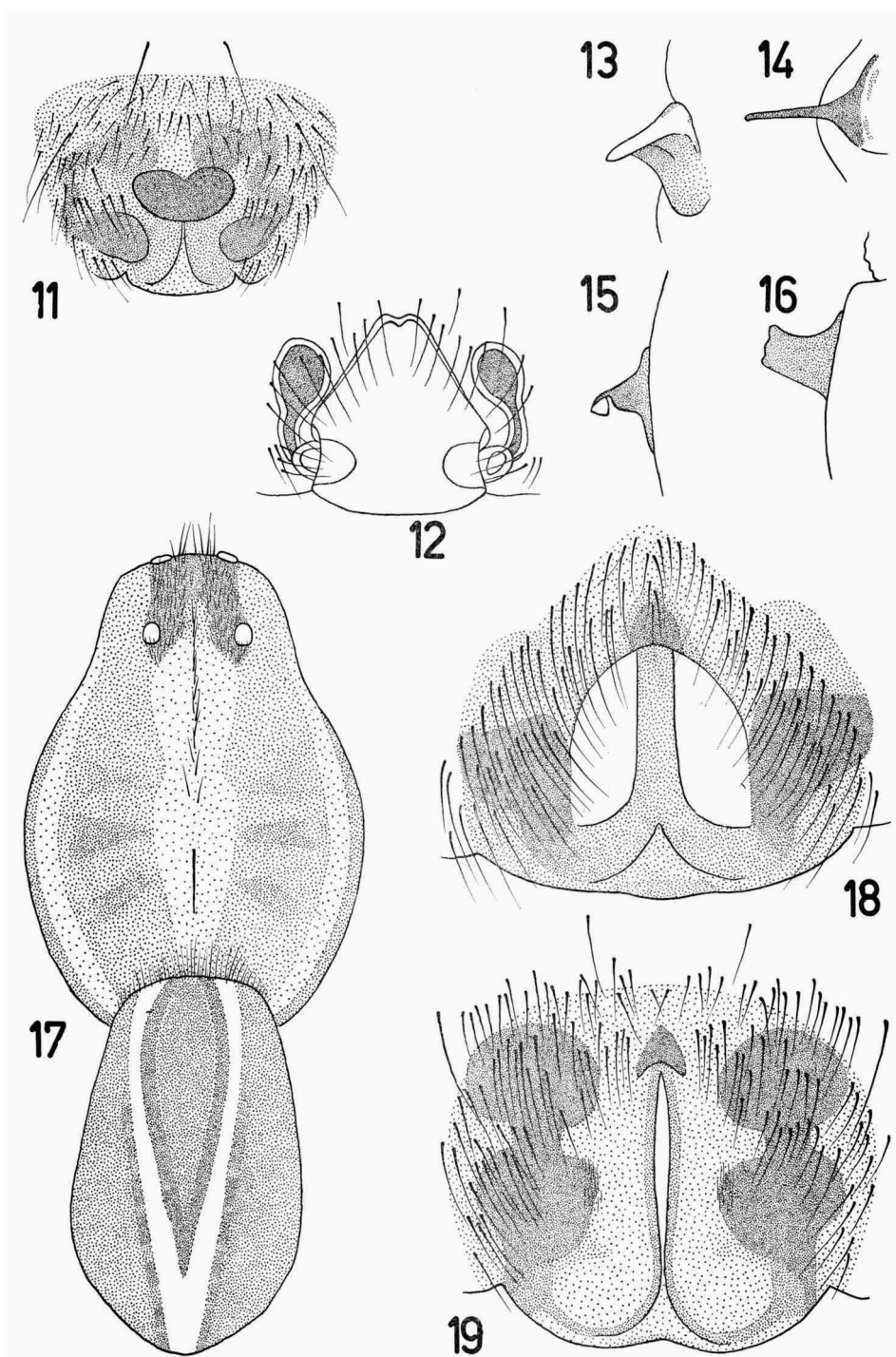
#### *Alopecosa fabrilis*-group.

One dutch species:

#### 4. *Alopecosa fabrilis* (Cl.)

*Araneus fabrilis* Clerck, 1757, pp. 86, 87, Pl. 4 fig. 2; *Lycosa fabrilis* Becker, 1882<sup>a</sup>, pp. 89, 90, Pl. 7 fig. 3; de Lessert, 1910<sup>e</sup>, p. 484; Simon, 1937, pp. 1097-1099, 1133, figs. 1709, 1710; *Tarentula fabrilis* Dahl, 1908<sup>f</sup>, pp. 330, 336, 337-339, fig. 51; Dahl, 1927, pp. 21, 22, 76, figs. 46, 47; Palmgren, 1939<sup>b</sup>, pp. 22, 23, figs. 7, 8, 21, map 2; Holm, 1947, pp. 16, 17, fig. 11, Pl. 3 figs. 21, 22, Pl. 9 fig. 11; Locket & Millidge, 1951, pp. 276, 277, figs. 133D, G.

Length: ♀ 11.0-14.7 m., ♂ 9.9-12.1 mm. Carapace greyish brown, with broad, light brown median and lateral bands. Light bands with white pubescence, especially in males. Marginal dark bands indistinct or absent. Radiating striae black, very distinct. Eye area in males densely clothed with white hairs. Abdomen: pattern of dorsal surface much like that of *A. accen-*



Figs. 11-19, *Alopecosa*: 11, epigyne of *A. accentuata*,  $\times 50$ ; 12, vulva of *A. cursor*,  $\times 25$  (after Dahl, 1908f, fig. 46b); 13-16, median apophyses of male palpal organs, prolateral aspects,  $\times 50$ : 13, *A. cursor* (after Dahl, 1927, fig. 35), 14, *A. inquilina* (after Dahl, 1927, p. 31b), 15, *A. accentuata*, 16, *A. fabrilis*; 17, male of *A. cuneata*, dorsal aspect,  $\times 20$  (legs and palps omitted); 18, 19, epigynes: 18, *A. fabrilis*,  $\times 50$ , 19, *A. inquilina*,  $\times 85$ .

*tuata* (cf. fig. 26), white spots next to median band very distinct in posterior half. Ventral surface greyish black. Clypeus light brown. Chelicerae olive-brown, with whitish pubescence on the proximal parts. Fang with a small excrescence on the outer margin (fig. 10). Mandibulae brown, labium darker. Sternum black-brown, with a lighter anterior streak. Legs light brown, with darker blotches on femora distinct in females, less distinct in males. Young immature specimens have black blotches on femora, patellae, and tibiae. Male palp: median apophysis of tarsal organs robust and blunt in prolateral view (fig. 16). Epigyne (fig. 18): general outlines as in *A. cuneata*-group, but very broad, and densely clothed with black hairs.

Dutch records. *Lycosa febrilis* van Hasselt, 1879<sup>a2</sup>, p. xxv (Mook); *Tarentula fabrilis* van Hasselt, 1886<sup>a</sup>, p. 85 (Amersfoort, Nijmegen, Loosduinen, Maastricht); Waage, 1938, p. 181 (Sint Pietersberg).

Distribution: Europe. Dutch localities: Noord-Holland: between Huizen and Blaricum; Zuid-Holland: Katwijk, Meijendel, Loosduinen (v.H.); Utrecht: Amersfoort (v.H.); Friesland: Terschelling; Gelderland: Huls-horst, Schaarsbergen, Hoge Veluwe, Nijmegen (v.H.); Noord-Brabant: Drunen; Limburg: Mook (v.H.), Herkenbos, Sint Pietersberg (W.), Maastricht (v.H.).

Occurrence. Common in open, sandy places. In our dunes this species lives on the most bare and open sandhills with very short herbage or with mosses and lichens only. Thanks to their sandy appearance the specimens of *A. fabrilis* beautifully match with their substratum, and are almost invisible when not moving. Adults from March till July, and in September and October. The species has two periods of copulation, one in autumn, and one, less obvious, in spring; probably these peaks of activity represent only one period of copulation, which is interrupted by winter. Development from egg to adult presumably lasts nearly two years.

#### *Alopecosa accentuata*-group.

Of the dutch species of the *A. accentuata*-group, viz., *A. accentuata*, *A. cursor*, and *A. inquilina*, only the first is represented in our collections in fair numbers. *A. cursor* and *A. inquilina* are extremely rare, and consequently my material is very scarce; all specimens of these two species (one adult, and two juvenile females only) are from collection van Hasselt.

Dutch species.

#### 5. *Alopecosa accentuata* (Latr.)

*Lycosa accentuata* Latreille, 1817<sup>c</sup>, pp. 294, 295; Becker, 1882<sup>a</sup>, pp. 92-94, Pl. 7 fig. 5; Simon, 1937, pp. 1100, 1103, 1135, figs. 1715, 1725; *Tarentula*



*barbipes* Dahl, 1908<sup>f</sup>, pp. 327, 336, 345-349, fig. 45; Dahl, 1927, pp. 16, 17, 76, figs. 33, 34; Palmgren, 1939<sup>b</sup>, pp. 21, 22, figs. 6, 20; Locket & Millidge, 1951, p. 275, figs. 122F, 133C, F; *Lycosa barbipes* de Lessert, 1910<sup>c</sup>, pp. 485, 486; *Tarentula accentuata* Holm, 1947, p. 18, Pl. 3 figs. 23, 24, Pl. 9 fig. 14.

Length: ♀ 8.0-9.9 mm; ♂ 6.8-7.5 mm. Carapace reddish brown, with a lighter median band. Lateral bands very indistinct, separated from margins by narrow marginal dark bands. Median and lateral bands with white pubescence. Abdomen: dorsal surface of female specimens (fig. 26) with a black median stripe, this stripe is accompanied by two black bars pointing outwards, and followed by a series of chevrons. Median stripe bordered by a white area, which extends to the spinners. Outside the median figure the abdomen is spotted with white dots. Pattern in male specimens obscure, more whitish. Ventral surface light grey-brown. Clypeus dark. Chelicerae olive-brown, with almost black apices. Mandibulae dark yellow-brown, labium black-brown. Sternum uniform shining dark brown. Legs: al joints except tarsi clearly annulated in female specimens, less distinctly in males. Male femora I dark, tibiae I black, densely clothed with black hairs, especially on the ventral surfaces. Male palp: median apophysis of tarsal organs (fig. 15) with a spatulate appendix. Epigyne (fig. 11) broader than high, with a thickened upper part. Cocoons white, nearly spherical, 5.5 mm in diameter, containing 65-75 eggs.

Dutch records. *Lycosa inquilina* Six <sup>1)</sup>, 1858<sup>a</sup>, p. 298 (Driebergen); van Hasselt, 1879<sup>a2</sup>, pp. xxiv (Mook); *Lycosa barbipes* van Hasselt, 1876<sup>c2</sup>, p. lii (Hilversum); Chrysanthus 1953, p. 88 (Roermond); *Lycosa accentuata* Becker, 1879<sup>o</sup>, p. cxxix (between Hilverding and Marden); 1882<sup>a</sup>, p. 94 (Oirschot, between Hilversum and Marden, Maastricht, Den Haag); *Tarentula andrenivora* van Hasselt, 1886<sup>a</sup>, p. 84.

Distribution: Europe. Dutch localities: Noord-Holland: Huizen, Bloemendaal, Hilversum (v.H.), between Hilversum and Marden (B.); Zuid-Holland: Katwijk, Leiden, Meijendel, Den Haag (B.); Utrecht: Oud-Leusden, Driebergen (S.), Woudenberg; Drente: Dwingelo; Overijssel: Ootmarsum, Wezep; Gelderland: Stroe; Noord-Brabant: Oirschot (B.); Limburg: Mook (v.H.), Roermond, Herkenbos, Vlodrop, Ubachsberg, Schin op Geul, Maastricht (B.), Kerkrade, Bemelen.

Occurrence. Common, in the same biotopes as *A. fabrilis*. Adults from March till July, and from September till November. Primary period of copulation in spring, secondary in autumn. Females with cocoons in April and May.

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1) According to van Hasselt, 1886<sup>a</sup>, p. 85.

6. *Alopecosa cursor* (Hahn)

*Lycosa cursor* Hahn, 1831<sup>a</sup>, pp. 17, 18, Pl. 5 fig. 14; Becker, 1882<sup>a</sup>, pp. 100, 101, Pl. 8 fig. 3; Simon, 1937, pp. 1102, 1105, 1135, figs. 1718, 1726; *Tarentula cursor* Dahl, 1908<sup>f</sup>, pp. 327, 336, 349, 350, fig. 46; Dahl, 1927, pp. 17, 18, 76, figs. 35, 36.

The only two specimens I saw of this species were two juvenile females from collection van Hasselt (no. 784), easily recognizable by the yellowish dorsal blotches at the base of the abdomen.

Length: 6.6-7.0 mm (adult specimens, according to Dahl (1927, p. 17): ♀ 7 mm, ♂ 6 mm). Carapace greyish brown, with a yellow-brown median band, which is strongly constricted, and clothed with thin white pubescence. Lateral bands broken, consisting of some patches of light pubescence only. Abdomen greyish brown dorsally, with a distinct pattern as in *A. accentuata*, there are two basal, orange-yellow blotches on either side of the lanceolate stripe. Ventral surface yellow-brown. Clypeus light. Chelicerae light brown, with darker median parts. Mandibulae and labium light brown. Sternum uniform dark brown. Legs greyish brown, with indistinct annulations on femora and tibiae. Male palp and epigyne: according to Dahl (1908<sup>f</sup>, p. 327) the median apophysis of the male palpal organs is boot-shaped ("Stiefelförmig") in lateral view (fig. 13), and the epigyne is a pentagonal, smooth, chitinous plate, with a small notch in the proximal part (vulva, fig. 12).

Dutch records. *Lycosa cursor* Becker, 1879<sup>o</sup>, p. cxxix (between Hilverding and Marden); 1882<sup>a</sup>, p. 101 (between Hilversum and Marden, Maastricht); *Tarentula cursor* van Hasselt, 1886<sup>a</sup>, p. 83 (Hilversum, Arnhem, Maastricht).

Distribution: Europe, Siberia, Asia Minor. Dutch localities: Noord-Holland: Hilversum (v.H.), between Hilversum and Marden (B.); Gelderland: Arnhem (v.H.); Limburg: Maastricht (B., v.H.).

Occurrence. Very rare. This species has not been found in our country since seventy years. According to Dahl (1927, p. 18), *A. cursor* is restricted to very dry, sunny biotopes. Adults in spring.

7. *Alopecosa inquilina* (Cl.)

*Araneus inquilinus* Clerck, 1757, pp. 88-90, Pl. 5 fig. 2; *Lycosa inquilina* Becker, 1882<sup>a</sup>, pp. 91, 92, Pl. 7 fig. 4; de Lessert, 1910<sup>c</sup>, pp. 481, 482; Simon, 1937, pp. 1099, 1133, figs. 1711, 1712; *Tarentula inquilina* Dahl, 1908<sup>f</sup>, 326, 336, 339-341, fig. 44; Dahl, 1927, pp. 15, 16, 76, figs. 31, 32; Palmgren, 1939<sup>b</sup>, p. 21, figs. 4, 5, 19, map 2; Holm, 1947, pp. 15, 16, Pl. 3 figs. 25, 26, Pl. 9 fig. 10.

Length: ♀ 13.7 mm (one female only, I did not see any male specimens). Carapace broad, olive-brown, with yellow-brown median band and caput. Lateral bands very obscure, not or scarcely lighter than the dark regions. No distinct marginal dark bands. Abdomen: dorsal surface yellowish, with a darker lanceolate stripe. Pattern in the only specimen I saw obviously faded by long preservation; fresh specimens, however, according to Dahl (1927, p. 15), also have an indistinct abdominal pattern. Ventral surface greyish brown, darker than sides. Eye area narrow. Clypeus yellow-brown. Chelicerae dark brown, with black pubescence, apices with yellowish hairs. Mandibulae and labium brown, with yellowish apices. Sternum uniform dark brown. Legs light red-brown, with some darker markings on the ventral surfaces of the femora. Male palp, according to Dahl (1927, fig. 31), with a very long, sharply acuminate median apophysis in the tarsal organs (fig. 14). Epigyne (fig. 19) high, with a characteristic narrow median groove, densely clothed with stout black hairs.

Dutch records. *Lycosa inquilina* Becker, 1879<sup>f</sup>, p. xl (prov. Utrecht, Holland, Noord-Brabant, Limburg, Zeeland); 1882<sup>a</sup>, p. 92 (prov. Utrecht, Limburg, Zeeland); *Tarentula inquilina* van Hasselt, 1886<sup>a</sup>, p. 85; 1890<sup>a</sup>, p. 194.

Distribution: Europe and Siberia, not in British Isles. Dutch localities <sup>1)</sup>: provinces "Holland", Zeeland, Utrecht, Noord-Brabant, and Limburg (B.).

Occurrence. Very rare, I know of only one dutch specimen (collection van Hasselt, no. 799). According to Dahl (1927, p. 16), *A. inquilina* lives under dry leaves of hardwoods. Adluts in spring and early summer.

## Genus 2. **Xerolycosa** Dahl

Dahl, 1908<sup>f</sup>, p. 361.

Typus generis *Lycosa nemoralis* Westring (1861, pp. 472-474)

Spiders of medium size. Carapace black-brown, with a conspicuous median light band of white pubescence. Abdomen grey-brown, with a lanceolate stripe and chevrons, pattern not very distinct. Eyes of anterior row of equal diameters, the row is straight. Chelicerae with two teeth in the inner row. Sternum black-brown. Legs with dark blotches, sometimes almost annulated. Chaetotaxy: except for dorsal and some retrolateral spines on legs I and II, all verticils of tibiae and metatarsi are complete. Male palp: the median apophysis of the tarsal organs with a characteristic outline in lateral view: three protrusions are visible, viz., a distal, membranaceous protrusion,

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<sup>1)</sup> Probably some confusion took place with *A. accentuata*, some of the records perhaps refer to this species (cf. van Hasselt 1886<sup>a</sup>, p. 85).

a median, chitinized, sharp dent, and a proximal, membranous, rounded protrusion. Epigyne with two white openings, and a broad septum.

Key to the species.

The only differential characters between juvenile specimens of the two species are to be found in the pubescence of the carapace. I could not find any differences in chaetotaxy, nor in any other structural features.

1. Dark regions next to median light band with black hairs only. Lateral light bands formed by white pubescence, not pigment. Chitinized dent in the median apophysis of the male palpal organs as broad as long (fig. 33). White openings in epigyne (fig. 34) broader than high . . . . . 1. *X. nemoralis*, p. 16.
- Dark regions next to median light band with black and whitish hairs. Lateral light bands formed by white pigmentation and some light pubescence. Chitinized dent in median apophysis of male palpal organs half as broad as long (fig. 32). White openings in epigyne (fig. 35) as broad as high . . . . . 2. *X. miniata*, p. 17.

Dutch species.

1. *Xerolycosa nemoralis* (Westr.)

*Lycosa nemoralis* Westring, 1861, pp. 472-474; Becker 1882<sup>a</sup>, pp. 102, 103, Pl. 8 fig. 4; Simon, 1937, pp. 1106, 1136, figs. 1730, 1731; *Lycosa nemoralis* de Lessert, 1910<sup>c</sup>, pp. 479-481; *Xerolycosa nemoralis* Dahl, 1908<sup>f</sup>, pp. 361, 362-364, fig. 57; Dahl, 1927, pp. 27, 28, 76, figs. 63, 64; Palmgren, 1939<sup>b</sup>, pp. 28, 29, figs. 25-27, map 5; Holm, 1947, pp. 23, 24, Pl. 4 figs. 36, 37, Pl. 10 fig. 25; Locket & Millidge, 1951, pp. 271-273, figs. 132A, B.

Length: ♀ 5.2-7.0 mm, ♂ 4.6-5.4 mm. Carapace: median band very distinct in outline, with an entirely black region next to it. Lateral bands indistinct, consisting of white pubescence only. Abdomen: dorsal surface grey-brown. Lanceolate stripe brown, followed by a series of yellow-brown chevrons and lateral dots. The lanceolate stripe is anteriorly surrounded by a yellow-brown figure, shaped as an inverted U. Ventral surface yellow, with grey and black pubescence. Clypeus light brown, width one and a half times the diameter of an eye of the anterior row. Chelicerae dark brown, with darker apices. Mandibulae yellow-brown, labium darker. Legs: coxae and trochanters of a peculiar yellow-grey colour ventrally, femora dark, with lighter dorsal blotches, femora III and IV in males light, with darker dorsal blotches. Patellae, tibiae, and metatarsi grey-brown, with darker blotches, tarsi light. Male palp dark brown, tarsus darker in the basal part. Chitinized dent in

median apophysis of tarsal organs broad, approximately as broad as long (fig. 33). Epigyne (fig. 34): white openings broader than high, breadth of septum variable.

Dutch records. *Lycosa nivalis* Six, 1858<sup>b</sup>, p. 298 (De Bilt); *Lycosa nemoralis* Becker, 1882<sup>a</sup>, p. 103 (vicinity of Utrecht, Breda, Maastricht); *Tarentula nemoralis* van Hasselt, 1886<sup>a</sup>, pp. 82, 83 (De Bilt, Wageningen); *Tarentula miniata*?<sup>1)</sup> van Hasselt, 1886<sup>a</sup>, p. 82 (De Bilt, Nijmegen); *Xerolycosa nemoralis* Chrysanthus, 1953, p. 88 (Vlodrop); *Xerolycosa miniata* (pro parte<sup>2)</sup>) Chrysanthus, 1951<sup>b</sup>, p. 99 (Brunssum).

Distribution: palearctic region. Dutch localities: Utrecht: Bilthoven, Utrecht (B.), De Bilt (S., v.H.); Drente: Westerbork; Gelderland: Wilp, Stroe, Barneveld, Hoge Veluwe, Schaarsbergen, Boeschoten, Bennekom, Wageningen (v.H.), Wooldse Veen, ?Nijmegen (v.H.<sup>1)</sup>); Noord-Brabant: Breda (B.), Esbeek, Helenaveen; Limburg: Roermond, Vlodrop, Heerlen, Brunssum, Schin op Geul, Maastricht, Eysden, Vijlen, Epen.

Occurrence. Common in sandy places, glades in woods, and peat-soils in the eastern part of our country. Adults from June till September, period of copulation in July and August.

## 2. *Xerolycosa miniata* (C.L.K.)

*Lycosa miniata* C. L. Koch, 1834, Heft 123 fol. 13, 14; Becker, 1882<sup>a</sup>, pp. 104, 105, Pl. 8 fig. 5; Simon, 1937, pp. 1106-1108, 1136, figs. 1732, 1733; de Lessert, 1910<sup>c</sup>, p. 481; *Xerolycosa miniata* Dahl, 1908<sup>f</sup>, pp. 361, 362, 364, 365, fig. 58; Dahl, 1927, pp. 28, 29, 76 figs. 65-68; Palmgren 1939<sup>b</sup>, p. 29, figs. 28, 29, map 5; Holm, 1947, p. 24, Pl. 4 figs. 34, 35, Pl. 10 fig. 26; Locket & Millidge, 1951, p. 273, figs. 132C, D.

This species is very much like *X. nemoralis*. Instead of giving a complete description and thus repeating the greater part of the preceding one, I give some differential characters only:

Length: ♀ 4.9 mm (one specimen only, abdomen desiccated); ♂ 4.7-5.3 mm. Carapace more reddish, median light band less distinct in outline, dark regions with a thin whitish pubescence. Lateral light bands not only consisting of a very thin white pubescence, but mainly formed by light

1) Van Hasselt recorded *X. miniata* from De Bilt and Nijmegen. The specimens in his collection, however, all belong to *X. nemoralis*.

2) The specimens recorded by Chrysanthus from Brunssum do not all belong to this species. In the collection of the Natuurhistorisch Museum, Maastricht, I found three samples, viz.,

no. 733: 1 ♀ s.ad., Brunssum, in wood and on heath, 17-IV-1950. = *X. miniata*.

no. 757, and no. 759: 1 juv. and 1 ♀ s.ad respectively, Brunssum, on peat-soil, 17-IV-1950. = *X. nemoralis*.

pigmentation. Abdomen: dorsal surface with grey pubescence thicker than in *X. nemoralis*. Legs: more yellow, blotches less distinct. Male palp (fig. 31): chitinized dent in median apophysis of tarsal organs half as broad as long (fig. 32). Epigyne (fig. 35): white openings as broad as high, septum narrower than in *X. nemoralis*.

Dutch records. *Lycosa miniata* Becker, 1879<sup>o</sup>, p. cxxix (between Maartensdijk and De Bilt); 1882<sup>a</sup>, p. 104 (De Bilt); *Tarentula miniata*?<sup>1)</sup> van Hasselt, 1886<sup>a</sup>, p. 82 (De Bilt, Nijmegen); *Xerolycosa miniata* (pro parte<sup>2)</sup>) Chrysanthus, 1951<sup>b</sup>, p. 99 (Brunssum).

Distribution: palearctic region. Dutch localities: Noord-Holland: Texel, Den Helder; Zuid-Holland: Meijndel; Utrecht: between Maartensdijk and De Bilt (B.), De Bilt (B., v.H.); Gelderland: Boeschoten, ?Nijmegen (v.H.<sup>1)</sup>); Noord-Brabant: Tilburg, Horn; Limburg: Brunssum, Sint Pietersberg.

Occurrence. Very rare, but widespread. According to Dahl (1908<sup>f</sup>, p. 365), *X. miniata* lives in sandy places, which are overgrown with short grasses. Adults from April till August, period of copulation in early summer.

### Genus 3. **Trochosa** C. L. Koch

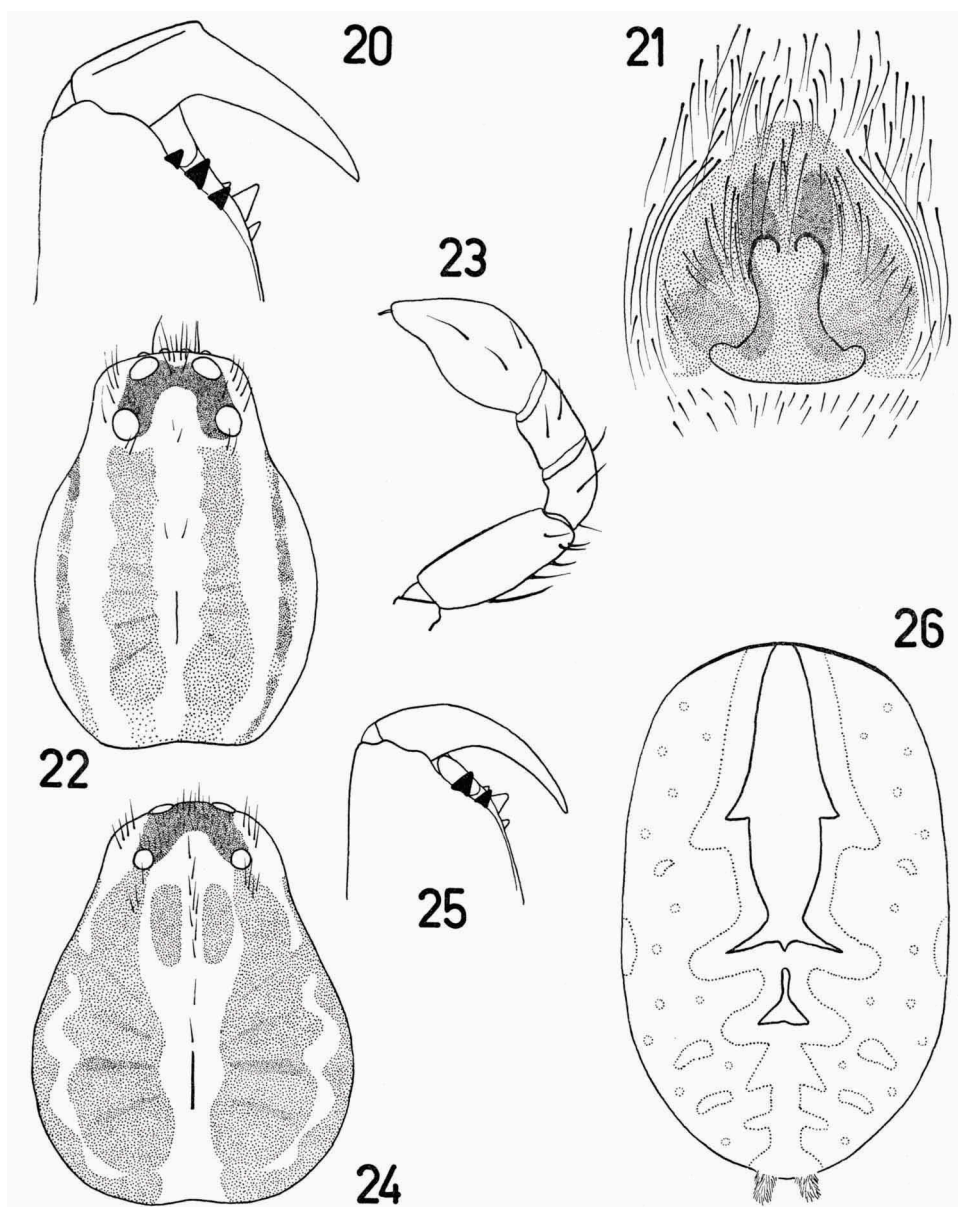
C. L. Koch, 1848<sup>a</sup>, pp. 95, 96.

Typus generis *Aranea ruricola* de Geer (1778<sup>a</sup>, pp. 282-284, Pl. 11 figs. 13, 14, Pl. 17 figs. 1, 2)

Large spiders. Carapace (fig. 24) broad, brown, with lighter median and lateral bands. Median light band with two brown bars in front of the fovea. Abdomen olive-brown dorsally, speckled with grey. Median stripe yellowish. Eyes: anterior row slightly procurved, shorter than or equal in length to the median row. Clypeus narrow, width about equal to the diameter of a median eye of the anterior row. Chelicerae with two or three teeth in the inner row. Legs robust, with faint annulations on the femora. Tibiae, metatarsi, and in some species tarsi, of the first legs of the male darkened. Chaetotaxy: the situations of the spines do not furnish differential specific characters, only *T. spinipalpis* is, in the male sex, recognizable by the chaetotaxy of the palpal tibia, and by the number of spines on metatarsus I. The male palp bears useful differential characters in some details. Epigyne much alike in the four species, with no reliable distinctive marks in exterior view. Separation of the species can be done by determining the ratios of several measurements (Locket & Millidge, 1951, pp. 278, 279, fig. 135), it

1) See foot-note 1 on p. 17.

2) See foot-note 2 on p. 17.



Figs. 20, 21, *Trochosa ruricola*: 20, fang and top of chelicera, ventral aspect,  $\times 40$ , 21, epigyne,  $\times 60$ .

Fig. 22, carapace of *Hygrolycosa rubrofasciata*, dorsal aspect,  $\times 20$ .

Figs. 23-25, *Trochosa terricola*: 23, palp of subadult male, prolateral aspect,  $\times 20$ , 24, carapace, dorsal aspect,  $\times 20$ , 25, fang and top of chelicera, ventral aspect,  $\times 40$ .

Fig. 26, abdomen of *Alopecosa accentuata*, dorsal aspect,  $\times 20$ .

is, however, much easier to take out the epigyne and study its interior aspect (Chrysanthus, 1955<sup>b</sup>): the outlines of the helmet-shaped broadenings give very useful specific characters.

*Trochosas* are rather slow spiders, living in burrows under stones or logs, or in mosses. They are partly nocturnal in habits. There are two periods of copulation: a primary in spring, and a secondary, less obvious, in autumn. In my opinion these two periods represent the two parts of one period of copulation, which is interrupted by winter; some specimens reach the adult stage before winter, and probably mate in autumn, most specimens, however, do not reach maturity before early spring of the next year, and copulate in April. Tretzel (1954, pp. 679-683; 1955, pp. 144, 145, fig. 25) speculates on the origin of these two periods of copulation in one year. He supposes the periodicity to be determined by endogene factors, the secondary period of copulation is considered to be an atavisme, its diminution being due to inter-specific competition.

#### Key to the species.

I see no possibility for accurate identification of juvenile and subadult specimens of this genus. The coloration of the dorsal abdominal stripe may give some indications (cf. Dahl, 1908<sup>f</sup>, pp. 270, 271), it does not, however, lead to any certainty. Conclusions as to the identity of immature specimens may be based on simultaneous occurrence of immature and adult specimens (e.g., the material from Meijendel consists of 2011 ♂♂ and 440 ♀♀ of *T. terricola*, and 1 ♂ and 1 ♀ of *T. ruricola* from a locality at the edge of the area of research, hence the immature specimens probably all belong to *T. terricola*), but in small collections this procedure is not reliable (e.g., a sample, collected in „De Ruiter”, an old pool of the river Roer near Herkenbos (25-XI-1948, leg. exc. R.M.N.H.), contained, next to a juvenile specimen, 1 ♂ of *T. spinipalpis*, 1 ♀ of *T. ruricola*, and 1 ♂ of *T. terricola*!).

1. Male fang with an excrescence on the outer margin (fig. 20). Male palp, fig. 44. In the vulva the exterior offshoots of the helmet-shaped broadenings are converging downward (fig. 57). Epigyne, fig. 21. . . .  
1. *T. ruricola*, p. 21.
- Outside of the fang smooth (fig. 25). In the vulva the offshoots of the helmet-shaped broadenings are diverging downward (figs. 55, 56, 58)  
2
2. Tarsus of male palp without apical claws<sup>1)</sup>, its tibia without ventral

1) N.B. All subadult males from Meijendel, very probably belonging to *T. terricola*, bear an apical claw on the tarsus of the palp (fig. 23). This differential character is to be used for adult males only!



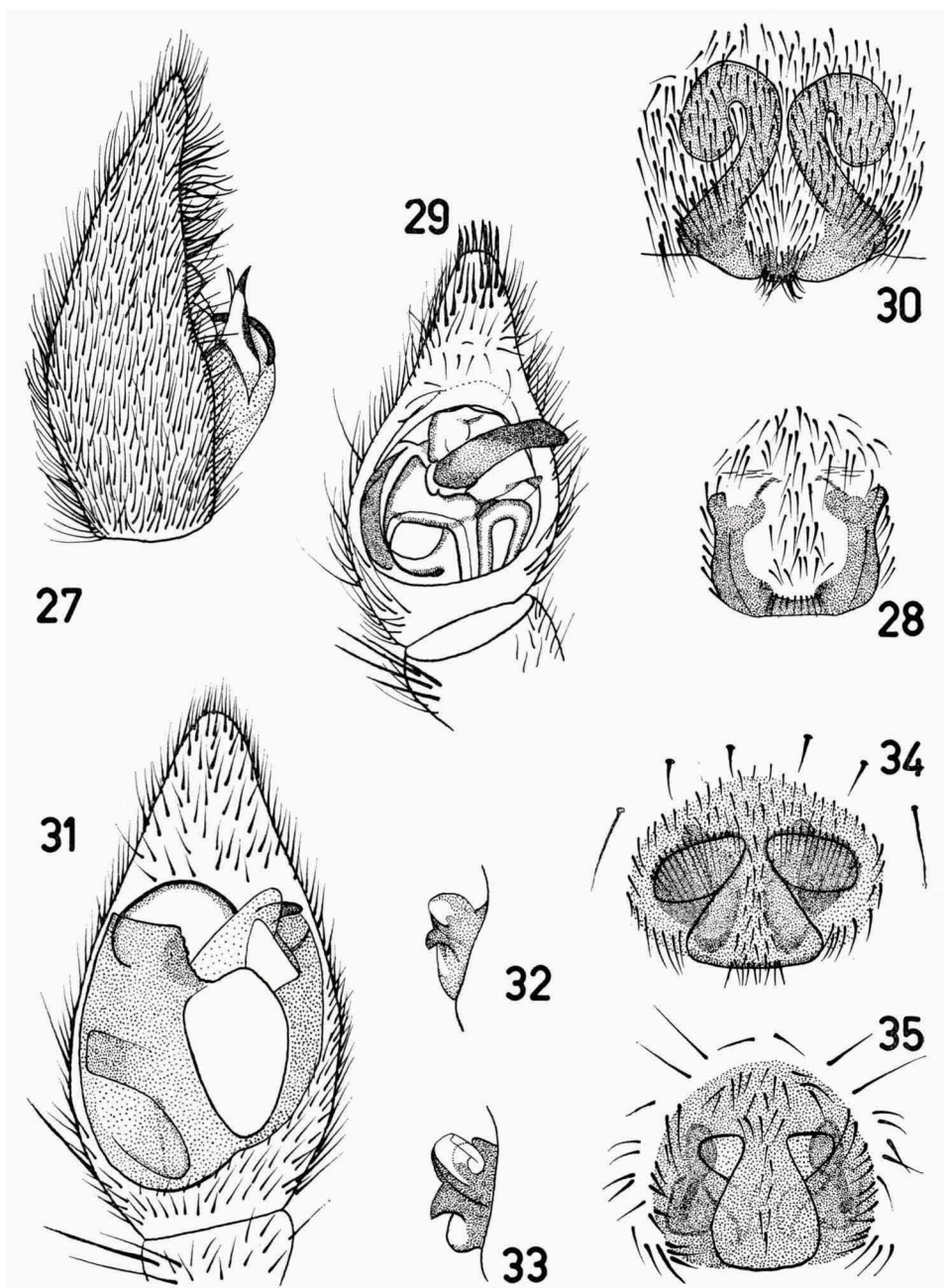
- spines. Male palp, fig. 45. In the vulva the helmet-shaped broadenings are rounded in front (fig. 55) . . . . . 2. *T. terricola*, p. 23.
- Tarsus of male palp with one or more claws apically, or its tibia with ventral spines. In the vulva the helmet-shaped broadenings are acute in front (figs. 56, 58) . . . . . 3
3. Tarsus of male palp with one or two apical claws, its tibia without ventral spines. Male palp, fig. 41. Metatarsi I of male apically with five spines [(ls<sub>a</sub>), (li<sub>a</sub>), v<sub>a</sub>], male tarsi I dark. In the vulva the helmet-shaped broadenings are small in comparison with the total dimensions of the vulva (fig. 58) . . . . . 3. *T. robusta*, p. 25.
- Tarsus of male palp in most specimens without apical claws, its tibia with a number of ventral spines. Male palp, figs. 42, 43. Metatarsi I of male with four apical spines [(ls<sub>a</sub>), li<sub>a</sub>", v<sub>a</sub>], male tarsi I light. In the vulva the helmet-shaped broadenings are more robust in comparison with the other parts (fig. 56) . . . . . 4. *T. spinipalpis*, p. 24.

Dutch species.

1. *Trochosa ruricola* (de G.)

*Aranea ruricola* de Geer, 1778<sup>a</sup>, pp. 282-284, Pl. 11 figs. 13, 14, Pl. 17 figs. 1, 2; *Lycosa ruricola* Becker, 1882<sup>a</sup>, pp. 113, 114, Pl. 9 fig. 3; de Lessert, 1910<sup>c</sup>, p. 493; Simon, 1937, pp. 1109, 1110, 1112, 1136, 1137, figs. 1736, 1737; *Trochosa ruricola* Dahl, 1908<sup>f</sup>, pp. 268, 270, 277, 278, fig. 24; Dahl, 1927, pp. 54, 55, 77, figs. 142-144; Palmgren, 1939<sup>b</sup>, pp. 62, 63, figs. 93-96, map 18; Holm, 1947, pp. 13, 14, figs. 9, 10, Pl. 2 figs. 17, 18, Pl. 9 fig. 7; Locket & Millidge, 1951, pp. 279, 280, figs. 134A, 136A; Chrysanthus, 1955<sup>b</sup>, p. 518, fig. c.

Length: ♀ 8.1-14.5 mm, ♂ 6.2-9.0 mm. Carapace with dark olive-brown markings, and narrow lateral light bands. Abdomen yellowish grey dorsally, with a yellow median lanceolate stripe, which is bordered by black. Chevrons distinct in most specimens, and forming a continuous longitudinal band over the abdomen. Sides speckled with grey, gradually changing to the light yellow colour of the ventral surface. Chelicerae with two or three teeth in the inner row, if three, the apical tooth is small. Adult male with an excrescence on the outside of the fang (fig. 20). Sternum olive-brown. Legs yellowish brown, in some specimens with very faint darker blotches on the dorsal surfaces of the femora. Apical joints darker than basals, especially in females. Tibiae, metatarsi, and tarsi of the first legs in males darkened. Male palp (fig. 44): the tarsus bears a claw. Epigyne (fig. 21): in the vulva (fig. 57) the helmet-shaped broadenings are rounded at top, with converging offshoots.



Figs. 27, 28, *Aulonia albimana*: 27, tarsus of male palp, retrolateral aspect,  $\times 85$ , 28, epigyne,  $\times 75$ .

Figs. 29, 30, *Hygrolycosa rubrofasciata*: 29, tarsus of male palp, ventral aspect,  $\times 55$ , 30, epigyne,  $\times 95$ .

Figs. 31-35, *Xerolycosa*: 31, tarsus of male palp of *X. miniata*, ventral aspect,  $\times 75$ , 32, 33, median apophyses of male palpal organs, retrolateral aspects,  $\times 75$ : 32, *X. miniata*, 33, *X. nemoralis*; 34, 35, epigynes,  $\times 85$ : 34, *X. nemoralis*, 35, *X. miniata*.

Cocoons white, slightly flattened, 5-6 mm in diameter, containing approximately 150 eggs.

Dutch records. *Lycosa ruricola* Becker, 1879<sup>f</sup>, p. xl; 1882<sup>a</sup>, p. 114 (Maastricht, De Bilt); Bouwman, 1935, fig. 2 (prey of *Psammochares viaticus*); *Lycosa (Trochosa) ruricola* van Hasselt, 1883<sup>b</sup>, p. xxxii (Wageningen); *Trochosa ruricola* van Hasselt, 1886<sup>a</sup>, pp. 81, 82; 1886<sup>b</sup>, p. 103 (Bolsward, Oranjewoud); ? <sup>1)</sup> Kluyver, 1933, pp. 105, 136 (Wageningen); Waage, 1938, p. 181 (Sint Pietersberg); Chrysanthus, 1950, p. 71; 1951<sup>b</sup>, p. 100 (Maastricht, Wahlwiller); *Trochosa spinipalpis* Chrysanthus, 1958, p. 144 (Brunssum).

Distribution: palearctic region. Dutch localities: Noord-Holland: Texel, Beverwijk; Zuid-Holland: Koudekerk a/d Rijn, Voorschoten, Wassenaar, Meijndel, Den Haag, Boskoop, Kethel, Rhon, (Voorne) <sup>2)</sup>, Renesse; Utrecht: De Bilt (B.), Woudenberg; Friesland: Terschelling, Bolsward (v.H.), Oranjewoud (v.H.); Drente: Wijster, (Westerbork); Overijssel: Enschede; Gelderland: Wilp, (Emst), Barneveld, Wageningen (v.H., K. <sup>1)</sup>); Noord-Brabant: Udenhout, Oisterwijk, Esbeek; Limburg: Wellerlooi, Herkenbos, Vlodrop, Brunssum, Heerlen, Houthem, (Geulem), Maastricht (B., C.), Sint-Pietersberg, Gronsveld, Rijckholt, Wahlwiller, Caestert.

Occurrence. Widespread and common in slightly moist localities. In dry biotopes *T. ruricola* is replaced by *T. terricola*, in more humid localities by *T. spinipalpis*. Adult females throughout the year, except in winter, adult males in April and May (primary period of copulation), and (less) from August till October (secondary period of copulation). Females with cocoons in May, June, and July.

## 2. *Trochosa terricola* Thor.

*Trochosa terricola* Thorell, 1856, pp. 161, 162; Dahl, 1908<sup>f</sup>, pp. 269, 270, 271-276, fig. 27; Dahl, 1927, pp. 56, 57, 77, figs. 148-150; Palmgren, 1939<sup>b</sup>, pp. 63-65, figs. 99, 100, map 19; Holm, 1947, p. 14, Pl. 2 figs. 19, 20, Pl. 9 fig. 8; Locket & Millidge, 1951, pp. 281, 282, figs. 134C, 136C; Chrysanthus, 1955<sup>b</sup>, pp. 518, 520, fig. a; *Lycosa terricola* Becker, 1882<sup>a</sup>, pp. 110-112, Pl. 9 fig. 2, Pl. 27 fig. 4; de Lessert, 1910<sup>c</sup>, pp. 492, 493; Simon, 1937, pp. 1109, 1137, figs. 1738, 1739.

<sup>1)</sup> Kluyver's records (det. M. Pinkhof, Amsterdam) all concern immature specimens. I doubt whether Pinkhof was able to identify immature specimens of *Trochosa*!

<sup>2)</sup> Localities from which only immature specimens (identity uncertain) are known are noted in parenthesis.

Length: ♀ 8.3-9.4 mm; ♂ 5.5-7.6 mm. Carapace (fig. 24) with reddish brown dark markings, lateral light bands often broken into patches. Abdomen reddish grey-brown dorsally, median lanceolate stripe reddish, not very distinct. Chevrons indistinct in most specimens. Sides with grey pubescence, ventral surface yellowish grey. Chelicerae with two teeth in the inner row. Sternum reddish brown. Legs yellow-brown, more reddish towards the apices, with very faint annulations on femora. Male tibiae and metatarsi I darkened, tarsi light. Male palp (fig. 45): tarsus without apical claws. Epigyne characteristically broad, the helmet-shaped broadenings in the vulva are distinctly rounded in front, with diverging offshoots (fig. 55). Cocoons white, 5-7 mm in diameter, slightly flattened. One cocoon contained approximately 150 eggs, three others 33, 46, and 59 pulli respectively.

Dutch records. *Lycosa terricola* Becker, 1879<sup>o</sup>, p. cxxix (between Hilversum and Amersfoort); 1882<sup>a</sup>, p. 112 (Utrecht, Breda, between Hilversum and Amersfoort, Maastricht); *Trochosa terricola* van Hasselt, 1886<sup>a</sup>, p. 82; 1886<sup>b</sup>, p. 103 (Bolsward, Oranjewoud); ?<sup>1</sup>) Kluyver, 1933, p. 136 (Wageningen); van der Hammen, 1949, pp. 73, 81 (Delft); Chrysanthus, 1950, p. 71; van der Drift, 1951, p. 139, fig. 14 (Hoge Veluwe); Chrysanthus, 1951<sup>b</sup>, p. 100 (Geleen, Brunssum); Wiebes, 1959<sup>a</sup>, pp. 84-89, figs. 1-9 (Meijndel, gynandromorph).

Distribution: palearctic region. Dutch localities: Noord-Holland: Texel, Zandvoort, Heemstede, Hilversum, between Hilversum and Amersfoort (B.); Zuid-Holland: Oegstgeest, Leiden, (Maaldrift), Meijndel, (Delft), Rozenburg; Utrecht: Bilthoven, Amersfoort, Leusden, Utrecht (B.), Woudenberg; Friesland: Terschelling, Bolsward (v.H.), Oranjewoud (v.H.); Groningen: Schiermonnikoog; Drente: Westerbork, Dwingeloo, Hogeveen; Overijssel: Wezep; Gelderland: Hulshorst, (Stroe), Epe, Wilp, Voorthuizen, Barneveld, Hoenderloo, Hoge Veluwe, ?Wageningen (K. 1)), (Ede), Zeddam; Noord-Brabant: Drunen, Ulvenhout, Breda (B.), Tilburg, (Baarle-Nassau), Esbeek; Limburg: Wellerlooi, Arcen, Broekhuizen, Swalmen, (Horn), Roermond, Herkenbos, Sint Odiliënberg, Geleen, Brunssum, Oud Valkenburg, Sint Pietersberg, Maastricht (B.), Eysden, Mechelen, Vijlen.

Occurrence. Widespread and very common in dry and slightly moist places, especially under trees and shrubs. Adults from early spring till in autumn, period of copulation in April (primary) and in September (secondary). Females with cocoons in July (cocoons containing pulli).

### 3. *Trochosa spinipalpis* (F. O. Pick.-Cambr.)

*Lycosa spinipalpis* F.O. Pickard-Cambridge, 1895<sup>b</sup>, pp. 28-30, Pl. 3 figs.

1) See foot-note 1 on p. 23.

4, 5, 9, 11, 14; Simon, 1937, pp. 1109, 1110, 1137, figs. 1740, 1741; *Trochosa spinipalpis* Dahl, 1908<sup>f</sup>, pp. 269, 271, 280, 281, fig. 26; Dahl, 1927, pp. 55, 56, 77, figs. 145-147; Palmgren, 1939<sup>b</sup>, p. 65, figs. 97, 98, map 20; Holm, 1947, p. 14, Pl. 2 figs. 15, 16, Pl. 9 fig. 9; Locket & Millidge, 1951, p. 282, figs. 134D, 136 D; Chrysanthus, 1955<sup>b</sup>, p. 518, fig. b.

Length: ♀ 9.2-10.0 mm (two specimens only), ♂ 6.9-7.8-8.0 mm (three specimens only). Carapace with umber-brown dark markings, edges of lateral light bands jagged. Abdomen deeper brown dorsally than in *T. terricola*, lanceolate stripe reddish. Chrevons distinct, pale. Sides speckled, ventral surface with umber-brown hue. Chelicerae with three teeth in the inner row. Sternum reddish brown, somewhat lighter than in *T. terricola*. Legs yellow-brown, apical joints darker. Femora faintly annulated. Male tibiae and metatarsi I darkened, tarsi I light. Chaetotaxy: male metatarsi I with four apical spines only, viz., [ $ls_a$ ], [ $li_a''$ ], [ $va$ ], as in females. Male palp (figs. 42, 43): tibia with 10-12 ventral spines. One male has the tarsus of its palp provided with an apical claw, usually these joints are without claws. Epigyne: in the vulva the helmet-shaped broadenings are acute in front, with diverging offshoots (fig. 56).

Dutch record. *Trochosa spinipalpis*?<sup>1)</sup> Kluuyver 1933, p. 136 (Wageningen).

Distribution: Central Europe, British Isles, and Scandinavia. Dutch localities: Gelderland: ?Wageningen (K.<sup>1)</sup>); Noord-Brabant: Oosterhout; Limburg: Weiler, Herkenbos.

Occurrence. Rare. According to Dahl (1908<sup>f</sup>, p. 281) and Tretzel (1955, p. 106) this species is more hygrophilous than *T. ruricola*. Adults in September and October, according to Tretzel (l.c.) the primary period of copulation is in April and May, the secondary in September and October. The remark of Tretzel (1954, p. 679), that this secondary period of copulation is indicated by the capture of some adult females only, does not hold good for our country, nor is it in accordance with his own records (l.c., p. 651, no. 25).

#### 4. *Trochosa robusta* (Simon)

*Lycosa robusta* Simon, 1876<sup>a</sup>, pp. 286, 287; Becker, 1882<sup>a</sup>, p. 114, 115, Pl. 9 fig. 4; de Lessert, 1910<sup>c</sup>, pp. 493, 494; Simon, 1937, pp. 1110, 1137, figs. 1742, 1743; *Trochosa lapidicola* Dahl, 1908<sup>f</sup>, pp. 268, 269, 270, 278-280, fig. 25; Dahl, 1927, pp. 57, 58, 77, figs. 151, 152; *Trochosa robusta* Locket & Millidge, 1951, p. 280, figs. 134B, 136B; Chrysanthus, 1955<sup>b</sup>, p. 518, fig. d.

1) See foot-note 1 on p. 23.

Length: ♀ 8.0-10.8-11.5 mm (three specimens only), ♂ 8.5-10.1 mm (two specimens only). Carapace with dark brown markings, lateral light bands broad. Abdomen: dorsal surface grey-brown, with a yellow lanceolate stripe. Chrevons darker, indistinct. Sides light, with darker blotches and silvery pubescence. Ventral surface yellow. Chelicerae with three teeth in the inner row, or with two. Sternum light brown. Legs brown, femora lighter, with faint annulations. Male tibiae, metatarsi and tarsi I darkened, tarsi I fusiform, with rich black pubescence. Male palp (fig. 41): tarsus with one or two apical claws. Epigyne: in the vulva the broadenings have the same shape as in *T. spinipalpis*, but they are relatively smaller. The offshoots are diverging downwards (fig. 58).

Dutch records. *Lycosa robusta* Becker, 1882<sup>a</sup>, p. 115 (Maastricht, Utrecht, Breda); *Trochosa robusta*?<sup>1)</sup> van Hasselt, 1886<sup>a</sup>, p. 82 (Veenhuizen); 1890<sup>a</sup>, p. 194; Chrysanthus, 1958, p. 144 (Colmond, Maastricht, Gerendal, Roermond).

Distribution: Europe, except Scandinavia. Dutch localities: Utrecht: Utrecht (B.); Drente: Veenhuizen (v.H. 1)); Noord-Brabant: Breda (B.); Limburg: Colmond, Roermond, Maastricht, Gerendal.

Occurrence. Rare. Until autumn 1958 the only specimens of this species known to me were 1 ♀ and 1 ♂ from collection van Hasselt, then Father Chrysanthus (1958, in litt.) informed me of the capture of some specimens in Limburg. Various authors recorded *T. robusta* from under stones in dry places, according to Dahl (1908<sup>f</sup>, pp. 279, 280) the species is restricted to limy soils. Adults in April, May, and November, probably this species has two periods of copulation, just like the other species of the genus.

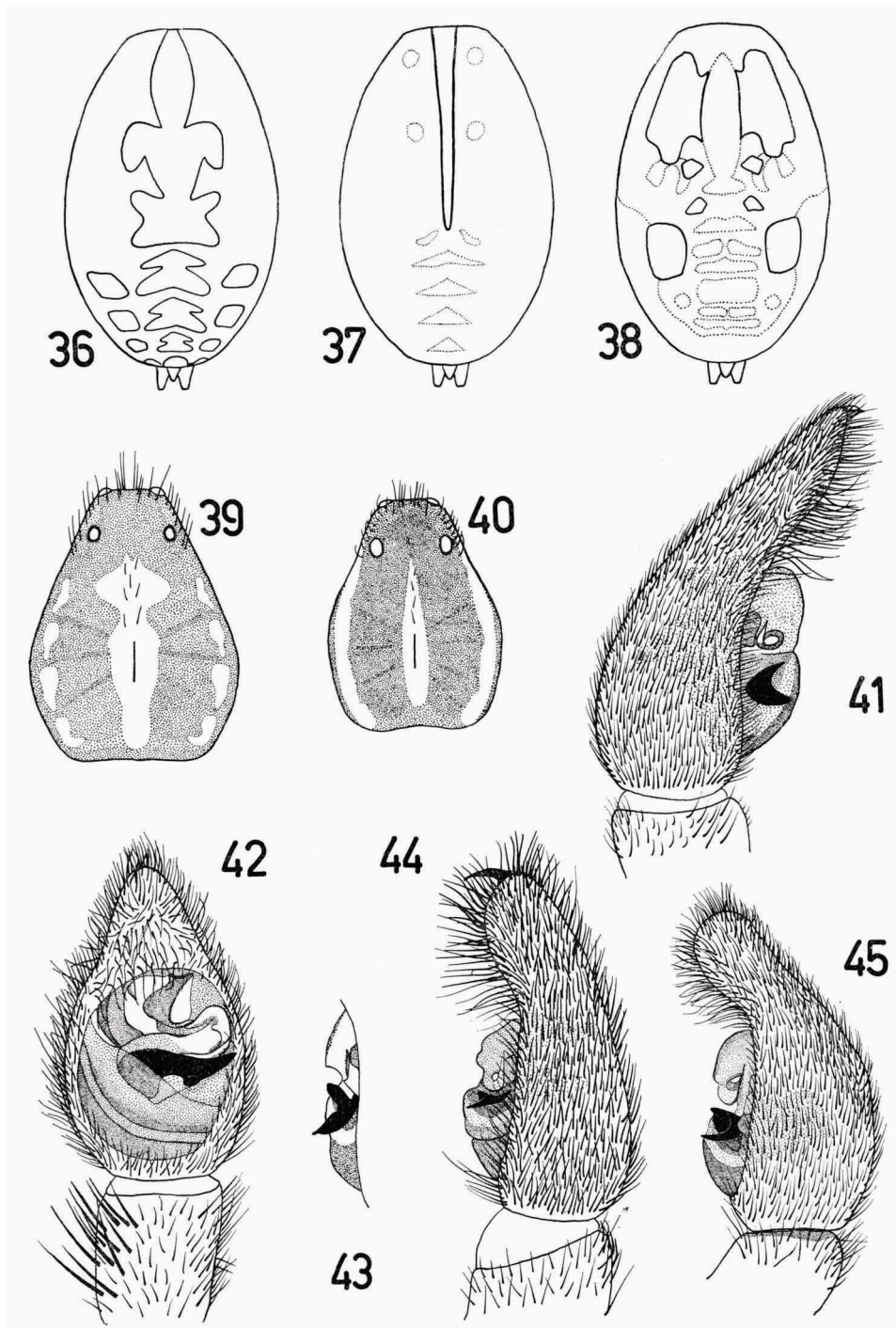
#### Genus 4. **Arctosa** C. L. Koch

C. L. Koch, 1848<sup>a</sup>, pp. 94, 95.

Typus generis *Aranea cinera* Fabricius (1777, pp. 249, 250)

Spiders of medium size. Carapace without median light band. Abdomen with a lanceolate stripe, other markings (white spots, chevrons) are often more conspicuous. Eyes small. Anterior row of eyes straight or recurved. Chelicerae with three teeth in the inner row, seldom with four or only two. Legs clearly annulated in two species, without markings in the other. Chaetotaxy: number of spines on tibiae I and II reduced. Male palp: tarsus with two apical claws. Palpal organs with a long apical apophysis, and a short median apophysis. Epigyne small and simple.

1) The record of van Hasselt (1886<sup>a</sup>, p. 82) concerns a very large specimen of either *T. ruricola* or *T. robusta* from Veenhuizen. In 1890<sup>a</sup>, p. 194, van Hasselt recorded *T. robusta* as a dutch species; he did, however, not refer again to the Veenhuizen specimen.



Figs. 36-38, *Arctosa*, abdomines, dorsal aspects,  $\times 20$ : 36, *A. lutetiana*, 37, *A. leopardus*, 38, *A. perita*.

Figs. 39, 40, *Pardosa*, carapaces, dorsal aspects,  $\times 12$ : 39, *P. agricola*, 40, *P. monticola*.

Figs. 41-45, *Trochosa*, male palps,  $\times 40$ : 41, *T. robusta*, retrolateral aspect; 42, 43, *T. spinipalpis*: 42, ventral aspect, 43, median apophysis in retrolateral view; 44, *T. ruricola*, retrolateral aspect, 45, *T. terricola*, retrolateral aspect.

Key to the species.

1. Tibia with ( $v_1$ ), or  $v_1''$ , or without ventral spines. Median apophysis in male palpal organs short and coiled. Epigyne circular . . . 2
- Tibia I with ( $v_1$ ) and ( $v_2$ ). Median apophysis in male palpal organs blunt and with longitudinal ridges, or triangular. Epigyne triangular 3
2. Legs annulated. Abdomen with a grey lanceolate stripe and chevrons as in fig. 37. Anterior row of eyes straight (fig. 51). Femora II and I in most specimens with  $d_a$ , tibia I with  $v_1''$  or ( $v_1$ ), tibia II with  $v_1''$ . Male palp, fig. 46; tooth on median apophysis large. Epigyne, fig. 49  
1. *A. leopardus*, p. 28.
- Legs without annulations, apical joints darker than basals. Abdomen with a white sagittate spot and chevrons as in fig. 36. Anterior row of eyes recurved (fig. 52). Femora I and II without  $d_a$ , males have tibiae I with  $v_1''$ <sup>1)</sup>, tibiae II with  $v_2''$  or  $v_1''$ ,  $v_2''$ , females lack ventral spines on tibiae I and II. Male palp, fig. 48; tooth on median apophysis small. Epigyne, fig. 50. . . . . 2. *A. lutetiana*, p. 31.
3. Legs distinctly annulated. Carapace yellowish brown, conspicuously marked with dark spots. Abdomen with two pairs of large silvery patches (fig. 38). Male palp, fig. 54; median apophysis blunt, with ridges. Epigyne, fig. 47. Length 4.5-10 mm . . . . . 3. *A. perita*, p. 32.
- Legs obscurely annulated. Carapace dark grey-brown, more uniform in colour. Abdomen with dark markings. Median apophysis in male palpal organs triangular, apically with a very small tooth. Length 12-17 mm . . . . .  
*A. cinerea* 2).

Dutch species.

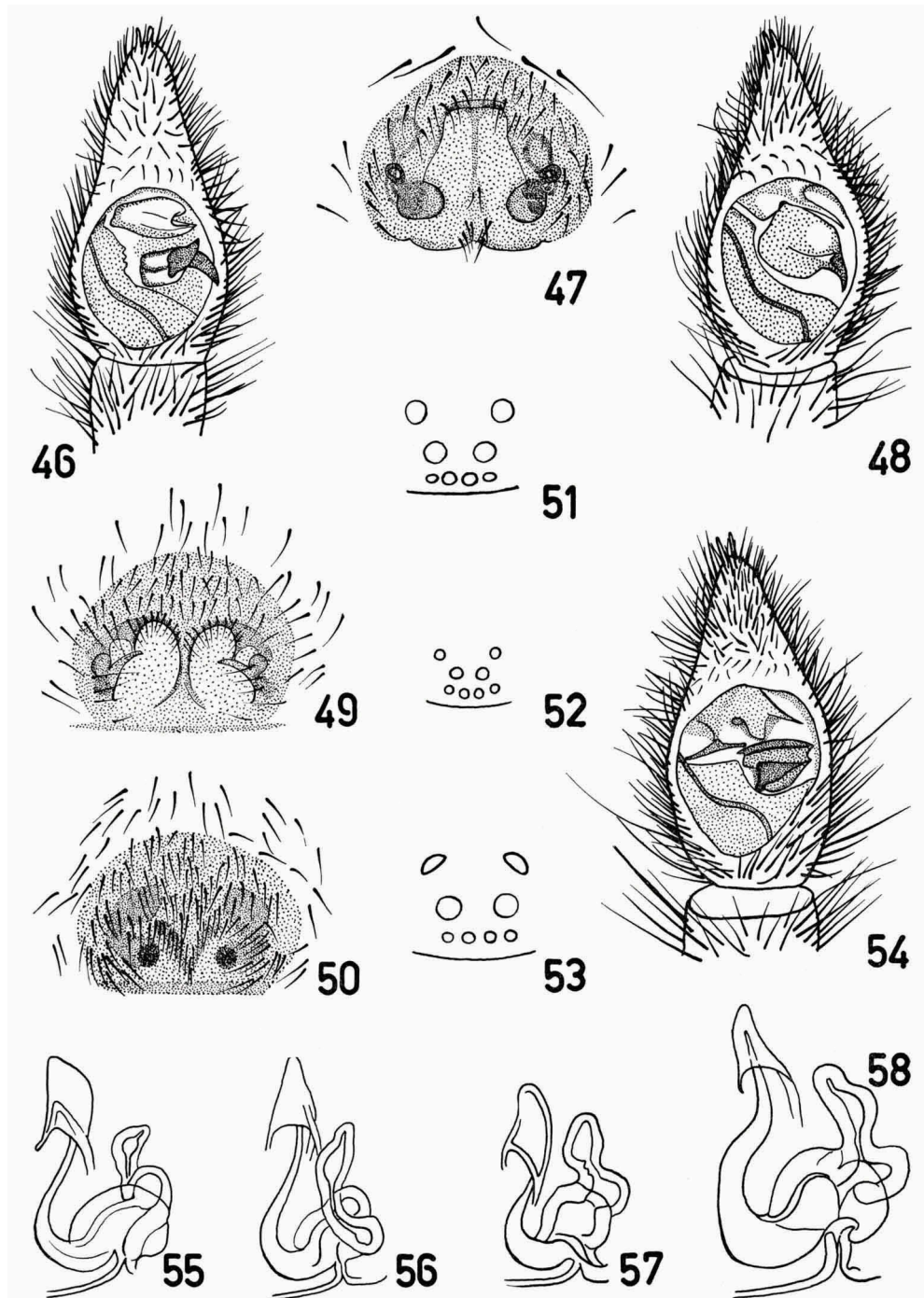
1. *Arctosa leopardus* (Sund.)

*Lycosa leopardus* Sundevall, 1832, p. 189; Simon, 1937, pp. 1116, 1139, figs. 1756, 1757; Becker, 1882<sup>a</sup>, pp. 109, 110, Pl. 9 fig. 1; *Lycosa leopardus* de Lessert, 1910<sup>c</sup>, p. 498; *Arctosa leopardus* Dahl, 1908<sup>f</sup>, pp. 309, 310, 311, 321-323, fig. 41; Dahl, 1927, pp. 71, 72, 78, figs. 183-186; Palmgren, 1939<sup>b</sup>, pp. 74, 75, figs. 125-127; Holm, 1947, p. 21, Pl. 4 figs. 44, 45,

1) Usually two prolateral spines are present in the basal part, one of which might be considered ventral  $v_1'$  (c.f. Wiebes, 1956, fig. 2<sup>a</sup>). In my notation, however, this spine is one of the laterals.

2) *Arctosa cinerea* (Fabr.) is distributed over the whole of the holarctic region, and known from nearly all European countries. For Belgium, Becker (1879<sup>k</sup>, p. lxxxix) recorded a locality in the vicinity of Brussels. The species has not yet been found in the Netherlands, but a find may be expected. *A. cinerea* lives, according to Dahl (1908<sup>f</sup>, p. 316), on sandy slopes of the shores of rivers and on beaches, where it constructs a burrow.





Figs. 46-54, *Arctosa*: 46, tarsus of male palp of *A. leopardus*, ventral aspect,  $\times 50$ ; 47, epigyne of *A. perita*,  $\times 65$ ; 48, tarsus of male palp of *A. lutetiana*, ventral aspect,  $\times 50$ ; 49, 50, epigynes: 49, *A. leopardus*,  $\times 75$ , 50, *A. lutetiana*,  $\times 65$ ; 51-53, eyes, frontal aspects,  $\times 20$ : 51, *A. leopardus*, 52, *A. lutetiana*, 53, *A. perita*; 54, tarsus of male palp of *A. perita*, ventral aspect,  $\times 50$ .

Figs. 55-58, *Trochosa*, vulvae, left halves,  $\times 65$  (adapted from Chrysanthus, 1955<sup>b</sup>, figs. a-d): 55, *T. terricola*, 56, *T. spinipalpis*, 57, *T. ruricola*, 58, *T. robusta*.

Pl. 9 fig. 21; Locket & Millidge, 1951, pp. 284, 285, figs. 137C, 138A.

Length: ♀ 5.0-6.1-6.4 mm (three specimens only), ♂ 5.2-5.6 mm (two specimens only). Carapace dark brown, with black radiating striae, outer margins black. Brown regions with thin black pubescence, the radiating striae with white hairs. One subadult female has two white spots, consisting of white pubescence, behind the posterior eyes. Abdomen: dorsal surface (fig. 37) grey-black, with white patches. Median lanceolate stripe distinct, followed posteriorly by rather indistinct chevrons. Two pairs of round spots occur next to the lanceolate stripe in the anterior part. Ventral surface yellow, with darker streaks. Eyes: median eyes of anterior row larger than laterals, the row is straight. Arrangement of eyes as in fig. 51. Clypeus dark, width one and a half times the diameter of a median eye of the anterior row. Chelicerae reddish brown, with black hairs. Mandibulae yellow-brown, labium darker. Sternum black-brown (one subadult female has lighter blotches opposite the coxae, and a lighter median stripe). Legs: coxae, tronchanteres, femora, and patellae light yellow-brown, tibiae, metatarsi, and tarsi a trifle darker. Femora, tibiae, and metatarsi with distinct annulations. Chaetotaxy: features in the spination of the legs are the ventral spines  $v_1''$  or ( $v_1$ ) on tibiae I, and the single ventral spine  $v_1''$  on tibiae II. Male palp (fig. 46): basal part of tarsus dark, proximal part lighter. Palpal organs: apical apophysis robust, bearing at its base a rounded, obtuse tooth. Median apophysis short and coiled, bearing at its base a sharp tooth that is but little smaller than the apophysis itself. Epigyne (fig. 49) small, with two light, circular openings. Edges of the openings densely clothed with hairs. In the vulva the round spermatecae are visible; the tubes leading to the openings have one coil.

Dutch records. *Arctosa farinosa* Six, 1858<sup>b</sup>, p. 298 (prov. Utrecht); *Lycosa leopardus* Becker, 1879<sup>f</sup>, p. xl (Utrecht); 1882<sup>a</sup>, p. 110 (vicinity of Utrecht, Breda); *Trochosa leopardus* van Hasselt, 1886<sup>a</sup>, p. 81 (Zeist, Katwijk).

Distribution: Europe, Asia Minor, Turkestan, Israël. Dutch localities: Zuid-Holland: Warmond, Katwijk (v.H.), Voorne, Rockanje; Utrecht: Utrecht (B.), Zeist (v.H.); Friesland: Terschelling; Noord-Brabant: Breda (B.); Limburg: Cottessen.

Occurrence. Widespread, but rare. According to Dahl (1908<sup>f</sup>, p. 322), *A. leopardus* is to be found almost exclusively in detritus on banks of stagnant waters. Locket & Millidge (1951, p. 285) record that no regular burrow is formed, but a cell is constructed among rubbish or leaves. Adults in May and July, period of copulation in May?

2. *Arctosa lutetiana* (Simon)

*Lycosa lutetiana* Simon, 1876<sup>a</sup>, pp. 293, 294; Becker, 1882<sup>a</sup>, p. 116, Pl. 9 fig. 5; Simon, 1937, pp. 1122, 1141; *Lycosa lucorum* de Lessert, 1910<sup>c</sup>, p. 499; *Tricca lutetiana* Dahl, 1908<sup>f</sup>, pp. 325, 326, fig. 43; Dahl, 1927, pp. 10, 11, 75, figs. 14-17.

In an earlier paper (Wiebes 1956, p. 413) I criticized the decision of Simon (1937) to place *Tricca* Simon (1888, p. 250), together with many other genera, in a collective genus *Lycosa*. Because of the peculiar situation of the eyes in *Tricca*, the scarcity and smallness of the spines on the first and second pairs of legs, and the pattern of the abdomen, I pleaded for a distinction between *Tricca* and the other genera. Now, after having seen many species of *Arctosa*<sup>1)</sup>, I see in *Arctosa* the same tendency to reduce the number of spines on legs I and II, and the same constitution of vulva and bulbus. The only character of *Tricca* not found in *Arctosa* is the recurved anterior row of eyes, this row in *Arctosa* being either straight or procurved (cf. Chamberlin, 1908, pp. 284, 285). I do not consider, however, this differential character to be of generic value, so I place *Tricca lutetiana* Simon in the genus *Arctosa* C. L. Koch.

Length: ♀ 6.3-7.0 mm, ♂ 5.5-6.8 mm. Carapace olive-brown, anterior and median parts, and lateral bands lighter. Brown regions with small appressed hairs, lighter regions with white pubescence. A line formed by long black hairs runs from the fovea to the eye-area, some similar hairs occur between the eyes, but whitish hairs are more conspicuous in the eye area. Abdomen: dorsal surface (fig. 36) dark grey with a yellowish pubescence which is mixed with scattered black, thicker hairs. Anteriorly the abdomen bears a white sagittate spot, followed by a series of five white chevrons, in the posterior part these are accompanied by white lateral patches. With the exception of the basal part, the dark regions are speckled with small white spots. Ventral surface of abdomen yellowish brown. Eyes of anterior row of equal diameters, the row is recurved. Arrangement of eyes as in fig. 52. Clypeus light yellow, width about equal to the diameter of an eye of the anterior row. Chelicerae dark brown, with black hairs. Mandibulae brown, labium darker. Sternum yellowish brown. Legs: coxae, trochanteres, and femora yellow, patellae yellowish brown, tibiae, metatarsi, and tarsi darker (colour of carapace). Chaetotaxy: characteristics in the spination of the legs are (cf. Wiebes, 1956, pp. 409-412, figs. 2a, b) the lack of  $d_a$  on femora I and II, one ventral spine  $v_1$  on tibiae I only in males, and none in females, tibiae II in males with two

1) I am much indebted to Dr. W. J. Gertsch, New York, for sending to me many specimens of North American lycosid spiders.

ventral spines  $v_1''$ ,  $v_2''$ , or with only one  $v_2''$ , very seldom with three  $v_1''$ , ( $v_2$ ) or ( $v_1$ ),  $v_2''$ , or none, tibiae II in females devoid of spines. Male palp (fig. 48): apical apophysis of tarsal organs slender, bearing at its base an obtuse tooth. Median apophysis short and coiled, at its base provided with a small transparent tooth. Epigyne (fig. 50) small, densely clothed with black hairs, especially along the V-shaped ridge. Spermathecae pear-shaped; tubes not coiled.

Dutch record. *Tricca lutetiana* Wiebes, 1956, pp. 405-415, figs. 1, 2 (Meijendel).

Distribution: Central Europe and Scandinavia (the species was recently recorded by Lohmander (1956, pp. 82, 83) from Western Småland, Sweden). The only Dutch locality is Meijendel.

Occurrence. In the dune-area of Meijendel, *A. lutetiana* is found in bushes of birch, poplar, hawthorn, and creeping willow. I suppose the females to have sedentary life-habits; I did, however, not yet succeed in finding the species alive in the field, so I could not confirm this supposition. Adults from March till September, period of copulation in May and June, probably beginning as early as September and interrupted by winter.

### 3. *Arctosa perita* (Latr.)

*Aranea perita* Latreille, 1799<sup>c</sup>, p. 170; *Lycosa perita* Becker, 1882<sup>a</sup>, pp. 105-107, Pl. 8 fig. 6; Simon, 1937, pp. 1115, 1138, figs. 1754, 1755; *Lycosa perita* de Lessert, 1910<sup>c</sup>, pp. 496, 497; *Arctosa perita* Dahl, 1908<sup>f</sup>, pp. 309, 311, 318-320, figs. 4, 39; Dahl, 1927, pp. 69, 70, 78, figs. 179, 180; Palmgren, 1939<sup>b</sup>, p. 74, figs. 120, 121; Holm, 1947, pp. 20, 21, fig. 6a, Pl. 4 figs. 40, 41, Pl. 9 fig. 20; Locket & Millidge, 1951, p. 284, figs. 137B, 138B.

Length: ♀ 5.0-9.9 mm, ♂ 4.5-6.6 mm. Carapace: colour variable, yellowish brown, or more reddish. Marginal bands and two inner bands dark brown, often broken into patches. In the median region three pairs of dark spots occur between the posterior eyes and the fovea, the first pair is, in some specimens, continuous with the inner darker bands. Pubescence varying from silvery grey to black. Eye area dark. Abdomen: dorsal surface (fig. 38) conspicuously marked with two pairs of large, silvery white patches and some similar, smaller spots. Median lanceolate stripe grey, followed by a series of indistinct chevrons. Ground colour black. Pubescence grey, interspersed with rather long black hairs. Ventral surface grey-brown, in some specimens with a darker median region. Eyes: median eyes of the anterior row but little larger than laterals, the row is straight. Arrangement of eyes as in fig. 53. Clypeus light brown, width less than the diameter of a median eye of the anterior row.

Chelicerae reddish brown, the apices darker; with white and black hairs. Mandibulae olive-brown, labium of same colour. Sternum black. Legs yellow-brown, femora, patellae, and tibiae with distinct annulations. Chaetotaxy: characteristic spines on the legs are I' on patellae I and II; four ventral spines ( $v_1$ ), ( $v_2$ ) on tibiae I; two ventrals on tibiae II:  $v_1''$ ,  $v_2''$ , or, very rarely, three: ( $v_1$ ),  $v_2''$ ; lateral  $l_1''$  on femora III. Male palp (fig. 54): apical apophysis of tarsal organs slender, without basal tooth. Median apophysis short and blunt, with longitudinal ridges. Epigyne (fig. 47) small, triangular, ridges with black hairs, septum almost glabrous. Spermathecae pear-shaped; tubes with one coil.

Dutch records. *Arctosa picta* Six, 1858<sup>b</sup>, p. 298 (Driebergen); *Lycosa perita* Becker, 1879<sup>f</sup>, p. xl (prov. Zeeland, Gelderland, Holland, Utrecht); 1882<sup>a</sup>, p. 106 (between Maartensdijk and De Bilt, between Hilversum and Marden, Maastricht); Bouwman, 1915, figs. 4, 5 (prey of *Pompilus plumbeus*); *Trochosa picta* van Hasselt, 1886<sup>a</sup>, p. 81; *Arctosa perita* Chrysanthus, 1950, p. 71; 1951<sup>b</sup>, p. 100 (Brunssum).

Distribution: palearctic region. Dutch localities: Noord-Holland: Texel, Den Helder, Hilversum, between Hilversum and Marden (B.); Zuid-Holland: Katwijk, Leiden, Meijendel, Oost-Voorne; Utrecht: Bilthoven, between Maartensdijk and De Bilt (B.), Driebergen (S.); Zeeland: Haamstede; Friesland: Terschelling; Drente: Dwingeloo, Westerbork; Overijssel: Enschede; Gelderland: Hulshorst, Wilp, Barneveld, Hoge Veluwe, Wageningen; Noord-Brabant: Tilburg, Esp, Helenaveen; Limburg: Wellerlooi, Brunssum, Sint Pietersberg, Maastricht (B.).

Occurrence. Widespread and common in dry, sandy places, where the specimens form small burrows, which they clothe with silk. Adults from February till April and from August till in October, period of copulation in April and May, probably beginning in August and interrupted by winter. Pulli in June.

#### Genus 5. **Hygrolycosa** Dahl

Dahl, 1908<sup>f</sup>, p. 366.

Typus generis: *Trochosa rubrofasciata* Ohlert (1865, p. 10)

One dutch species only.

##### 1. *Hygrolycosa rubrofasciata* (Ohlert)

*Trochosa rubrofasciata* Ohlert, 1865, p. 10; *Lycosa rubrofasciata* Simon, 1937, pp. 1108, 1136, figs. 1734, 1735; Locket & Millidge, 1951, pp. 270, 271, figs. 131B, C, F; *Hygrolycosa rubrofasciata* Dahl, 1908<sup>f</sup>, p. 366, figs. 1, 3, 59, 60; Dahl, 1927, pp. 14, 15, 76, figs. 26-30; Palmgren, 1939<sup>b</sup>, p. 33, fig. 39; Holm, 1947, pp. 11, 12, fig. 8, Pl. 2 figs. 13, 14, Pl. 9 fig. 6.

Length: ♀, ♂ 5.0-5.5 mm. Carapace (fig. 22) reddish yellow, with two darker, median bands, and broken lateral bands. Fovea brown. Black hairs occur between the fovea and the eye area, and on the anterior part of the carapace. Abdomen: dorsal surface reddish brown. Median stripe indistinct, accompanied by dark marks. Sides with darker blotches. Pubescence brown, interspersed with stout black hairs, especially in the anterior region. Ventral surface yellow, in males with many very small warts in the median region. Eyes large, anterior row straight. Clypeus light, in most specimens with two dark streaks, width two to three times the diameter of an eye of the anterior row. Chelicerae yellow-brown, with longitudinal darker streaks. Anterior surfaces with long black hairs. Inner row with three teeth. Mandibulae yellow-brown, basal parts darker, labium darker. Sternum yellow-brown, with dark brown blotches opposite coxae I, II, and III. Legs yellow-brown, femora and patellae with small dark blotches in female specimens, less distinct in males. Chaetotaxy: characteristic is the spination on tibiae I and II. These joints bear two divergent rows, consisting of four spines each. The complete formula of the chaetotaxy of tibia I and II is  $(v_1)-(l_1)$ , or  $(l_1)$  absent- $(v_2)-(v_3)-(l_2)-(v_a)$ . Male palp: tarsus (fig. 29) light brown, apically with five or six spines and approximately ten very stout hairs. Median apophysis large and broad, protruding to the edge of the alveolus and beyond. Epigyne (fig. 30) yellow-brown, densely clothed with whitish hairs. Spermathecae and tubes conspicuous, even in external view. Cocoon white, diameter 4.0 mm, height 2.7 mm, containing approximately 60 eggs.

Dutch records. *Hygrolycosa rubrofasciata* Boschma, 1950, p. 20 (Oisterwijk); Chrysanthus, 1951<sup>a</sup>, p. 77 (Brunssum); 1951<sup>b</sup>, p. 100 (idem).

Distribution: the species is known from nearly all European countries, including Great Britain and Scandinavia. It has not yet been recorded from Belgium or Luxemburg. Dutch localities: Gelderland: Wooldse Veen; Noord-Brabant: Oisterwijk, Molenven near Borne, Esbeek, Valkenswaard; Limburg: Herkenbos, Brunssum.

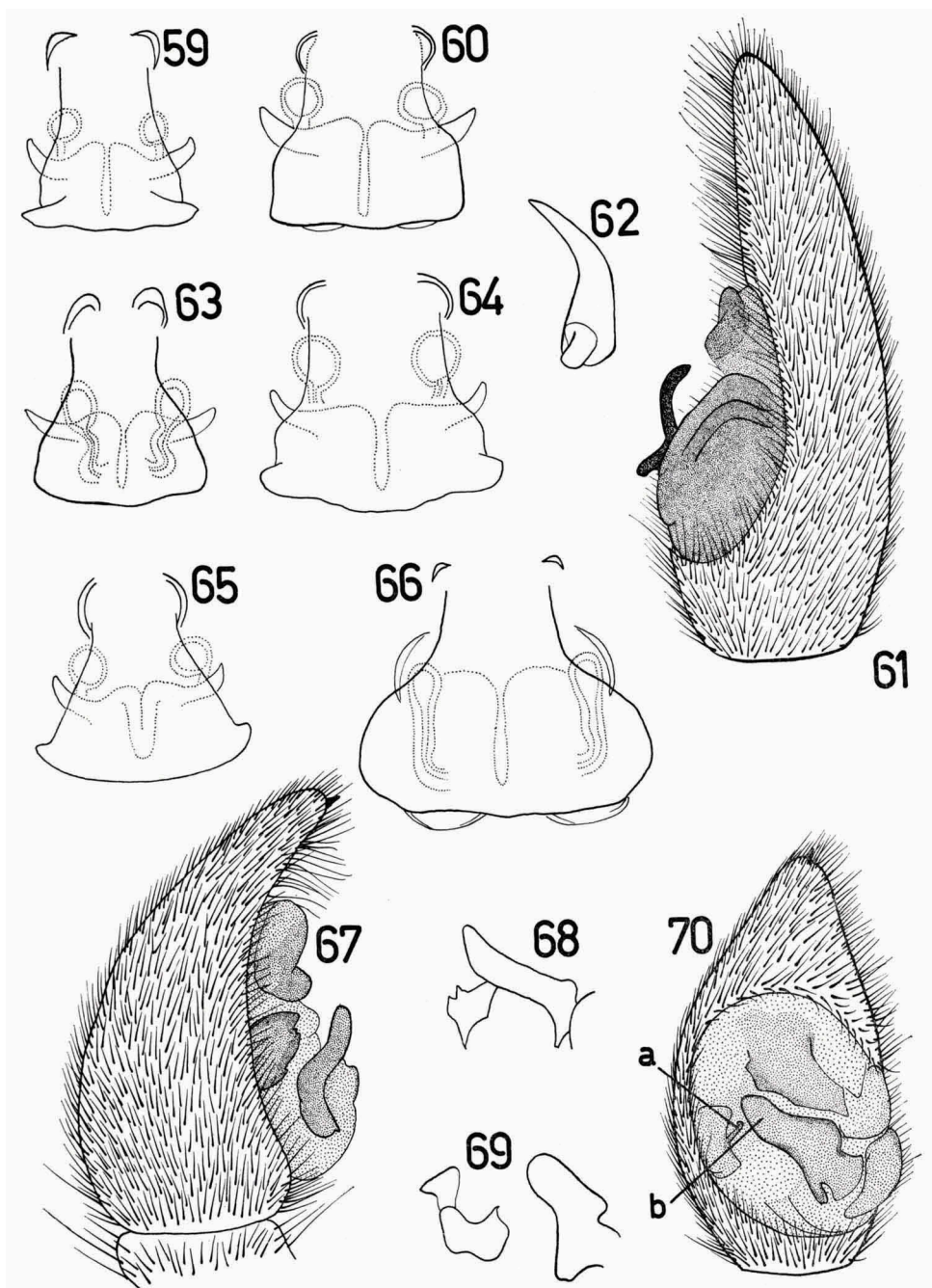
Occurrence. *H. rubrofasciata* seems to be restricted to marshy places and peat-soils in our southern provinces. Adults in April, May, and September. Period of copulation probably in April, perhaps beginning in September and interrupted by winter. Female with cocoon in May.

#### Genus 6. **Pardosa** C. L. Koch

C. L. Koch, 1848<sup>a</sup>, pp. 100, 101 = *Lycosa* auct.

Typus generis *Lycosa hortensis* Thorell (1872<sup>b</sup>, p. 299)

Spiders of medium size. Carapace with a median and two lateral light



Figs. 59-70, *Pardosa*: 59, 60, epigynes,  $\times 50$ : 59, *P. monticola*, 60, *P. agricola*; 61, 62, tarsus of male palp of *P. paludicola*,  $\times 55$ : 61, prolateral aspect, 62, median apophysis in ventral view; 63-65, epigynes,  $\times 50$ : 63, *P. agrestis*, 64, *P. agricola*, 65, *P. purbeckensis*, 66, *P. palustris*; 67-70, tarsi of male palps: 67, *P. palustris*, retrolateral aspect,  $\times 60$ ; 68, 69, median apophyses, ventral aspects,  $\times 55$ : 68, *P. arenicola* (after Knülle, 1954, fig. 2), 69, *P. purbeckensis*; 70, *P. monticola*, ventral aspect,  $\times 60$ : a, terminal apophysis, b, tegular apophysis.

bands. The median band may be dilated, blunt, or pointed in front, the lateral bands are continuous or broken (figs. 39, 40, 84). Abdomen: pattern of dorsal surface consisting of a more or less distinct lanceolate stripe, followed by a series of chevrons (fig. 84). Eyes: anterior row of eyes shorter than median row, slightly procurved, lateral eyes of this first row smaller than medians. Clypeus twice as wide as the diameter of an eye of the anterior row or wider. Chelicerae usually with longitudinal dark streaks, and with dark apices; inner row with three teeth. Mandibulae spatulate, labium quadrangular. Legs long and slender, especially leg IV; usually annulated or at least femora with dorsal blotches of dark colour. Chaetotaxy: most verticils are complete, some reduction in the number of lateral spines may occur on tibiae and metatarsi I and II. Tibiae I with an anterior row of three spines  $v_1'-v_2'-l_2'$ . Sexual organs: four groups of species are recognizable, mainly by the structures of the sexual organs, viz.,

Group I: *P. monticola*-group. Septum of the epigyne large, narrow in front, and widening behind (cf. fig. 59). Tegular apophysis of male palpal organs rather robust, general outline as in fig. 70.

Group II: *P. paludicola*-group. Septum of the epigyne very high and narrow (fig. 81). Median apophysis of male palpal organs robust, and tapering towards apex; general outline, figs. 61, 62.

Group III: *P. amentata*-group. Septum of the epigyne not very large, broadly dilated behind (cf. fig. 75). Median apophysis of male palpal organs slender and tapering (general outline as in fig. 85), or very short (fig. 71).

Group IV: *P. pullata*-group. Epigyne broad, general outline of median septum as in fig. 76. Median apophysis of male palpal organs long and tapering (cf. fig. 86).

The characters mentioned above are largely sufficient to classify adult specimens; it is often very difficult, however, to identify immature specimens of this genus. The key given by Dahl (1908<sup>i</sup>, pp. 388-395) is, to my experience, very difficult to use. I venture to give a new key to the species for immature specimens of *Pardosa*. I see no possibility, however, to differentiate between the species of the *P. monticola*-group.

Key to the species for immature specimens.

1. Retrolateral row of spines  $l_1''-l_2''$  on tibiae I present or not; if not, the markings of the carapace are yellowish and very clear-cut, and the median light band is pointed in front . . . . . 2
- Retrolateral row of spines on tibiae I absent (fig. 103). The median light band of the carapace is reddish brown, and not very distinct. *P. pullata*.
2. Retrolateral ( $l_1''-l_2''$ ) and posterior ventral ( $v_1''-v_2''$ ) rows of spines



- on tibiae I converging, i.e.,  $l_2''$  situated more ventrally than  $l_1''$  . . . 3
- Retrolateral and posterior ventral rows of spines on tibiae I parallel, or retrolateral spines absent . . . . . 4
3. Retrolateral and posterior ventral rows of spines on tibiae I strongly converging (fig. 101). Median light band of carapace in female specimens brown, with ill-defined margins, pure white in males. Lateral bands not distinct . . . . . *P. lugubris*.
- $l_2''$  situated only slightly more ventrally than  $l_1''$  (fig. 100). Median light band yellowish, dilated in front, lateral light bands distinct, broken . . . . . *P. hortensis*.
4. Median light band of carapace very broad, with straight margins (fig. 84) . . . . . *P. nigriceps*.
- Median light band dilated or pointed in front, never very broad. Lateral bands continuous or broken . . . . . 5
5. Median light band of carapace dilated in front . . . . . 6
- Median light band pointed in front . . . . . *P. monticola*-group, p.p.:  
*P. agrestis pseudomonticola*,  
*P. monticola*,  
*P. palustris*,  
*P. purbeckensis*.
6. Lateral light bands of carapace continuous . . . . . 7
- Lateral light bands broken . . . . . 9
7. Markings of the carapace yellowish . . . . . 8
- Markings of the carapace reddish brown, not very distinct . *P. prativaga*.
8. Legs, at least partly, with distinct annulations . *P. monticola*-group, pp.:  
*P. agrestis*,  
*P. palustris herbigrada*.
- Legs dark brown, without distinct markings . . . . . *P. paludicola*.
9. Markings of the carapace yellowish, very distinct . . . . . 10
- Markings of the carapace reddish brown, not very distinct . *P. prativaga*.
10. Dorsal surface of abdomen behind lanceolate stripe, and sides, speckled with small white spots. Carapace usually not very dark . . . . .  
. . . . . *P. monticola*-group, pp.:  
*P. agrestis pseudoagricola*,  
*P. agricola*.
- Dorsal surface of abdomen and sides speckled with black. Ground colour of carapace almost black . . . . . *P. amentata*.

*Pardosas* are vagrant spiders that do not construct any retreat, not even temporarily. They run their prey down and leap upon it from a short distance.

## Groups of species.

Group I. *P. monticola*-group.

This is a very homogeneous group of closely allied species, most of which are extremely difficult to distinguish in the female sex and in immature stages. Male specimens of most species, on the contrary, are very easily to be identified.

Though some of the "species" of this group may be no more than varieties of other species (Dahl, 1908<sup>f</sup>, p. 373), I rather treat them as separate species, until more is known about their real status.

In the following key I borrow some differential characters from Dahl (1908<sup>f</sup>), Locket & Millidge (1951), and Knülle (1954), as my material of some species is very scanty. For the names of the apophyses of the male palpal organs, see fig. 70.

## Key to the species (adult specimens only).

1. Median light band of carapace pointed or blunt in front, not dilated (cf. fig. 40) . . . . . 2
- Median light band of carapace dilated in front (fig. 39) . . . . . 6
2. Lateral light bands of carapace continuous . . . . . 3
- Lateral light bands of carapace broken . . . . . *P. arenicola*<sup>1)</sup>
3. Septum of the epigyne very broad posteriorly (part behind the "taille" twice as broad as long), with rounded edges (fig. 66). Tegular apophysis of male palpal organs blunt, terminal apophysis visible as a prominent and jagged marginal sclerite (fig. 67). Female legs partly annulated. Tibiae and metatarsi I of males twice as thick as the corresponding articulations of legs II-IV, tarsi without any darker parts . . . . . 4. *P. palustris*, p. 44.
- Septum of the epigyne not very broad posteriorly (part behind the "taille" less than one and a half times as broad as long, not counting the horns). Terminal apophysis of male palpal organs much smaller, and never prominent. Tibiae and metatarsi I of males not much thicker than the tibiae and metatarsi of the other legs . . . . . 4

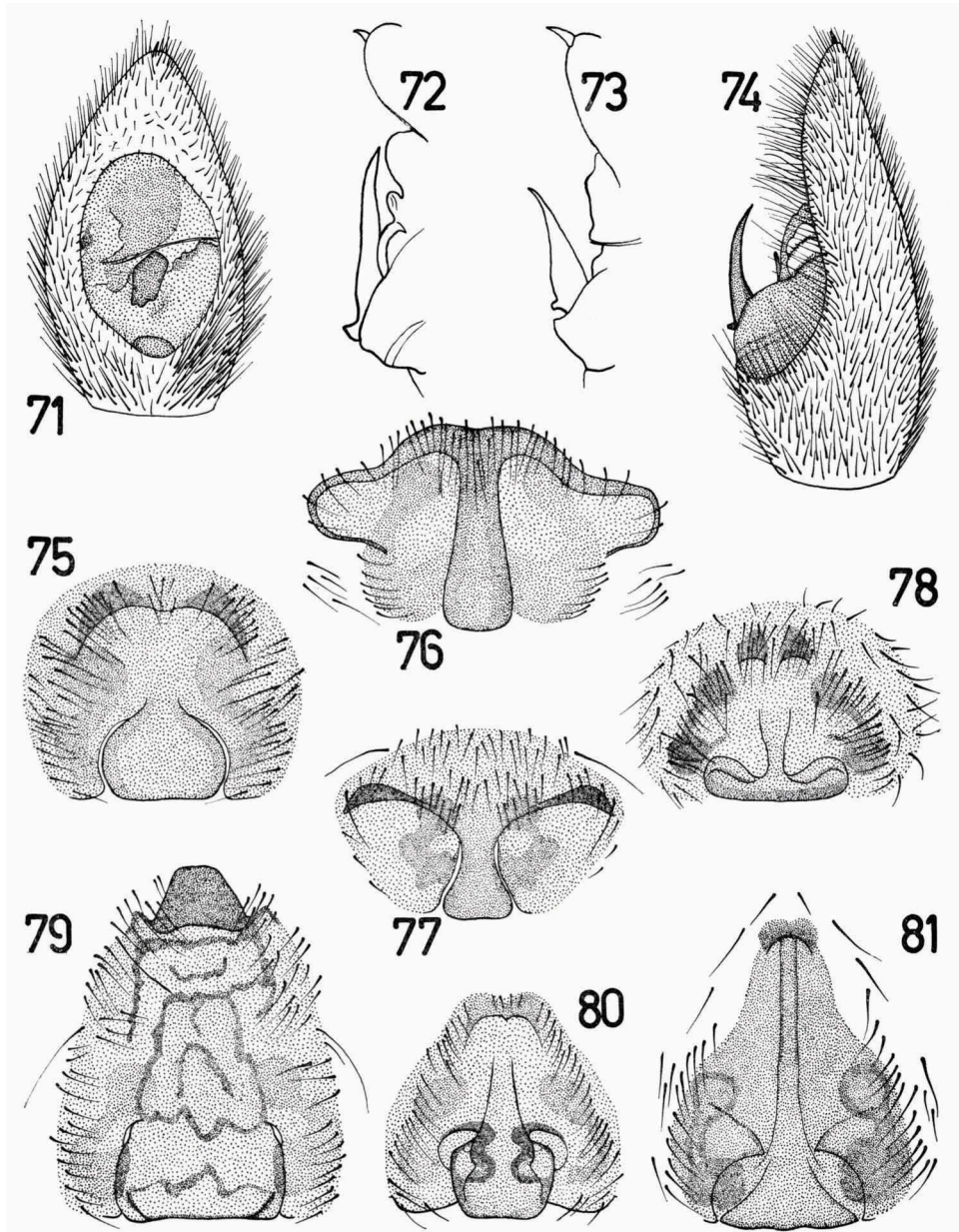
1) *P. arenicola* (O. Pickard-Cambridge, 1875<sup>e</sup>, pp. 253-255, Pl. 8 fig. 9), a species very close to *P. agricola*, has not yet been found in our country, although the species is known from all surrounding countries. It may be distinguished from *P. agricola* by its less distinct carapace-pattern, and by its pointed or blunt median light band (this band is dilated in front in *P. agricola*). Annulations on female legs very obscure (very clear-cut in *P. agricola*). The sexual organs (apophyses of male palp, fig. 68) are almost indistinguishable from those of *P. agricola*; according to Dahl (1908<sup>f</sup>, p. 375) there is a difference in the pubescence of the epigyneal area: next to the septum various thicker hairs occur in *P. arenicola*, and only one in *P. agricola*.

4. Septum of the epigyne with a longitudinal groove in its posterior central region. Tegular apophysis of male palpal organs blunt, terminal apophysis sharply pointed, directed towards the tegular apophysis (fig. 69)  
. . . . . 5
- Posterior region of the septum of the epigyne nearly flat, without distinct grooves (fig. 59). Tegular apophysis of male palpal organs somewhat attenuated, the terminal apophysis is a slender finger-like structure with its apex pointing away from the tegular apophysis (fig. 70). Legs of females partly annulated, males have only the femora darkened above. Tarsi I of males without any darker parts . . . 3. *P. monticola*, p. 43.
5. Annulations on female legs more or less distinct. Apical parts of male tarsi I darkened, pubescence of metatarsi and tarsi I of normal length  
. . . . . 1. *P. agrestis pseudomonticola*, p. 41.
- Annulations on female legs absent or very obscure. Male tarsi I without any darker parts, metatarsi and tarsi I with very long pubescence. Usually larger than the preceding species . . . 5. *P. purbeckensis*, p. 45.
6. Lateral light bands of carapace continuous . . . . . 7
- Lateral light bands of carapace broken . . . . . 8
7. Like *P. palustris*, key no. 3 . . . 4. *P. palustris herbigrada*, p. 45.
- Septum of the epigyne less broad posteriorly (part behind the "taille" about one and a half times as broad as long), fig. 63. Terminal apophysis of male palpal organs small, pointed, directed towards the tegular apophysis (as in fig. 69). Markings on female legs usually distinct, often not consisting of complete annulations, but of dorsal blotches only. Male tibiae and metatarsi I normal, tarsi I with dark apical parts . . . . .  
. . . . . 1. *P. agrestis*, p. 39.
8. Septum of the epigyne broadening gradually behind, as in fig. 63. Tegular apophysis of male palpal organs rather short and blunt, terminal apophysis shaped as a pointed tooth, directed towards the tegular apophysis (as in fig. 69). Male tarsi I darkened in the apical halves only  
. . . . . 1. *P. agrestis pseudoagricola*, p. 41.
- Septum of the epigyne broadening more abruptly behind (figs. 60, 64). Tegular apophysis of male palpal organs longer and tapering, the terminal apophysis bears two rather blunt, small teeth (as in fig. 68). Male tarsi I darkened over nearly the whole length . . . 2. *P. agricola*, p. 42.

Dutch species.

1. *Pardosa agrestis* (Westr.)

*Lycosa agrestis* Westring, 1861, pp. 480, 481; Smith, 1907<sup>a</sup>, pp. 16, 17, Pl.



Figs. 71-81, *Pardosa*: 71-74, tarsi of male palps,  $\times 55$ : 71, *P. hortensis*, ventral aspect; 72, 73, outlines of tarsal organs, prolateral aspects: 72, *P. nigriceps*, 73, *P. amentata*; 74, *P. lugubris*, prolateral aspect; 75-80, epigynes,  $\times 70$ : 75, *P. amentata*, 76, *P. pullata*, 77, *P. prativaga*, 78, *P. lugubris*, 79, *P. nigriceps*, 80, *P. hortensis*; 81, epigyne of *P. paludicola*,  $\times 55$ .

1 fig. 3; Dahl, 1908<sup>f</sup>, pp. 377, 392, 395, 436-438, fig. 70; Dahl, 1927, pp. 49, 50, 77, figs. 130-132; Palmgren, 1939<sup>b</sup>, pp. 57-59, map 1; Holm, 1947, pp. 29, 30, fig. 13<sup>b</sup>, Pl. 10 fig. 30; Locket & Millidge, 1951, pp. 255-258, figs. 122I, 123C, 126A, B, 127C<sup>1</sup>); Knülle, 1954, pp. 72, 74, 75, figs. 4a, b, c, 6; *Pardosa agrestis* Becker, 1882<sup>a</sup>, pp. 126, 127, Pl. 10 fig. 2; de Lessert, 1910<sup>e</sup>, pp. 508-510, figs. 222-224; Simon, 1937, pp. 1056, 1070, 1071, 1127, figs. 1628, 1629, 1665; (pro parte) Tambs Lyche, 1940, pp. 35-38, 48, 53, fig. 3, map 11, Tab. 2.

Length: ♀ 5.0-6.4 mm, ♂ 5.4 mm (one male specimen only). Carapace dark brown, with yellowish markings. In typical specimens the median light band is dilated in front, and the lateral light bands are continuous. Some specimens (var. *pseudoagricola* Dahl, 1908<sup>f</sup>, pp. 377, 395) have the lateral bands broken, and thus resemble *P. agricola* very much. In fact it is very difficult to separate *pseudoagricola* from *agricola*, usually the pattern of the carapace is more clear-cut in the latter, but no great reliance is to be placed in this character in preserved specimens. Another variety, var. *pseudomonticola* Simon (1937, pp. 1071, 1127), with the median light band sharply pointed in front, and continuous lateral bands, is very close to *P. monticola*, from which it is not distinguishable by the pattern of the carapace. To this second variety belongs the only male specimen I saw of the species, it is almost black, with very obscure and narrow bands on the carapace. Abdomen: dorsal surface greyish brown, pattern usually very obscure. Ventral surface yellowish, with a darker region in the middle behind the epigastric furrow. Clypeus light, continuous with lateral bands of carapace, except for var. *pseudoagricola*, in which the sides of the head are dark. Chelicerae yellow, with dark outer apices. Mandibulae and labium yellow. Sternum almost black, with a lighter region in the anterior half. Legs yellow, almost green in some specimens, with dark dorsal patches on femora I and II, and more or less distinct annulations on the other joints except tarsi. Apical halves of male tarsi I darkened. Male palp: tegular apophysis of tarsal organs rather short and blunt, terminal apophysis sharply pointed towards tegular apophysis (as in fig. 69). Epigyne (fig. 63) variable, but always its margins more abruptly diverging behind than in *P. monticola* or *P. purbeckensis*, though not as much as in *P. agricola*. Septum with a longitudinal groove in its posterior part. Cocoon yellow-white, flattened, diameter 5.7 mm, containing approximately 77 eggs.

Dutch record. *Lycosa agrestis* Chrysanthus, 1951<sup>b</sup>, p. 99 (Geleen).

Distribution: palearctic region. Dutch localities: Groningen: Schiermon-

1) Figs. 124A, B: "Male palps of *Lycosa agrestis* and *purbeckensis*" in Locket & Millidge (1951) really belong to *P. arenicola* and *P. agricola*, cf. Knülle, 1954, figs. 2, 4a, and Locket & Millidge, 1951, figs. 125B, D, 126A.

nikoog; Gelderland: Boeschoten (var. *pseudoagricola*); Noord-Brabant: Breda, Oosterhout; Limburg: Wellerlooi (var. *pseudomonticola*), Geleen (var. *pseudomonticola*), Sint Pietersberg (var. *pseudomonticola*).

Occurrence. According to Tretzel (1952, p. 105), this species is to be found on sandy and loamy soils, especially in corn-fields. Adults in May and July, male in May, female with cocoon in May.

## 2. *Pardosa agricola* (Thor.)

*Lycosa agricola* Thorell, 1856, p. 121; Strand, 1898<sup>b</sup>, pp. 147, 148, 155; Smith, 1907<sup>a</sup>, pp. 15, 16, Pl. 1 figs. 2a, b; Holm, 1947, p. 30, fig. 13c, Pl. 5 figs. 50, 51, Pl. 10 figs. 31, 32; Locket & Millidge, 1951, p. 255, figs. 123B, 124A, B<sup>1</sup>), 125C, D, 127 B; Knülle, 1954, p. 73; *Lycosa fluviatilis* Dahl, 1908<sup>f</sup>, pp. 375, 395, 433-435; Dahl, 1927, pp. 52, 53, 76, figs. 139-141; Palmgren, 1939<sup>b</sup>, pp. 55-57, figs. 57, 85, map 17; *Pardosa agricola* Simon, 1937, pp. 1057, 1070, 1127, figs. 1631, 1632, 1662, 1663; *Pardosa agrestis* (pro parte) Tambs-Lyche, 1940, pp. 35-38, 48, 53, fig. 3, map 11, Tab. 2.

Length: ♀ 6.2-6.3 mm (two females only). Carapace (fig. 39) dark brown, with very distinct yellow markings. Median light band dilated in front, lateral light bands as broad as marginal dark bands, broken. Abdomen: dorsal surface greyish black, pattern rather obscure in my specimens<sup>2</sup>). Ventral surface yellow-brown. Clypeus light yellow, separated from lateral light bands by wide dark bars at the sides of the head. Chelicerae yellow, with darker outer apices, and darker longitudinal streaks. Mandibulae olive-brown, with a darker region in the middle. Labium darker. Sternum black-brown, with a lighter median streak in the anterior half. Legs yellow-brown. Annulations on all joints, except tarsi, very clear-cut. Male palp: tegular apophysis of tarsal organs rather long, terminal apophysis with two small teeth (as in fig. 68). Epigyne (figs. 60, 64) rather broad posteriorly, its margins diverging abruptly.

Dutch records. This species is new to our fauna. Van Hasselt (1890<sup>a</sup>, p. 192) recorded the capture of an immature female specimen from Scheveningen, the only specimen in his collection labelled *Lycosa agricola* (1 ♀ juv, no. 823), however, belongs to *P. amentata*. The male specimen from Horn recorded by Chrysanthus (1954<sup>a</sup>, p. 40) belongs to *P. monticola*.

Distribution: palearctic region. Dutch localities: Gelderland: Wilp; Noord-Brabant: Riel.

1) See foot-note on p. 41.

2) According to Locket & Millidge (1951, p. 255), the pattern is distinct, especially in male specimens.

Occurrence. This species seems to be restricted to stony banks of brooks and rivers (Dahl, 1927, pp. 52, 53). Adult female in August, adults, according to Dahl (l.c.), in early spring, females with cocoons in May.

### 3. *Pardosa monticola* (Cl.)

*Aranea monticola* Clerck, 1757, pp. 91-93, Pl. 4 fig. 5; *Lycosa monticola* Strand, 1898<sup>b</sup>, pp. 148, 149, 150; Smith, 1907<sup>a</sup>, pp. 17, 18, Pl. 1 figs. 4a, b, Pl. 4 fig. A; Dahl, 1908<sup>f</sup>, pp. 376, 390, 430-433, fig. 69; Dahl, 1927, pp. 48, 49, 77, figs. 127-129; Palmgren, 1939<sup>b</sup>, p. 59, figs. 58, 86, map 15; Holm, 1947, p. 29, fig. 13a, Pl. 10 fig. 29; Locket & Millidge, 1951, p. 259, figs. 123G, 124C, 126E, F, 127E; Knülle, 1954, pp. 70, 71, 74, figs. 3a, b; *Pardosa monticola* Becker, 1882<sup>a</sup>, pp. 127, 128, Pl. 10 fig. 3; de Lessert, 1910<sup>e</sup>, pp. 510, 511; Simon, 1937, pp. 1068, 1074, 1129, figs. 1658, 1672; *Pardosa agrestis* (pro parte) Tambs-Lyche, 1940, pp. 35-38, 48, 53, fig. 3, map 11, Tab. 2.

Length: ♀ 4.9-7.0 mm, ♂ 4.4-5.3 mm. Carapace (fig. 40) dark brown, with yellow median and lateral bands. Median light band pointed in front, in most specimens ending between the posterior eyes, in some specimens this band is extended into a white streak, consisting of pubescence, between the posterior and median eyes. Lateral bands wide and usually continued around the clypeus. Marginal dark bands narrow or absent. In general, male specimens are darker than females. Abdomen: dorsal surface grey-brown. Median yellowish stripe more distinct in males than in females. Chevrons obscure, reddish brown, edged by black. Sides spotted with silvery grey pubescence. Ventral surface yellowish in females, more grey in males. Clypeus yellow. Chelicerae yellowish, with an oblique darker streak running from half way the inner margin to the outer apex, and leaving a triangular yellow region along the inner margin. Sternum dark brown in females, almost black in males; in some specimens the central region is lighter. Mandibulae, labium, and coxae of legs bright yellow in female specimens, dark grey in males. Legs of females yellow, with a reddish tinge in some specimens. Dorsal surfaces of femora with black streaks, tibiae and metatarsi distinctly annulated. Male femora darkened above, other joints without any dark markings. Male palp black. Tegular apophysis of tarsal organs somewhat attenuated, terminal apophysis finger-like in shape, its apex pointing away from the tegular apophysis (fig. 70). Epigyne (fig. 59) rather small, with smooth lateral edges, gradually widening posteriorly. Septum flat, or with a very indistinct groove in its posterior part. Cocoons greyish white, spherical, 3.2-3.7 mm in diameter, containing approximately 40 eggs.

Dutch records. *Lycosa monticola* Six, 1858<sup>b</sup>, p. 299 (De Bilt); van Has-

selt, 1876<sup>c2</sup>, p. liii (Hilversum); 1886<sup>a</sup>, p. 88 (prov. Utrecht, Gelderland, Zuid-Holland, Noord-Brabant, Limburg); Chrysanthus, 1950, p. 70; 1954<sup>a</sup>, p. 40 (Boekoel); *Pardosa monticola* van Hasselt, 1870<sup>c</sup>, p. 30 (Molencate); Becker, 1879<sup>f</sup>, p. xl (prov. Utrecht, Gelderland); 1879<sup>o</sup>, p. cxxix; 1882<sup>a</sup>, p. 128 (between Maartensdijk and De Bilt, between Hilversum and Marden, Utrecht); *Lycosa agricola* Chrysanthus, 1954<sup>a</sup>, p. 40 (Horn).

Distribution: palearctic region. Dutch localities: Noord-Holland: Texel, Den Helder, Zandvoort, Hilversum (v. H.), between Hilversum and Marden (B.); Zuid-Holland: Katwijk, Maaldrift, Meijndel, Groenendaal, Oost-Voorne, Rockanje; Zeeland: Renesse; Utrecht: Bilthoven, between Maartensdijk and De Bilt (B.), Utrecht (B.), De Bilt (S.); Friesland: Terschelling; Groningen: Schiermonnikoog; Gelderland: Stroe, Hoenderloo, Deelen, Hoge Veluwe, Bennekom, Molencate (v. H.); Noord-Brabant: Oosterhout; Limburg: Horn, Boekoel.

Occurrence. *P. monticola* is to be found in places with scanty vegetation. There is some controversy amongst various authors as to the ecological habits of the species. According to Dahl (1908<sup>f</sup>, p. 433; 1927, p. 49) the species is euryoecous, according to Tretzel (1952, p. 106), however, stenoecous. This diversion of opinion arises from the fact that specimens of *P. monticola* may be caught in rather dry localities as well as in humid meadows. Tretzel (l.c.) collected the species in dry localities only. Nørgard (1945, table 4) published some data on reactions to temperature and humidity, he found a high preferential temperature (40°-42° C), and a strong resistance against drought. In my opinion, *P. monticola* is probably euryoecous, from my researches in Meijndel it is evident that the species has a preference for open biotopes with little or no vegetation.

Adults from April till in October, period of copulation in May and June. Females with cocoons in June and August.

#### 4. *Pardosa palustris* (L.)

*Aranea palustris* Linnaeus, 1758, p. 623; *Lycosa palustris* Strand, 1898<sup>b</sup>, pp. 148, 155; Smith, 1907<sup>a</sup>, pp. 20, 21, Pl. 2 fig. 6a, b, Pl. 4 fig. E; Holm, 1947, pp. 28, 29, fig. 12b, Pl. 5 figs. 52, 53, Pl. 10 fig. 28; Knülle, 1954, pp. 71, 72, fig. 1; *Pardosa palustris* Becker, 1882<sup>a</sup>, pp. 129, 130, Pl. 10 fig. 4; *Lycosa tarsalis* Dahl, 1908<sup>f</sup>, pp. 373, 389, 439-442, fig. 66; Dahl, 1927, pp. 47, 48, 77, figs. 124-126; Palmgren, 1939<sup>b</sup>, pp. 54, 55, figs. 56, 69, 84, map 16; Locket & Millidge, 1951, pp. 259-261, figs. 123E, 124D, 126C, D, 127F; *Lycosa herbigrada* Strand, 1898<sup>b</sup>, pp. 148, 155; Smith, 1907<sup>a</sup>, pp. 19, 20, Pl. 2 figs. 7a, b, Pl. 4 fig. C; *Lycosa tarsalis* var. *herbigrada* Locket & Millidge,



1951, p. 261, figs. 121, 123F; *Pardosa tarsalis* de Lessert, 1910<sup>c</sup>, pp. 512, 513; Simon, 1937, pp. 1064, 1072, 1128, figs. 1648, 1669; Tams-Lyche, 1940, pp. 13-18, 48, 53, fig. 1, map 3, tab. 2; *Pardosa herbigrada* Simon, 1937, pp. 1064, 1071, 1128, fig. 1666.

Length: ♀ 5.0-7.1 mm, ♂ 4.5-5.6 mm. Carapace indistinguishable from that of *P. monticola*, except in the var. *herbigrada* Blackwall (1857<sup>a</sup>, pp. 285, 286), in which the median band is dilated in front as in *P. agrestis*. Abdomen: dorsal surface greyish brown, pattern very obscure. In the var. *herbigrada* the pattern is more distinct in most specimens: yellow median stripe and red-brown chevrons bordered by black, sides black in the anterior half, with many silvery patches of pubescence, posterior half with rich silvery pubescence, interspersed with black hairs. In males the abdomen is dark grey-brown dorsally, with a yellow-brown median lanceolate stripe. Ventral surface greyish, more yellow in the var. *herbigrada*. Clypeus yellow, continuous with lateral light bands of carapace. Chelicerae yellow, with darker outer apices, and sometimes a darker longitudinal loop as in *P. monticola*. Mandibulae yellow, labium dark brown. Sternum dark brown or black, in some specimens with a lighter region in the anterior half, in the var. *herbigrada* brown, with darker streaks and blotches. Female legs yellow, annulated on all joints except femora and tarsi. Femora with darker blotches on the dorsal surfaces only. Tarsi I of males twice as thick as the other tarsi, without any darker parts, all joints in male specimens without annulations, only the femora darkened above. Male palp (fig. 67): the marginal sclerite on the exterior side of the tarsal organs is very characteristic. Epigyne (fig. 66) very broad posteriorly, with rounded edges. Cocoon white, spherical, 3.5 mm in diameter, containing approximately 40 pulli.

Dutch records. *Lycosa herbigrada* van Hasselt, 1886<sup>a</sup>, p. 89 (Zwolle); 1887<sup>a</sup>, p. xxxii (Winterswijk); 1890<sup>a</sup>, p. 203 (Winterswijk); *Lycosa tarsalis* Kluyver, 1933, pp. 105, 136 (Wageningen).

Distribution: palearctic region. Dutch localities: Drente: Westerbork, Ootmarsum; Gelderland: Wilp, Wageningen (K.); Noord-Brabant: Baarle-Nassau; Limburg: Sint Pietersberg, Eys, Vijlen, Epen. The specimens of the var. *herbigrada* are from: Drente: Westerbork; Overijssel: Zwolle (v. H.); Gelderland: Boeschoten, Winterswijk (v. H.).

Occurrence. Common in our eastern provinces, in heaths and meadows. Adults from April till August, males from May till July, female with pulli in August.

5. *Pardosa pubeckensis* F. O. Pick. Cambr.

*Pardosa pubeckensis* F. O. Pickard-Cambridge, 1895<sup>b</sup>, pp. 32, 33, Pl. 4

figs. 1, 4, 7, 8, 9; *Lycosa purbeckensis* Smith, 1907<sup>a</sup>, p. 18, Pl. 1 figs. 5a, b, Pl. 4 fig. B; Locket & Millidge, 1951, p. 258, figs. 122J, 123D, 126A, B, 127D<sup>1</sup>); Knülle, 1954, pp. 68, 69, 74, 75, figs. 4a, 5.

Length: ♀ 5.9-7.3 mm, ♂ 5.6-6.0-6.1 mm (three males only). Carapace very much like that of *P. monticola*, but more greyish in most specimens. Abdomen: pattern of dorsal surface obscure, but median lanceolate stripe always clearly visible in females, more greyish, almost black sometimes, in male specimens. Ventral surface greyish yellow, with a darker median region. Clypeus light, continuous with lateral light bands of carapace. Chelicerae as in *P. monticola*, but darker loops not very distinct in some females. Mandibulae, labium, and sternum as in *P. monticola*. Legs yellow-brown and rather hairy, especially in the male. Male metatarsi and tarsi I with very long pubescence. Annulations, if any, very obscure, usually dark markings are present on the dorsal surfaces of the femora only, though in some specimens tibiae and metatarsi may bear some dark patches. Male palp (apophyses, fig. 69) indistinguishable from that of *P. agrestis*. Epigyne (fig. 65) very much like that of *P. monticola*, but the septum with a more or less distinct groove in its posterior part.

*P. purbeckensis* resembles *P. agrestis* var. *pseudomonticola* most closely; perhaps it is, as Locket & Millidge (1951, p. 258) remark, only another variety of *P. agrestis*.

Dutch record. *Lycosa purbeckensis* de Jong, 1949, pp. 215, 216 (N.O. Polder near Blokzijl; Texel).

Distribution: British Isles, Denmark, Germany, Netherlands. Dutch localities: Noord-Holland: Texel (J.); Zuid-Holland: Oost-Voorne, Scheelhoek; Friesland: Terschelling; N.O. Polder: near Blokzijl (J.).

Occurrence. Common on mud-flats and shores. The spiders of this species are able to survive the high tide by submerging beneath the surface (Bristowe, 1923<sup>a</sup>, pp. 154-156). Ecological remarks are given by Knülle (1954). Adult females from April till in July, adult males in April and May, period of copulation probably in these months.

Group II. *P. paludicola*-group.

One dutch species only.

#### 6. *Pardosa paludicola* (Cl.)

*Aranea paludicola* Clerck, 1757, pp. 94, 95, Pl. 4 fig. 7; *Lycosa paludicola* Strand, 1898<sup>b</sup>, pp. 149, 150; Dahl, 1908<sup>f</sup>, pp. 373, 379, 392, 397-400, fig. 73; Dahl, 1927, pp. 40, 41, 76, figs 105-107; Palmgren, 1939<sup>b</sup>, p. 43, figs. 41, 61,

1) See foot-note on p. 41.

75, map 9; Holm, 1947, p. 35, Pl. 7 figs. 80, 81, Pl. 10 fig. 41; Locket & Millidge, 1951, p. 270, fig. 131E; Locket & Millidge, 1953, p. 415, figs. 249A, B; *Pardosa paludicola* Becker, 1882<sup>a</sup>, pp. 144, 145, Pl. 11 fig. 5; Simon, 1937, pp. 1066, 1086, 1124, figs. 1653, 1690; Tambs-Lyche, 1940, pp. 46, 47, 49, 53, map 12, Tab. 2; *Lycosa fumigata* Smith, 1907<sup>a</sup>, pp. 27, 28, Pl. 3 fig. 15.

Length: ♀ 8.0-8.4 mm (two females only); ♂ 8.0 mm (one male only). Carapace grey-brown, with indistinct markings: two broad yellow-brown lateral bands and a similar median band, which is broadly dilated in front. Lateral bands not continued around clypeus, but broken by faint dark bars at the sides of the head. Abdomen: dorsal surface dark brown, with very obscure pattern. In the male the abdomen is dorsally clothed with very long black hairs, giving the spider a black appearance. Ventral surface yellow-brown. Clypeus light yellow-brown. Chelicerae yellow-brown, with darker (reddish) longitudinal streaks. Mandibulae brown, labium darker. Sternum dark brown, almost black in the male, with a lighter median anterior band. Legs brown, femora with faint blotches on the dorsal surfaces, more uniformly greyish brown on the ventral surfaces. Other joints without darker parts. Ventral surfaces of femora, especially in males, with thick black pubescence. Male palp with a black tarsus (fig. 61), apophysis of tarsal organs (fig. 62) long and tapering. Epigyne (fig. 81) with a rather long and narrow median groove. Cocoon dark brown, flattened, diameter 6.0 mm, high 3.0 mm, containing approximately 100 eggs.

Dutch records. *Lycosa paludicola* Six, 1858<sup>b</sup>, p. 299 (Utrecht); Snellen van Vollenhoven, 1859, p. 61; van Hasselt, 1877<sup>c</sup>, p. xxvi (excursion to Domburg, Oost-Capelle, and Woensdrecht<sup>1</sup>); 1886<sup>a</sup>, p. 86 (Amsterdam, Den Haag, Wassenaar, Giessendam; prov. Utrecht, Noord-Brabant); 1886<sup>b</sup>, p. 103 (Bolsward, Oranjewoud); Chrysanthus, 1950, p. 70; *Pardosa paludicola* Becker, 1879<sup>f</sup>, p. xl; 1882<sup>a</sup>, p. 145 (Utrecht, Breda, Den Haag, Amsterdam, etc.).

Distribution: palearctic region. Dutch localities: Noord-Holland: Amsterdam (B., v. H.), Hilversum; Zuid-Holland: Wassenaar (v. H.), Den Haag (B., v. H.), Giessendam (v. H.); Zeeland (v. H. 1); Utrecht: Utrecht (S., B.); Friesland: Bolsward (v. H.), Oranjewoud (v. H.); Noord-Brabant: Breda (B.), Oosterhout.

Occurrence. Rare along ditches and in humid meadows. About a hundred years ago this species seems to have been not at all rare in our country, judging from the records of Six, Snellen van Vollenhoven, and Becker. Van Hasselt, on the contrary, records the species to be "rarior". The material

1) Van Hasselt did not specify the exact localities of the specimens captured on this excursion.

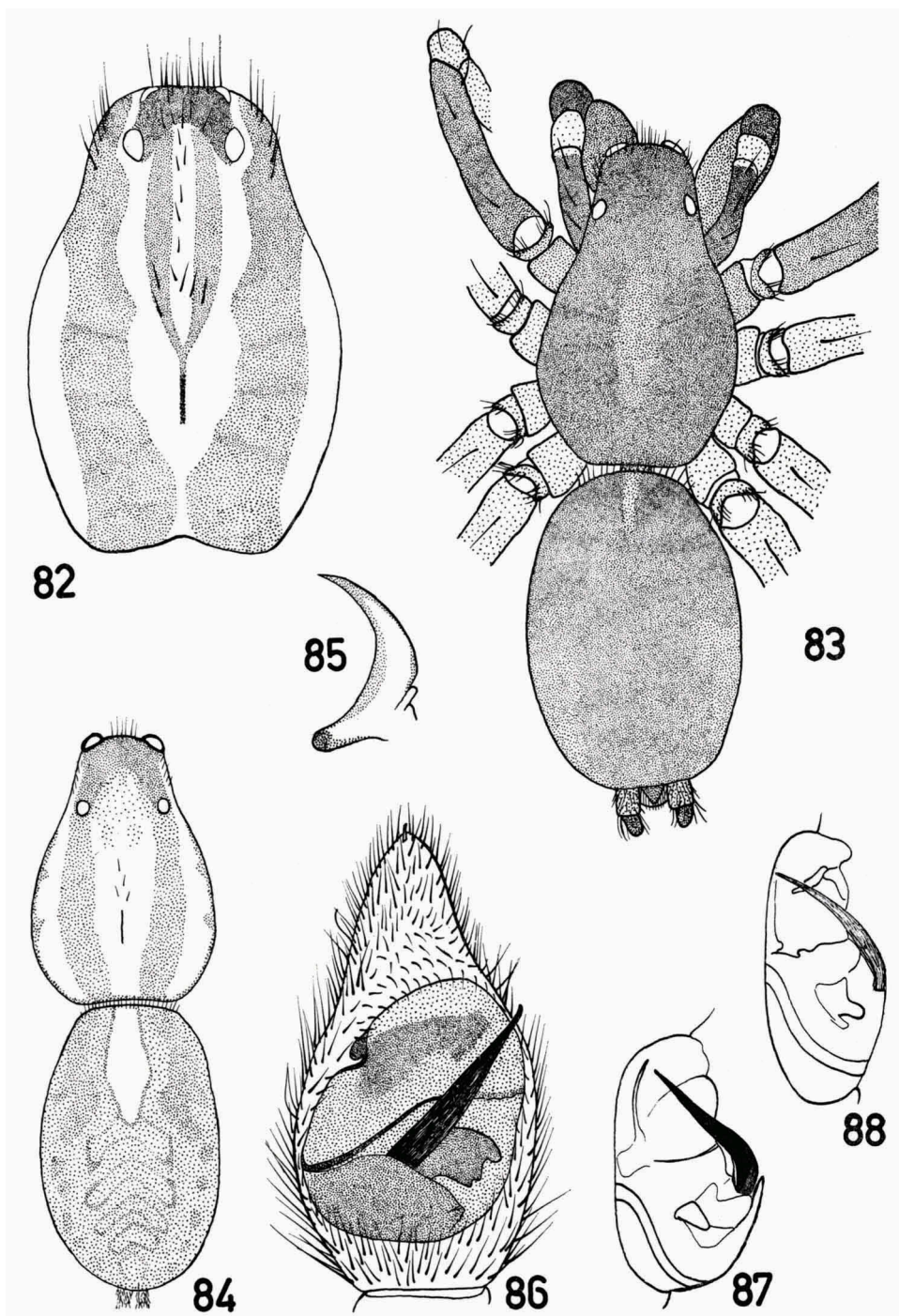


Fig. 82, carapace of *Pirata piraticus*, dorsal aspect,  $\times 20$ .

Fig. 83, subadult male of *Aulonia albimana*, dorsal aspect,  $\times 25$  (legs and palps partly omitted).

Figs. 84-88, *Pardosa*: 84, subadult female of *P. nigriceps*, dorsal aspect,  $\times 15$  (palps and legs omitted); 85, median apophysis of male palpal organs of *P. amentata*, ventral aspect,  $\times 75$ ; 86, tarsus of male palp of *P. pullata*, ventral aspect,  $\times 75$ ; 87, 88, male palpal organs, retrolateral aspects,  $\times 75$ : 87, *P. pullata*, 88, *P. prativaga*.

available in dutch collections is very scanty, next to 1 ♀ and 1 subadult ♂ from collection van Hasselt I know of two specimens: 1 ♀ with cocoon (May 4th), and 1 ♂ (April 23rd). Probably the species has its period of copulation in early spring.

Group III. *P. amentata*-group.

Key to the species.

1. Very dark. Bands of carapace rather bright yellow, the median tapered in front and behind, and thickest about the middle. Lateral bands usually, but not in all specimens, broken into three parts. Male palp not unlike that of *P. hortensis* (cf. fig. 71), with a short median apophysis. Epigyne much like that of *P. hortensis* (cf. fig. 80). . . . . *P. proxima*<sup>1)</sup>
- Light bands of carapace different . . . . . 2
2. Median and lateral bands of carapace greenish yellow, very broad (fig. 84), with straight margins. Tarsus of male palp densely clothed with black hairs. Outline of median apophysis of male palpal organs straight in lateral view (fig. 72). Epigyne (fig. 79) large, with many folds and wrinkles . . . . . 9. *P. nigriceps*, p. 52.
- Median light band either not so bright as in the preceding species, and lateral bands indistinct, or median band bright and dilated in front, and lateral bands broken . . . . . 3
3. Median light band of carapace dilated in front, lateral bands broken . . . . . 4
- Median light band of carapace brown, with ill-defined margins in females,

1) Adapted from the description of Locket & Millidge (1951, pp. 267-269). *Pardosa proxima* (C. L. Koch, 1848b, pp. 53-55, Pl. 517 figs. 1453, 1454) has been recorded from the Netherlands by Becker (1879f, p. xli; 1882a, p. 134) on the authorities of Six (1858b, 1863), and van Hasselt. Six, however, did not mention the species, nor any of its synonyms. Van Hasselt, according to Becker (1879f, p. xxxviii), sent notes on some specimens from his collection to Becker. In his catalogue, van Hasselt (1886a, p. 86) recorded "*Lycosa annulata*" from two other localities, viz., Loosduinen and Scheveningen, apart from the localities already cited by Becker (viz., prov. Utrecht and Gelderland). According to Bonnet (1958, p. 3411), *Lycosa annulata* sensu van Hasselt is synonymous with *P. proxima* (C.L.K.); the specimens in van Hasselt's collection labelled *Lycosa annulata*, however, certainly do not belong to *P. proxima*, but to *P. prativaga* (no. 805, 1 ♂ s.ad) and *P. amentata* (no. 806, 4 juv.). Accordingly, the records of van Hasselt do not concern *P. proxima*, nor do, probably, Becker's records.

Dahl (1908f, p. 426) did not give any reference on which his record of the species ("im westlichen Teil der Niederlande wurde sie gefunden") was based, it probably was borrowed from Becker. Dahl (l.c. p. 527) did not synonymize van Hasselt's *Lycosa annulata* with *P. proxima*, but with *P. hortensis*!

In my opinion it seems probable that all dutch records of *P. proxima* were based on van Hasselt's specimens, which belong to *P. prativaga* and *P. amentata*; consequently *P. proxima* is to be left out our faunal list. The species, however, may be found some day in our country, as it was observed very close to our southern boundary (Knocke, in Belgium; Becker, 1882a, p. 134).

- pure white and very clear-cut in males. Lateral bands not distinct. Tarsus of male palp slender, outline of median apophysis in lateral view as in fig. 74. Dilatation of epigyneal septum very broad (fig. 78) . . . . . 10. *P. lugubris*, p. 53.
4. Median apophysis of male palpal organs short (fig. 71). Epigyneal septum dilated at half length, and once again behind (fig. 80) . . . . . 8. *P. hortensis*, p. 51.
- Median apophysis of male palpal organs long (fig. 73). Epigyneal septum dilated behind only (fig. 75) . . . . . 7. *P. amentata* p. 50.

Dutch species.

7. *Pardosa amentata* (Cl.)

*Araneus amentatus* Clerck, 1757, pp. 96, 97, Pl. 4 fig. 8; *Pardosa amentata* Becker, 1882<sup>a</sup>, pp. 140-142, Pl. 11 fig. 3; de Lessert, 1910<sup>c</sup>, pp. 523, 524; Simon, 1937, pp. 1066, 1082, 1125, figs. 1651, 1683; *Pardosa saccata* Tambs-Lyche, 1940, pp. 21-24, 48, 52-54, 56, map 5, tab. 2; *Lycosa amentata* Strand, 1898<sup>b</sup>, pp. 146, 148, 157; Locket & Millidge, 1951, p. 264, figs. 129A, B, G; *Lycosa saccata* Smith, 1907<sup>a</sup>, pp. 23, 24, Pl. 3 figs. 10a, b; Dahl, 1908<sup>f</sup>, pp. 382, 394, 401-409, fig. 78; Dahl, 1927, pp. 41-43, 76, figs. 108-110; Palmgren, 1939<sup>b</sup>, pp. 44, 45, figs. 48, 63, 77, map. 10; Holm, 1947, p. 34, Pl. 6 figs. 66, 67, Pl. 10 fig. 40.

Length: ♀ 6.1-8.1 mm, ♂ 5.2-6.0 mm. Carapace dark brown, with a lighter median band, which is broadly dilated in front, and two broken lateral light bands. Pattern in males, except for the median band, indistinct. Abdomen: dorsal surface greyish brown, with normal *Pardosa*-pattern. Males are almost black, with a yellow median stripe. Ventral surface yellow-brown. Clypeus and chelicerae yellow-brown, the latter with darker streaks and black apices, especially in males. Mandibulae yellow-brown, with darker parts. Labium dark brown. Sternum dark brown, with a lighter streak in the anterior part in female specimens, uniform black in males. Legs yellow-brown, distinctly annulated in both sexes on femora, patellae, and tibiae, in female specimens also on metatarsi. Chaetotaxy:  $1_1''$ - $1_2''$  on tibiae I parallel to  $v_1''$ - $2''$  (fig. 102). Male palp: tibia and tarsus with many black hairs. Apex of median apophysis of tarsal organs (figs. 73, 85) pointing outwards in lateral view. Epigyne (fig. 75) broader than in the next species, septum with only one dilatation. Cocoons greyish brown, flattened, approximately 4.5 mm in diameter, containing 50 to 70 eggs.

Dutch records. *Aranea saccata* Bennet & Olivier, 1825, pp. 472, 473; *Lycosa saccata* Six, 1858<sup>b</sup>, p. 299 (prov. Utrecht); Snellen van Vollenhoven, 1859, pp. 61, 62; Waage, 1938, p. 181 (Sint Pietersberg); *Lycosa annulata*

(proparte <sup>1</sup>) van Hasselt, 1886<sup>a</sup>, p. 86 (Scheveningen, Loosduinen); *Lycosa amentata* van Hasselt, 1886<sup>a</sup>, p. 85; 1886<sup>b</sup>, p. 103 (Bolsward, Oranjewoud); van der Hammen, 1950, p. 112 (Sint Pietersberg); Chrysanthus, 1950, p. 70; 1951<sup>b</sup>, p. 99 (Maastricht, Gronsveld); *Pardosa amentata* Becker, 1879<sup>f</sup>, p. xli (prov. Utrecht, Gelderland, Limburg); 1882<sup>a</sup>, p. 141 (Utrecht, between Maartensdijk and De Bilt, Maastricht; prov. Gelderland); *Lycosa (Pardosa) agricola* <sup>2</sup>) van Hasselt, 1890<sup>a</sup>, p. 192 (Scheveningen); *Lycosa (Pardosa) hortensis* <sup>3</sup>) van Hasselt, 1898<sup>a</sup>, p. 49 (Arnhem); *Lycosa paludicola* Chrysanthus, 1957, p. 31 (Heerlen).

Distribution: palearctic region. Dutch localities: see map, fig. 112.

Occurrence. Very common in all parts of our country, in humid places. Adults from March till November. Period of copulation in April and May (copula observed on May 31<sup>st</sup>). Females with cocoons in May, and, more rarely, from June till in September.

#### 8. *Pardosa hortensis* (Thor.)

*Lycosa hortensis* Thorell, 1872<sup>b</sup>, p. 299; Dahl, 1908<sup>f</sup>, pp. 239, 387, 394, 422-425, fig. 85; Dahl, 1927, pp. 31, 32, 77; figs. 75-77; Palmgren, 1939<sup>b</sup>, p. 77; Locket & Millidge, 1951, p. 267, figs. 130A, B, F; *Lycosa annulata* Smith, 1907<sup>a</sup>, p. 26, Pl. 3 figs. 13a, b, Pl. 4 fig. F; *Pardosa hortensis* Becker, 1882<sup>a</sup>, pp. 142, 143, Pl. 11 fig. 4; de Lessert, 1910<sup>c</sup>, pp. 516, 517; Simon, 1937, pp. 1063, 1064, 1085, 1126, figs. 1646, 1687.

Length: ♀ 4.8-6.4 mm, ♂ 4.2-4.3-4.7 mm (three males only). This species is very much like *P. amentata*, except for its smaller size and some differences in:

Sternum: a trifle lighter towards the centre, but never with a light anterior streak. Chaetotaxy of the legs:  $1_1''-1_2''$  and  $v_1''-v_2''$  on tibiae I converging slightly (fig. 100),  $1_2''$  being situated a little more ventrally than  $1_1''$ . Male palp (fig. 71): median apophysis of tarsal organs very short. Epigyne (fig. 80) narrow, the septum with a characteristic broadening in the middle.

Dutch records. *Pardosa hortensis* Becker, 1882<sup>a</sup>, p. 143 (Utrecht, Breda, prov. Gelderland); *Lycosa hortensis* van Hasselt, 1886<sup>a</sup>, pp. 86, 87; Chrysanthus, 1954<sup>a</sup>, p. 40 (Epen).

Distribution: palearctic region, except Scandinavia. Dutch localities: Zeeland: Schouwen; Utrecht: Utrecht (B.); Gelderland: Doorwerth; Noord-Brabant: Breda, Baarle-Nassau; Limburg: Gerendal, Schin op Geul, Sint Pietersberg, Colmond, Mechelen, Epen.

1) 4 juvenile specimens in collection van Hasselt, no. 806, sub *Lycosa annulata*, belong to *P. amentata*.

2) see p. 42.

3) "♀ cum sacculo". The female specimen with cocoon, sub *Lycosa hortensis* in collection van Hasselt, no. 807, belongs to *P. amentata*.

Occurrence. Rather rare, found in our southern provinces only, in warm and sunny places. Adults from March till July, period of copulation in March and April. Female with pulli on June 15th.

9. *Pardosa nigriceps* (Thor.)

*Lycosa nigriceps* Thorell, 1856, pp. 116, 117; Strand, 1898<sup>b</sup>, pp. 148, 155, 156, 157; Smith, 1907<sup>a</sup>, pp. 24, 25, Pl. 3 figs. 11a, b; Dahl, 1908<sup>f</sup>, pp. 383, 393, 421, 422, fig. 80; Dahl, 1927, pp. 46, 47, 77, figs. 121-123; Palmgren, 1939<sup>b</sup>, pp. 51, 52, figs. 53, 67, 82, map 8; Holm, 1947, pp. 31, 32, Pl. 5 figs. 56, 57, Pl. 10 fig. 34; Locket & Millidge, 1951, pp. 264, 266, figs. 129C, D, H; *Pardosa nigriceps* Becker, 1882<sup>a</sup>, pp. 132, 133, Pl. 10 fig. 6; de Lessert, 1910<sup>e</sup>, pp. 517, 518; Simon, 1937, pp. 1061, 1062, 1076, 1130, figs. 1640, 1673; Tambs-Lyche, 1940, pp. 9-11, 48, 54, 56, map 1, tab. 2.

Length: ♀ 5.0-6.8 mm, ♂ 4.5-5.4 mm. Carapace (fig. 84) olive-brown. Median and lateral light bands greenish yellow, very broad. Median band with two darker spots between fovea and eyes. Lateral light bands continued around clypeus. Cephalic part in males with white hairs. Abdomen: median lanceolate stripe on dorsal surface (fig. 84) in female specimens very distinct, yellow, more reddish in males, followed by a series of greyish chevrons. Sides yellow-grey, ventral surface yellow. Clypeus yellow. Chelicerae yellow in females, apices darkened, in males moreover with dark longitudinal streaks. Mandibulae greyish, labium darker. Sternum dark brown, with a longitudinal lighter band in most female specimens, more uniform in males. Legs uniform yellow-brown, except for some darker dorsal blotches on the femora. Male palps with conspicuous black tarsi. Median apophysis of tarsal organs with a characteristic outline in lateral view (fig. 72). Epigyne (fig. 79) very high, with many folds and wrinkles. Cocoons bluish, flattened, 3.0 to 4.0 mm in diameter, containing approximately 30 eggs.

Dutch records. *Pardosa nigriceps* Becker 1881<sup>b</sup>, p. xxviii (Oirschot); 1882<sup>a</sup>, p. 133 (Oirschot); *Lycosa nigriceps* van Hasselt 1886<sup>a</sup>, p. 88 (prov. Utrecht, Gelderland, Zuid-Holland, Noord-Brabant); Chrysanthus 1954<sup>a</sup>, p. 40 (Arcen).

Distribution: Europe. Dutch localities: Noord-Holland: Bloemendaal, Zandvoort; Zuid-Holland: Meijendel, Oost-Voorne, Rockanje; Zeeland: Axel, Vijfhoek; Utrecht: Amersfoort; Friesland: Terschelling, Opsterland; Groningen: Schiermonnikoog; Drente: Westerbork; Overijssel: Staphorst, Wezep; Gelderland: Hulshorst, Garderen, Hoge Veluwe, Schaarsbergen, Wooldse Veen; Noord-Brabant: Oosterhout, Oirschot (B.); Limburg: Arcen, Haelen, Herkenbos, Sint Pietersberg, Vijlen.

Occurrence. Common on heaths, and in the dunes. Spiders of this species



may be found climbing herbs and small shrubs. Adults from April till November. Period of copulation in early May. Females with cocoons from May till in July, some cocoons (from November 1st) contained but few small spiderlings.

10. *Pardosa lugubris* (Walck.)

*Aranea lugubris* Walckenaer, 1802, p. 239; *Lycosa lugubris* Strand, 1898<sup>b</sup>, pp. 147, 157; Smith, 1907<sup>a</sup>, pp. 25, 26, Pl. 3 figs. 12a, b; Holm, 1947, pp. 33, 34, Pl. 6 figs. 68, 69, Pl. 10 fig. 39; Locket & Millidge, 1951, pp. 266, 267, figs. 129E, F, 130E; *Lycosa chelata* Dahl, 1908<sup>f</sup>, pp. 383, 393, 418-421, fig. 79; Dahl, 1927, pp. 43, 77, figs. 111-113; Palmgren, 1939<sup>b</sup>, pp. 45, 46, figs. 47, 64, 78, map 11; *Pardosa lugubris* Becker, 1882<sup>a</sup>, pp. 138, 139, Pl. 11 fig. 2; de Lessert, 1910<sup>c</sup>, pp. 521, 522; Simon, 1937, pp. 1065, 1081, 1082, 1130, figs. 1650, 1682; *Pardosa chelata* Tambs-Lyche, 1940, pp. 18-21, 48, 51, 53, 54, 55, 56, map 4, tabs. 1, 2.

Length: ♀ 4.9-6.2 mm, ♂ 4.0-4.7 mm. Carapace red-brown, with a broad, ill-defined, median band, which is light brown in female specimens, and in males white, consisting of pubescence. Lateral bands not distinct. Abdomen: dorsal surface dark brown, lighter in the basal part, pattern indistinct. Ventral surface reddish brown. Clypeus brown in females, darker in males. Chelicerae and mandibulae brown, labium darker. Sternum black-brown, in some specimens with a lighter central streak. Legs reddish brown, annulated on all joints except tarsi, lighter in male specimens, with black-brown femora. Chaetotaxy:  $l_1''$ - $l_2''$  and  $v_1''$ - $v_2''$  on tibiae I strongly converging,  $l_2''$  nearly ventral in position (fig. 101). Male palp: tarsus (fig. 74) black, slender, median apophysis long and tapering in lateral view. Epigyne (fig. 78) with a very narrow septum; dilatation broad. Cocoons greyish brown, flattened, 3.5-4.0 mm in diameter, containing 25-30 eggs.

Dutch records. *Lycosa silvicultrix* Six, 1858<sup>b</sup>, p. 299 (De Bilt); *Lycosa alacris* Six, 1858<sup>b</sup>, p. 299 (De Bilt); van Hasselt, 1871<sup>b</sup>, p. 46 (Wassenaar); *Lycosa lugubris* van Hasselt, 1886<sup>a</sup>, p. 87; Chrysanthus, 1951<sup>b</sup>, p. 99 (Brunsum); *Lycosa chelata* van der Drift, 1951, pp. 121, 139, fig. 14 (Hoge Veluwe); *Pardosa lugubris* Becker, 1879<sup>f</sup>, p. xli (prov. Utrecht, Zeeland); 1882<sup>a</sup>, p. 139 (Maastricht, between Hilversum and Amersfoort).

Distribution: Europe. Dutch localities: Noord-Holland: Wijk aan Zee, Zandvoort, Heemstede, Hilversum, Bennebroek; Zuid-Holland: Oegstgeest, Leiden, Meijendel, Wassenaar (v. H.), Oost-Voorne, Rockanje; Zeeland (B.); Utrecht: Bilthoven, De Bilt (S.), Zeist, Amersfoort; Friesland: Opsterland; Drente: Westerbork, Dwingeloo; Overijssel: Denekamp, Herikerberg; Gelderland: Hulshorst, Epe, Garderen, Wilp, Barneveld, Hoge Veluwe, Benne-

kom; Noord-Brabant: Breda, Baarle-Nassau, Esbeek, Valkenswaard, Leende; Limburg: Swartbroek, Bezel, Herkenbos, Geleen, Brunssum, Geulem, Schin op Geul, Gulpen, Maastricht (B.), Sint Pietersberg, Eys, Mechelen, Eysden, Vijlen, Epen.

Occurrence. Very common in clearings in woods. Adults from April till October, period of copulation in May. Females with cocoons from May till in August.

#### Group IV. *P. pullata*-group.

Key to the species.

1. Legs distinctly annulated. Tibiae I and II with retrolateral spines  $l_1''$ - $l_2''$ , situated as in fig. 102, metatarsi I and II with at least one retrolateral spine  $l_2''$ , often with two  $l_1''$ - $l_2''$ . Median apophysis of male palpal organs yellowish, and very long (fig. 88). Epigyneal septum broad, upper edges of epigyne rounded (fig. 77) . . . . 11. *P. prativaga*, p. 54.
- Legs not or very indistinctly annulated. Tibiae and metatarsi I and II without any retrolateral spines (tibia, fig. 103). Median apophysis of male palpal organs darker and shorter than in the preceding species (fig. 87). Epigyneal septum narrower, upper margin of epigyne with lateral outgrowths (fig. 76) . . . . 12. *P. pullata*, p. 55.

Dutch species.

#### 11. *Pardosa prativaga* (L.K.)

*Lycosa prativaga* L. Koch, 1870, pp. 8, 43; Strand, 1898<sup>b</sup>, pp. 148, 150, 157; Smith, 1907<sup>a</sup>, pp. 22, 23, Pl. 2 figs. 9a, b; Holm, 1947, p. 32, figs. 3, 14a, Pl. 6 figs. 62, 63, Pl. 10 fig. 37; Locket & Millidge, 1951, pp. 262, 264, figs. 128A, B, F; *Lycosa riparia* Dahl, 1908<sup>f</sup>, 381, 390, 412-414, fig. 77; Dahl, 1927, pp. 45, 46, 77, figs. 117-119; Palmgren, 1939<sup>b</sup>, pp. 47-49, figs. 44, 66, map 13; *Pardosa prativaga* Becker, 1882<sup>a</sup>, pp. 136, 137, Pl. 11 fig. 1; Simon, 1937, pp. 1061, 1080, 1125, figs. 1639, 1679; *Pardosa riparia* de Lessert, 1910<sup>c</sup>, pp. 519, 520; Tambs-Lyche, 1940, pp. 24-28, 48, 53, 55, map 6, tab. 2.

Length: ♀ 5.1-7.5 mm, ♂ 4.8-5.3 mm. Carapace greyish brown, with indistinct markings, median and lateral bands reddish. The median band is dilated in front, lateral bands continuous or broken. Males are darker in colour than females. Abdomen: dorsal surface with the normal *Pardosa*-pattern, rather dark and not very distinct. Ventral surface grey-brown. Clypeus reddish yellow, chelicerae of the same colour, with darker streaks. Mandibulae and labium grey-brown. Sternum grey-brown, and lighter in the anterior half in female specimens, uniform black in males. Legs brown, all joints, except

tarsi, distinctly annulated<sup>1)</sup>. Chaetotaxy: tibiae I and II with retrolateral spines  $l_1''-l_2''$ , this row is parallel to  $v_1''-v_2''$ . Metatarsi I and II with at least one retrolateral spine  $l_2''$ , often with two  $l_1''-l_2''$ . Male palp: tibia and basal part of tarsus with black pubescence. Tarsal organs (fig. 88) with a long and light yellow median apophysis. Epigyne (fig. 77): anterior edges rounded, septum rather broad.

Dutch records. *Lycosa riparia* van Hasselt, 1886<sup>a</sup>, pp. 87, 88 (Warmond, Breda); Kluyver, 1933, p. 136 (Wageningen); *Lycosa prativaga* van Hasselt, 1886<sup>a</sup>, p. 88 (Den Haag); *Lycosa annulata* (pro parte<sup>2)</sup>) van Hasselt, 1886<sup>a</sup>, p. 86 (Scheveningen, Loosduinen).

Distribution: palearctic region. Dutch localities: Zuid-Holland: Nieuwkoop, Reewijk, Warmond (v. H.), Voorschoten, Den Haag (v. H.), Scheveningen or Loosduinen (v. H.<sup>2)</sup>), Oost-Voorne; Zeeland: Axel; Friesland: Terschelling; Overijssel: Kampen, Wezep; Gelderland: Barneveld, Wageningen (K.), Wooldse Veen; Noord-Brabant: Breda, Oisterwijk; Limburg: Herkenbos, Cotessen.

Occurrence. In fields and marshy soils. In the dunes the species has been found in the relatively humid dunes of Oost-Voorne only. Adults from March till August, period of copulation probably in May.

## 12. *Pardosa pullata* (Cl.)

*Araneus pullatus* Clerck, 1757, pp. 104, 105, Pl. 5 fig. 7; *Lycosa pullata* Strand, 1898<sup>b</sup>, pp. 147, 154; Smith, 1907<sup>a</sup>, pp. 21, 22, Pl. 2 figs. 8a, b; Dahl, 1908<sup>f</sup>, pp. 380, 381, 391, 392, 409-412, fig. 76; Dahl, 1927, pp. 44, 76, figs. 114-116; Palmgren, 1939<sup>b</sup>, pp. 46, 47, figs. 45, 65, 79, map 12; Holm, 1947, p. 32, Pl. 6 figs. 60, 61, Pl. 10 fig. 36; Locket & Millidge, 1951, pp. 261, 262, figs. 128C, D, E; *Pardosa pullata* Becker, 1882<sup>a</sup>, pp. 135, 136, Pl. 10 fig. 8; de Lessert, 1910<sup>c</sup>, pp. 518, 519; Simon, 1937, pp. 1065, 1081, 1125, figs. 1649, 1681; Tambs-Lyche, 1940, pp. 11-13, 48, 53, 55, 56, map 2, tab. 2.

Length: ♀ 4.8-5.7 mm, ♂ 4.6-5.3 mm. General pattern much like that of *P. prativaga*, usually, however, the specimens of *P. pullata* are more reddish in colour. Other differences are:

Legs without annulations or annulations very obscure. Chaetotaxy: tibiae and metatarsi I and II without any retrolateral spines (tibia, fig. 103). Male palp (fig. 86): black pubescence on tibia and tarsus thinner than in *P. prativaga*, apophysis of tarsal organs shorter, and much darker in colour (fig. 87).

1) The var. *sphagnicola* Dahl (1908<sup>f</sup>, pp. 381, 391, 414, 415), with uniformly coloured legs, has not yet been found in our country.

2) 1 ♂ s.ad, in collection van Hasselt (no. 805), sub *Lycosa annulata*, belongs to *P. prativaga*.

Epigyne (fig. 76): anterior edges with characteristic lateral outgrowths, septum more slender than in the preceding species. Cocoons light brown, slightly flattened, 3.0-3.5 mm in diameter, containing approximately 25-30 pulli.

Dutch records. *Lycosa pullata* Six, 1858<sup>b</sup>, p. 299 (Driebergen); van Hasselt, 1886<sup>a</sup>, p. 87 (prov. Utrecht, Gelderland, Zuid-Holland); Chrysanthus, 1951<sup>b</sup>, p. 99 (Brunssum); *Pardosa pullata* Becker, 1879<sup>f</sup>, p. xli (prov. Utrecht, Holland, Gelderland); 1882<sup>a</sup>, p. 136 (prov. Utrecht, Gelderland; Maastricht).

Distribution: Europe, Asia Minor. Dutch localities: Noord-Holland: Bergen aan Zee; Zuid-Holland: Maaldrift, Meijendel, Oost-Voorne, Rockanje, Gouderak; Zeeland: Renesse; Utrecht: Bilthoven, Soest, Amersfoort, Driebergen (S.); Groningen: Schiermonnikoog; Drente: Westerbork; Gelderland: Wilp; Noord-Brabant: Baarle-Nassau, Oisterwijk; Limburg: Herkenbos, Brunssum, Valkenburg, Tulle, Sint Pietersberg, Maastricht (B.), Rijckholt, Wahlwiller, Cottessen, Eys, Vijlen, Epen.

Occurrence. More widespread than the preceding species. *P. pullata* can be found in the same biotopes as *P. pratvaga*, but also in more dry places. e.g., in the dry dunes of Noord- and Zuid-Holland, where it is found, however, in the most humid parts only ("Bierlap" in Meijendel). Adults from April till August, period of copulation in April and May. Females with cocoons in April and May, female with pulli in July.

#### Genus 7. *Aulonia* C. L. Koch

C. L. Koch, 1848<sup>a</sup>, pp. 97, 98.

Typus generis *Lycosa albimana* Walckenaer (1805, p. 14)

One dutch species only.

##### 1. *Aulonia albimana* (Walck.)

*Lycosa alimimana* Walckenaer, 1805, p. 14; *Aulonia albimana* Becker, 1882<sup>a</sup>, pp. 146, 147, Pl. 12 fig. 4; Dahl, 1908<sup>f</sup>, pp. 302-306, fig. 35; de Lessert, 1910<sup>e</sup>, pp. 505, 506; Dahl, 1927, pp. 73-75, 78, figs. 189-192; Simon, 1937, pp. 1086, 1087, 1131, figs. 1694, 1695; Holm, 1947, pp. 22, 23, Pl. 5 figs. 48, 49, Pl. 9 fig. 24; Locket & Millidge, 1951, p. 291, fig. 140.

Length: ♀ 3.5-4.3 mm, ♂ 3.3-3.9 mm. General outline, fig. 83. Carapace dark brown, part behind the fovea lighter. Striae and fovea black. Head narrow, between and next to the eyes provided with long black hairs. Lateral edges of carapace with white pubescence. Abdomen: dorsal surface dark brown, speckled with grey. Lanceolate stripe short, with whitish hairs. Chevrons scarcely visible. Posterior spinners very long. Ventral surface brown,

lighter in the median part. Eyes relatively large. Anterior row strongly procurved; median eyes larger than laterals. Clypeus dark, width equal to the diameter of a median eye of the anterior row. Chelicerae directed obliquely backward, brown, with darker streaks. Inner row with three teeth. Mandibulae light brown, labium darker. Sternum dark brown in female specimens, lighter in males. Legs grey-brown in females, almost yellow in males, coxae, trochanteres, and femora of leg I black-brown in both sexes. Femora I in male specimens ventrally with very stout black hairs. Chaetotaxy: tibiae I in males with two ventral spines  $v_1''-v_2''$  only, in females with four ventrals, viz.,  $(v_1)-(v_2)$ . Tibiae II in both sexes with ventrals  $v_1''-v_2''$ , tibiae III with  $v_1'-v_2'$ , tibiae IV with  $(v_1)-(v_2)-(v_a)$ . Male metatarsi I with very small spines, viz.,  $[v_1'', l_1']-[v_2'', l_2']-(l_a)$ , spines on female metatarsi I of normal length  $(v_1)-l_1'-(v_2)-[l_{1a}, l_{1a}', \text{ or } (l_a)]$  <sup>1)</sup>. Palps dark brown, patellae yellow, sometimes almost ivory-white in female specimens, in males the white colour is formed by white pubescence only. Male palp: tarsus densely clothed with black hairs (fig. 27). Median apophysis forked. Epigyne (fig. 28) large, U-shaped, in some specimens narrower in the anterior part and almost triangular. Cocoon white, spherical, diameter 2.0 mm, containing approximately 12 eggs.

Dutch records. *Aulonia albimana* van Hasselt, 1886<sup>a</sup>, p. 89 (prov. Gelderland, Zuid-Holland); Dahl, 1908<sup>f</sup>, p. 305 ("im südlichen Teil von Holland").

Distribution: this species is known from whole Europe (north up to Finland, cf. Palmgren, 1947, p. 25), Syria, and Israël. Dutch localities: Zuid-Holland: Meijndel; Gelderland (v. H.).

Occurrence. In warm and sheltered places in dry biotopes. Adults from May till September, period of copulation in June. Female with cocoon in August.

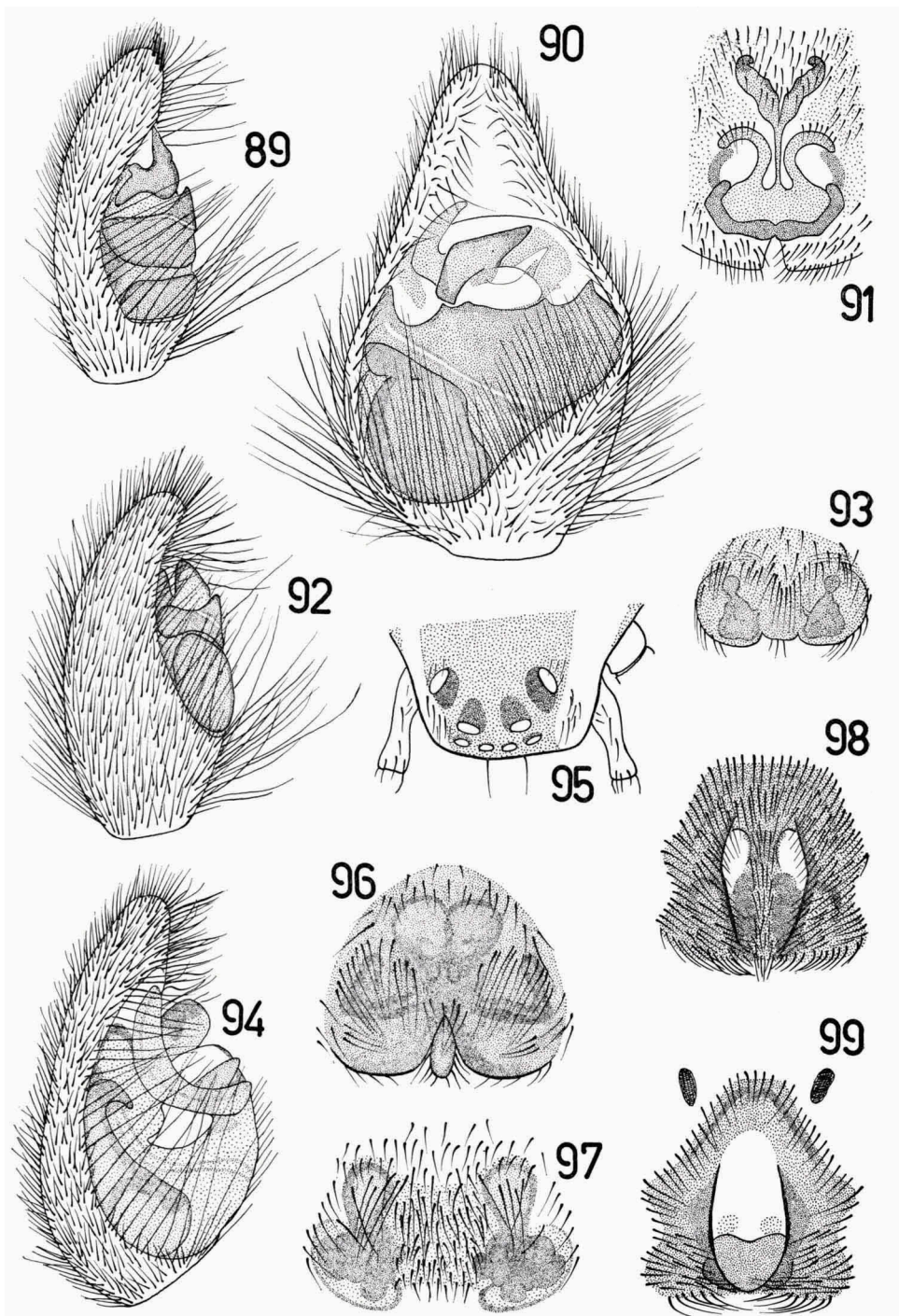
#### Genus 8. **Pirata** Sundevall

Sundevall, 1832, p. 192.

Typus generis *Araneus piraticus* Clerck (1757, pp. 102, 103, Pl. 5 fig. 4)

Small spiders. Carapace (fig. 82) with a V-shaped, dark band in front of fovea, and two lateral, dark bands. Abdomen: lanceolate stripe and chevrons accompanied by two rows of small, round spots of silvery white pubescence. Pattern of abdomen in some specimens not very distinct. Chelicerae with three teeth in both inner and outer rows. Chaetotaxy of legs: number of spines on tibiae I-IV and metatarsi I reduced. The reduction on tibiae I and II in

<sup>1)</sup> So Dahl's remark (1927, p. 74): "Der Metatarsus des Weibchens hat am unteren Ende nur zwei Stacheln, der des Männchens gar keinen" does not hold good for my specimens.



Figs. 89, 90, *Pirata*, tarsi of male palps,  $\times 50$ : 89, *P. knorri*, prolateral aspect, 90, *P. piscatorius*, ventral aspect.

Fig. 91, epigyne of *Pisaura mirabilis*,  $\times 25$ .

Figs. 92-94, *Pirata*: 92, tarsus of male palp of *P. piraticus*, prolateral aspect,  $\times 50$ , 93, epigyne of *P. knorri*,  $\times 60$ , 94, tarsus of male palp of *P. hygrophilus*, prolateral aspect,  $\times 50$ .

Fig. 95, anterior part of carapace of *Dolomedes fimbriatus*, dorsal aspect,  $\times 8$ .

Fig. 96, 97, *Pirata*, epigynes,  $\times 60$ : 96, *P. hygrophilus*, 97, *P. piscatorius*.

Figs. 98, 99, *Dolomedes*, epigynes,  $\times 25$ : 98, *D. fimbriatus*, 99, *D. plantarius*.

the first place affects ( $v_a$ ), the description of Locket & Millidge (1951, p. 287) "Tibia I with no ventral apical spines", however, does not hold good for all dutch specimens, not even for females (cf. *ibid.*, p. 250, in key), as I find this pair of spines complete in most male specimens (except for *P. hygrophilus*), and reduced to  $v_a'$  in female specimens of *P. piscatorius*. In the second place the reduction affects the lateral spines on tibiae and metatarsi I and II, and ventrals ( $v_1$ ) and ( $v_2$ ) on tibiae III and IV. The apical spines on metatarsi I are, in females, reduced to ( $l_a$ ), in adult male specimens of some species ( $l_a$ ) and  $v_a$  are present. Male palp: form and situation of the median apophysis in pro-lateral view give very useful specific characters. Epigyne in most species small; in external view only the lower parts are visible, after clearing two sets of spermathecae shine through the septum.

Species of *Pirata* occur in damp situations, in bogs, on lake- and riverbanks, and in marshy places. They frequently run on the surface of the water and, in case of danger, even go below the surface. Retreat-tubes are built close to the water (Nørgaard 1952).

Key to the species.

1. Lateral light bands on carapace separated from margins by dark bands. V-shaped figure very distinct. Anterior row of eyes recurved. Median apophysis of male palpal organs slender and coiled in ventral view, in pro-lateral view (fig. 94) enclosing, like a membrane, a rounded, robust tooth, and an acuminate, smaller one. Epigyne (fig. 96) large, showing two sets of spermathecae, the upper circular and partly overlapping, the lower tubular and coiled . . . . . 3. *P. hygrophilus*, p. 63. 1)
- Lateral light bands on carapace not separated from margins by dark bands. V-shaped figure distinct or faint. Anterior row of eyes procurved or straight. Median apophysis of male palpal organs shaped as a robust tooth in ventral view, or, if slender and coiled in ventral view, not appearing as a membrane in pro-lateral view. Epigyne smaller, with two basal, ear-like structures, or circles . . . . . 2

1) A species much resembling *P. hygrophilus*, *P. uliginosus* (Thorell, 1856, pp. 171, 172), of which I did not see any specimens and for that reason cannot very well fit into this key, is perhaps to be expected in our country. It was found in Scandinavia, Germany, Switzerland, and England, and it lives, according to Dahl (1927, p. 59), almost exclusively in peat-moors. It seems to be very close to *P. hygrophilus* in general appearance, but its dimensions are smaller, and the markings of the carapace are not quite so distinct. The adult male can be distinguished by its greater number of apical spines [ $l_a$ ],  $v_a$ ] on metatarsi I, and by the aspect of the palpal organs: only one, rounded apophysis is visible in pro-lateral view. In the epigyne the lower spermathecae are circular, and the basal septum between the two ridges is much wider than in *P. hygrophilus*.

2. Lateral light bands with white pubescence. Anterior row of eyes longer than or equal to median row, median eyes of anterior row larger than laterals. Legs not, or very faintly, annulated. Metatarsi I in adult males apically with three spines [(l<sub>a</sub>), v<sub>a</sub>] 1). Median apophysis of male palpal organs rounded or sharp in pro-lateral view, not nearly reaching the edge of the alveolus, robust in ventral view. Epigyne with two ear-like, basal structures . . . . . 3
- Lateral light bands without white pubescence. Anterior row of eyes shorter than median row, median eyes of anterior row smaller than or equal in diameter to laterals. Legs annulated, especially on femora. Metatarsi I in males apically with two spines (l<sub>a</sub>) only. Median apophysis of male palpal organs erect in pro-lateral view, straight or hooked at top, as large as nearly to reach the edge of the alveolus, slender in ventral view. Epigyne with circular basal structures . . . . . 4
3. V-shaped figure and lateral light bands on carapace distinct. Anterior row of eyes equal in length to median row. Sternum with dark patches opposite coxae I, II, and III. Chaetotaxy of legs in females: tibiae I without apical, ventral spines, tibiae II with ventrals v<sub>1</sub>''-v<sub>2</sub>''-[v<sub>a</sub>', or (v<sub>a</sub>), or (v<sub>a</sub>) absent]. Median apophysis of male palpal organs small in ventral view, tapering off to a point (fig. 105). Epigyne (fig. 104): in external view two ear-like structures are visible. Upper spermathecae circular . . . . . 1. *P. piraticus*, p. 61.
- V-shaped figure less distinct, lateral light bands consisting of white pubescence only. Anterior row of eyes longer than median row. Sternum without dark patches opposite coxae, in some specimens with a light, central streak. Chaetotaxy of legs in females: tibiae I with apical v<sub>a</sub>', tibiae II with ventrals (v<sub>1</sub>)-v<sub>a</sub>'. Median apophysis of male palpal organs (fig. 90) larger in ventral view, with straight margins. Epigyne (fig. 97): basal structures more angular. Upper spermathecae gradually widening into spermathecae . . . . . 2. *P. piscatorius*, p. 62.
4. Lateral light bands on carapace distinct. Anterior row of eyes procurved,

1) Dahl (1927, p. 63, in key) gives for *P. piscatorius* and *P. piraticus* "Der Metatarsus des ersten Beinpaars trägt am unteren Ende in beiden Geschlechtern vier Stacheln". The specimens that I have seen bear on metatarsi I:

(*P. piscatorius*) ♀, (v<sub>1</sub>)-(v<sub>2</sub>)-(l<sub>a</sub>) = 4 ventrals;

♂, (v<sub>1</sub>)-l<sub>1</sub>'-(v<sub>2</sub>)-[(l<sub>a</sub>), v<sub>a</sub>] = 5 ventrals;

(*P. piraticus*) ♀, (v<sub>1</sub>)-(v<sub>2</sub>)-(l<sub>a</sub>) = 4 ventrals;

♂, (v<sub>1</sub>)-(l<sub>1</sub>), or l<sub>1</sub>'-(v<sub>2</sub>)-[(l<sub>a</sub>), v<sub>a</sub>] = 5 ventrals.

Dahl's statement of 1908<sup>f</sup> (p. 284, in key) more closely agrees with my findings: "Am ersten Beinpaar des ♂ besitzt das distale Ende des Metatarsus, im Gegensatz zum ♀, vorn, hinten, und auch unten einen Stachel".



- median eyes of this row smaller than laterals. Legs distinctly annulated. Tibiae I darkened in adult males. Median apophysis of male palpal organs (fig. 89) straight at top in pro-lateral view. Upper spermathecae smaller than lower spermathecae. Epigyne, fig. 93 . . . 4. *P. knorri*, p. 64.
- Lateral light bands on carapace absent. Anterior row of eyes straight, median and lateral eyes of this row of equal diameters. Annulations on legs, if any, very faint. Median apophysis of male palpal organs hooked at top in pro-lateral view (fig. 106). Epigyne (fig. 107): basal parts circular, with slender outgrowths. Upper spermathecae larger than lower spermathecae . . . 5. *P. latitans*, p. 65.

Dutch species.

1. *Pirata piraticus* (Cl.)

*Araneus piraticus* Clerck, 1757, pp. 102, 103, Pl. 5 fig. 4; *Pirata piraticus* Becker, 1882<sup>a</sup>, pp. 122-124, Pl. 9 fig. 9; Dahl, 1908<sup>f</sup>, pp. 285, 287-292, fig. 34; Dahl, 1927, pp. 64, 65, 77, figs. 166-169; Palmgren, 1939<sup>b</sup>, pp. 70, 71, figs. 104, 109, 115, map 21; Holm, 1947, pp. 10, 11, Pl. 1 figs. 7, 8, Pl. 9 fig. 4; Locket & Millidge, 1951, pp. 287-289, figs. 139 B, F; *Lycosa piratica* de Lessert, 1910<sup>c</sup>, p. 504; Simon, 1937, pp. 1118, 1140, figs. 1769, 1770.

Length: ♀ 6.5-8.2 mm, ♂ 4.5-6.2 mm. Carapace (fig. 82) yellow-brown, with darker markings. V-shaped figure black-brown, lateral light bands broad, with silvery hairs. Abdomen: dorsal surface grey-brown. Median lanceolate stripe very distinct, pale, not half as long as the total length of the abdomen. Chevrons indistinct. Sides with silvery hairs. Ventral surface yellow-brown, darker grey in the central region in male specimens, in females only the outlines of this central area are dark. Eyes: diameter of a median eye of the anterior row approximately one and a half times the diameter of a lateral eye of the same row. Anterior row straight, as broad as the median row. Clypeus brown, half as wide as the diameter of a median eye of the anterior row. Chelicerae light brown. Mandibulae yellowish brown, labium darker. Sternum yellow-brown, with black patches opposite coxae I, II, and III. Legs yellow-brown, distal joints a trifle darker than basals. Colour uniform, no blotches, nor any annulations are visible. Chaetotaxy: ( $v_a$ ) lacking in females on tibiae I, present in male specimens. Metatarsi I in females apically with ( $1_a$ ), in adult males with [ $1_a$ ], ( $v_a$ ) (subadult males may have ( $1_a$ ) only!).  $v_1'$  and  $v_2'$  on female tibiae II absent, ( $v_a$ ) often incomplete; but for the dorsal spines all verticils are complete in male specimens. Male palp (fig. 92): tarsal organs in prolateral view with an obtuse median apophysis, this apophysis is robust in ventral view (fig. 105), with tapering margins. Epigyne

(fig. 104) : in external view two ear-like structures are visible, after clearing the circular spermathecae shine through the septum. Cocoons greyish white, spherical, 4.0-4.5 mm in diameter, containing approximately 75 eggs or pulli.

Dutch records. *Lycosa piratica* Six, 1858<sup>b</sup>, p. 298 (prov. Utrecht); *Lycosa* (*Potamia*) *piratica* van Hasselt, 1873<sup>b</sup>, p. xxvi (Velzen); *Pirata piraticus* Becker, 1879<sup>f</sup>, p. xl (prov. Utrecht, Limburg, Zeeland, Holland); 1882<sup>a</sup>, p. 123 (Oirschot, Utrecht, Breda, Maastricht; prov. Zeeland); van Hasselt, 1886<sup>a</sup>, pp. 80, 81; Kluyver, 1933, p. 136 (Wageningen); Chrysanthus, 1950, pp. 70, 71; 1954<sup>a</sup>, p. 40 (Arcen).

Distribution: holarctic region, Malayan Archipelago, and New Zealand. Dutch localities: Noord-Holland: Huisduinen, Velzen (v. H.), Diemen, Naardermeer; Zuid-Holland: De Kaag, Leiden, Leiderdorp, Nieuwkoop, Wasse-naar, Gouderak, Maassluis, Rozenburg, Poortugal, Voorne; Zeeland (B); Utrecht: Utrecht (B.); Drente: Eext, Wijster; N.O. Polder; Overijssel: Kampen; Gelderland: Wilp, Barneveld, Wageningen (K.); Noord-Brabant: Breda (B.), Ulvenhout, Baarle-Nassau, Oirschot (B.); Limburg: Wellerloo, Arcen (C.), Herkenbos, Vlodrop, Heerlen, Houthem, Maastricht (B.).

The species has also been found on a trip round the IJsselmeer, in "Anne Ruardi kolk", of which I do not know the exact situation.

Occurrence. Widespread and common "in damp localities, where some free water is present. *P. piraticus* builds its retreat in *Sphagnum*, in other low vegetation, in the irregularities of marshy grounds, or under stones which lie close to the water" (Nørgaard, 1952, p. 421). It seems to vicariate with *Pardosa pullata* (Cl.) to such an extent that *P. piraticus* lives in the stalk layer of the *Sphagnum*-carpet, while *P. pullata* lives on the surface (Nørgaard, 1951). Adults from March till in September, period of copulation probably in early summer. Females with cocoons in June.

## 2. *Pirata piscatorius* (Cl.)

*Araneus piscatorius* Clerck, 1757, p. 103, Pl. 5 fig. 5; *Pirata piscatorius* Becker, 1882<sup>a</sup>, pp. 121, 122, Pl. 9 fig. 8; Dahl, 1908<sup>f</sup>, pp. 284, 285, 287, 292-294, fig. 33; Dahl, 1927, pp. 63, 64, 77, figs. 164-165; Palmgren, 1939<sup>b</sup>, pp. 69, 70, figs. 101, 106, 114; Holm, 1947, p. 10, Pl. 2 figs. 11, 12, Pl. 9 fig. 3; Locket & Millidge, 1951, p. 290, figs. 139A, G; *Lycosa piscatoria* de Lessert, 1910<sup>c</sup>, p. 503; Simon, 1937, pp. 1118, 1140, figs. 1767, 1768.

Length: ♀ 8.8-9.3 mm (two specimens only), ♂ 8.4-8.6 mm (two specimens only). Carapace red-brown, with narrow light bands. V-shaped figure small, in some specimens not very distinct. Lateral light bands consisting of white pubescence only. Abdomen: dorsal surface dark brown, markings not

very distinct. Ventral surface lighter. Eyes: the diameter of a median eye of the anterior row is one and a half times the diameter of a lateral eye. Anterior row of eyes straight, longer than median row. Clypeus olive-brown, width one and a half times the diameter of a median eye of the anterior row. Chelicerae red-brown. Mandibulae yellowish, labium of same colour. Sternum olive-brown, in some males with a central lighter streak. Legs olive-brown, without annulations; rather hairy. Chaetotaxy:  $v_a''$  absent from tibiae I and II in females, tibiae II in females with  $l_1'-(v_1)-l_2'-v_a'$ . Metatarsi I in females apically with  $(l_a)$ , in adult males with  $[(l_a), v_a]$ . Male palp: tarsal organs (fig. 90) in ventral view with a robust median apophysis with straight margins, in prolateral view this apophysis is visible as a dark slender tooth. Epigyne (fig. 97): basal structures angular. Sperma-tubes gradually widening into the upper spermathecae. Cocoon yellowish, 5.0 mm in diameter, slightly flattened, containing approximately 100 eggs.

Dutch records. *Pirata piscatorius* Becker, 1882<sup>a</sup>, p. 122 (Maastricht, Utrecht); van Hasselt, 1886<sup>a</sup>, p. 80 (Maarssen).

Distribution: palearctic region. Dutch localities: Utrecht: Maarssen (v. H.), Utrecht (B.); Drente: Wijster; Gelderland: Geldermalsen; Noord-Brabant: Oisterwijk, Baarle-Nassau; Limburg: Herkenbos, Vlodrop, Maastricht (B.).

Occurrence. Rare, known from our south-eastern provinces only. According to Nørgaard (1952, p. 422) this species is more dependent on free water in its environment than *P. piraticus* or *P. hygrophilus*, its tube is often constructed at the very edge of the water. Adults in April and August, period of copulation probably in spring.

### 3. *Pirata hygrophilus* Thor.

*Pirata hygrophilus* Thorell, 1872<sup>b</sup>, pp. 343, 344; Becker, 1882<sup>a</sup>, pp. 120, 121, Pl. 9 fig. 7; Dahl, 1908<sup>f</sup>, pp. 282, 286, 294-296, fig. 29; Dahl, 1927, pp. 59, 60, 77, figs. 155, 156; Palmgren, 1939<sup>b</sup>, p. 68, figs. 102, 107, 112; Holm, 1947, p. 9, fig. 7a, Pl. 1 figs. 3, 4, Pl. 9 fig. 1; Locket & Millidge, 1951, p. 289, figs. 139D, H; *Lycosa hygrophila* de Lessert, 1910<sup>c</sup>, pp. 502, 503; Simon, 1937, pp. 1116, 1140, figs. 1760, 1761.

Length: ♀ 4.5-6.8 mm, ♂ 4.8-5.8 mm. Carapace brown, with darker markings. V-shaped figure distinct, dilatation wide. Lateral light bands separated from margins by dark bands. Abdomen: dorsal surface light grey-brown, median lanceolate stripe and chevrons yellowish-brown, bordered with black. Ventral surface grey-brown, rather uniform. Eyes of anterior row of equal diameters, the row is slightly recurved. Clypeus reddish brown, as wide as the diameter of an eye of the anterior row. Chelicerae olive-brown. Mandi-

bulae light brown, labium darker. Sternum dark brown, lighter towards the centre. Legs light brown, with very faint annulations on femora I and II. Chaetotaxy: tibiae I in both sexes without ( $v_a$ ), tibiae II with  $v_a'$ . Metatarsi I in both sexes with apicals ( $l_a$ ). Male palp (fig. 94): in ventral view the median apophysis of the tarsal organs is long and slender, in prolateral view two teeth are visible, one rounded and robust, the other small and acuminate, together ringed in by the membranous part of the median apophysis. Epigyne (fig. 96) large, with two sets of spermathecae: two circular, partly overlapping, upper spermathecae, and two tubular, lower spermathecae. Cocoons yellowish white, spherical or slightly flattened, diameter 2.5-4.5 mm. One cocoon contained approximately 100 eggs, the other 50.

Dutch records. *Pirata hygrophilus* van Hasselt, 1886<sup>a</sup>, p. 80 (Den Haag, Loosduinen); 1890<sup>a</sup>, p. 203 (Roermond); Chrysanthus, 1957, p. 31 (Heerlen).

Distribution: Europe. Dutch localities: Noord-Holland: Naardermeer; Zuid-Holland: Nieuwkoop, Den Haag (v. H.), Loosduinen (v. H.), Reewijk, IJsselmonde; Zeeland: Sas van Gent; Utrecht: Amersfoort, Woudenberg; Gelderland: Wilp; Noord-Brabant: Esbeek; Limburg: Weiler, Roermond (v. H.), Herkenbos, Heerlen.

Occurrence. According to Nørgaard (1952, p. 421) and Tretzel (1952, p. 102), *P. hygrophilus* occurs in shaded localities, under trees and bushes where the ground is covered with *Sphagnum*. Its retreat is built in the *Sphagnum*-layer. Adults from May till in July, period of copulation in May. Female with cocoon in June.

#### 4. *Pirata knorri* (Scop.)

*Aranea knorrii* Scopoli, 1763, p. 403; *Pirata knorri* Becker, 1882<sup>a</sup>, pp. 118, 119, Pl. 9 fig. 6; Dahl, 1908<sup>f</sup>, pp. 283, 284, 287, 296-298, fig. 32; Dahl, 1927, pp. 62, 63, 77, figs. 161-163; *Lycosa knorri* de Lessert, 1910<sup>c</sup>, pp. 501, 502; *Lycosa Knorri* Simon, 1937, pp. 1118, 1140, fig. 1764.

Length: ♀ (one specimen only) 6.0 mm, ♂ (one specimen only) 5.6 mm. Carapace olive-brown, with darker median and lateral bands. Dilatation of median dark band not very distinct, without distinct light region between the two arms of the V. Fovea large, black-brown, radiating striae very conspicuous. Lateral light bands broad, bordered with white hairs along the outer margins. Abdomen: dorsal surface black-brown, speckled with grey. Median lanceolate stripe yellow, chevrons indistinct. Sides with grey pubescence. Ventral surface grey-black in the male, lighter in the female. Eyes: median eyes of anterior row smaller than laterals, the row is slightly procurved, and shorter than the median row. Clypeus dark olive-brown, as wide

as the diameter of a median eye of the anterior row. Chelicerae dark brown. Mandibulae yellow-brown, lighter at apices, labium darker. Sternum grey-brown, with a lighter central streak. Legs yellow-brown, with distinct annulations on the femora, less distinctly annulated on patellae and tibiae. Tibiae I in males darkened. Chaetotaxy: tibiae I devoid of apical spines, tibiae II with  $v_a'$ . Metatarsi I with apicals ( $1_a$ ). Male palp (fig. 89): tarsal organs in prolateral view with an erect, sharp median apophysis, this apophysis is slender and coiled in ventral view. Epigyne (fig. 93): septum with two adjoining circles, upper spermathecae small.

Dutch records. *Pirata knorri* Becker, 1882<sup>a</sup>, p. 119 (Utrecht, Maastricht); *Pirata Knorrii* van Hasselt, 1886<sup>a</sup>, p. 81; 1890<sup>a</sup>, p. 194.

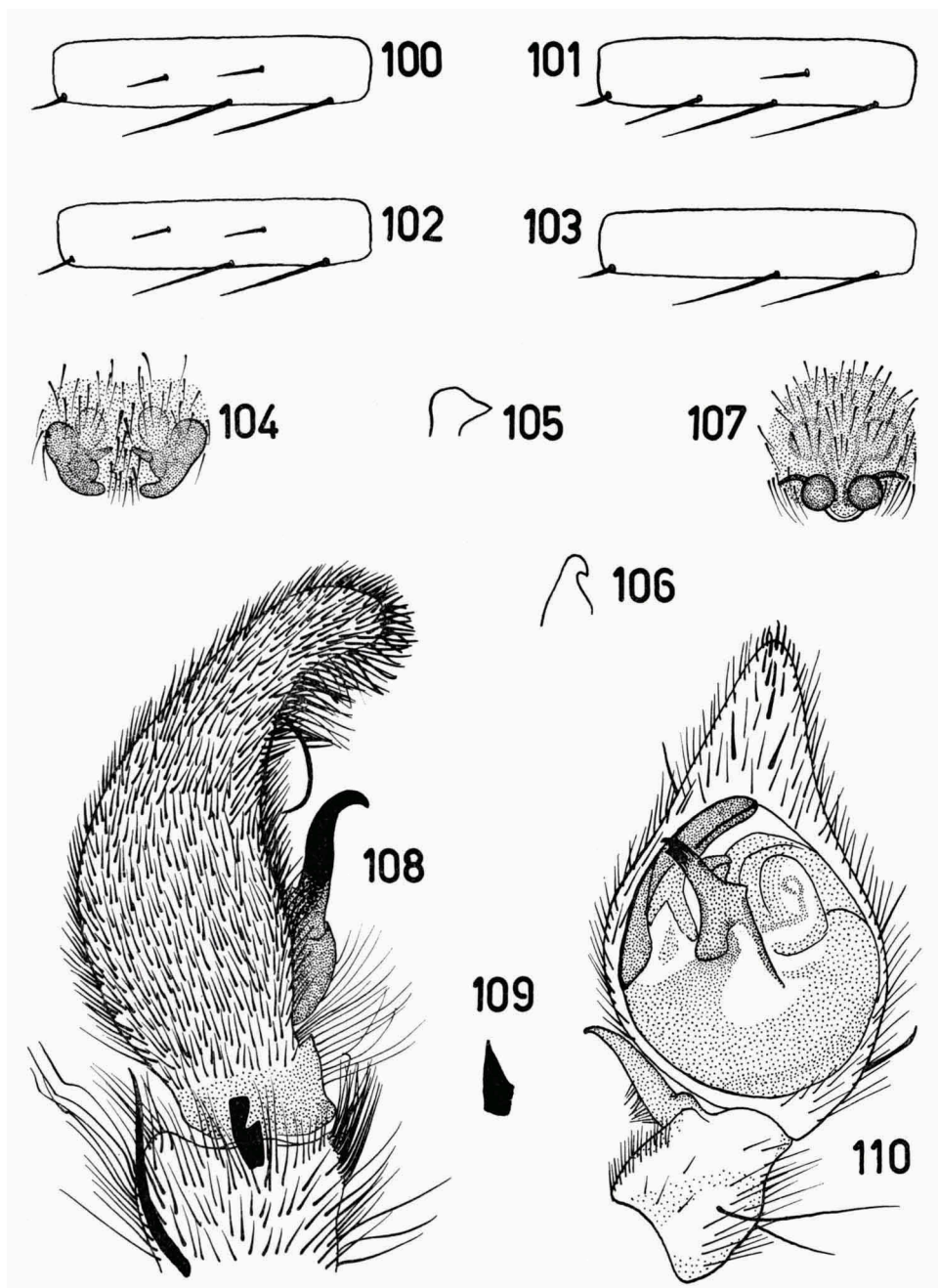
Distribution: Europe, exclusive the British Isles; Russia, Japan. The species was recently recorded from Sweden by Johansson (1943, p. 119). Dutch localities: Utrecht: Utrecht (B.); Limburg: Maastricht (B.).

Occurrence. Apparently very rare, the only Dutch specimens known to me are from collection van Hasselt. According to Dahl (1927, pp. 62, 63) the species is very exigent as to its biotope, and only occurs along shaded torrents with stony banks. Dahl (1908<sup>f</sup>, p. 298) collected adults in May, June, and July, females with cocoons were found in July.

##### 5. *Pirata latitans* (Bl.)

*Lycosa latitans* Blackwall, 1841<sup>b</sup>, p. 612-614; *Pirata latitans* Becker, 1882<sup>a</sup>, pp. 124, 125, Pl. 10 fig. 1; Dahl, 1908<sup>f</sup>, pp. 283, 287, 298-300, fig. 31; Dahl, 1927, pp. 61, 62, 77, figs. 159, 160; Locket & Millidge, 1951, pp. 289, 290, figs. 139C, E; *Lycosa latitans* de Lessert, 1910<sup>c</sup>, pp. 504, 505; Simon, 1937, pp. 1116, 1117, 1139, figs. 1762, 1763.

Length: ♀ 3.6-5.0 mm, I did not see any males of this species. Carapace dark brown, with very indistinct markings. Colour almost uniform, no lateral bands are visible. Margins with thin white pubescence. Abdomen: dorsal surface blackish grey, with yellowish brown median stripe and chevrons, in some specimens pattern very indistinct. Ventral surface yellowish grey-brown, lighter in the central region. Eyes of anterior row of equal diameters, the row is straight, and shorter than the median row. Clypeus brown, width one to two times the diameter of an eye of the anterior row. Chelicerae yellow-brown. Mandibulae yellow, labium darker. Sternum dark brown, lighter towards the centre. Legs olive-brown, rather uniform in colour, without or with very faint annulations. Chaetotaxy: tibiae I in females devoid of spines apically, except for one specimen with  $v_a''$  on tibiae I. Tibiae II with apical  $v_a'$  or without. Metatarsi I in females, and according to Dahl (1908<sup>f</sup>, p. 283, in key) in males too, with apicals ( $1_a$ ). Male palp: tarsal organs in



Figs. 100-103, *Pardosa*, tibiae I, prolateral aspects,  $\times 25$ : 100, *P. hortensis*, 101, *P. lugubris*, 102, *P. amentata*, 103, *P. pullata*.

Figs. 104-107, *Pirata*: 104, 105, *P. piraticus*: 104, epigyne,  $\times 75$ , 105, median apophysis of male palpal organs, ventral aspect,  $\times 65$ ; 106, 107, *P. latitans*: 106, median apophysis of male palpal organs, prolateral aspect,  $\times 65$  (after Dahl, 1908<sup>f</sup>, fig. 31), 107, epigyne,  $\times 75$ .

Figs. 108, 109, *Dolomedes*, male palps, retrolateral aspects,  $\times 20$ : 108, tarsus and tibia of *D. plantarius*, 109, tibial apophysis of *D. fimbriatus* (after Bonnet, 1930<sup>c</sup>, fig. 14).

Fig. 110, tarsus of male palp of *Pisaura mirabilis*, ventral aspect,  $\times 35$ .

prolateral view with an erect, hooked median apophysis (fig. 106, after Dahl, l.c., fig. 31). Epigyne (fig. 107) with two dark circles, which have slender outgrowths on the outer sides, and round, stalked upper spermathecae.

Dutch record. *Pirata latitans* de Jong, 1949, p. 216 (Naardermeer).

Distribution: Europe, except Scandinavia (although the species is known from the Baltic countries and from Nova Zembla). Dutch localities: Noord-Holland: Naardermeer (J.); Zuid-Holland: Nieuwkoop, Reewijk, Voorne; Zeeland: Renesse, Sas van Gent.

Occurrence. Probably not rare in marshy places in our western provinces. *P. latitans*, according to Dahl (1908<sup>f</sup>, p. 300), is never seen running on the surface of the water, as many other species of *Pirata* do. Adults from May till in July, female with cocoon, according to de Jong (l.c.), in June. Tretzel (1954, p. 647, fig. 6) published a phenological curve for the species, suggesting a period of copulation in June and July.

#### FAMILY PISAURIDAE

This family, closely related to the Lycosidae, is distinguishable by the following characters: the abdomen is more tapering behind than in the Lycosidae, the arrangement of the eyes is different (cf. fig. 95), the claws of the tarsi bear more teeth, and the tibiae of the male palps bear apophyses. Biologically, there is a difference in the conduct with the cocoon: females of Pisauridae bear the cocoon in the chelicerae, instead of having it attached to the spinnerets as in Lycosidae. A short time before the hatching of the spiderlings, the female constructs a tent of silk, in which the cocoon is placed.

Key to the genera.

1. Carapace with a median light band, lateral light bands, if present, very close to the margins. Abdomen with a distinct "folium". Inner row of the chelicerae with three teeth (two in very young specimens).  
1. *Pisaura*, p. 67.
- Carapace without a median band, lateral light bands not very close to the margins. Abdomen with two lateral light bands. Inner row of the chelicerae with four teeth (three in very young specimens). 2. *Dolomedes*, p. 69.

#### Genus **Pisaura** Simon

Simon, 1886, p. 354.

Typus generis *Araneus mirabilis* Clerck (1757, pp. 108-113, Pl. 5 fig. 10)  
One dutch species.

*Pisaura mirabilis* (Cl.)

*Araneus mirabilis* Clerck, 1757, pp. 108-113, Pl. 5 fig. 10; *Ocyale mirabilis*

Becker, 1882<sup>a</sup>, pp. 81-84, Pl. 5 figs. 1-12, Pl. 6 figs. 13-17; *Pisaura listeri* Dahl, 1908<sup>f</sup>, pp. 258-267, figs. 21-23; Dahl, 1927, pp. 7, 8, 75, figs. 6-9; Holm, 1947, p. 40, fig. 18, Pl. 8 fig. 90, Pl. 10 fig. 48; *Pisaura mirabilis* de Lessert, 1910<sup>e</sup>, pp. 474, 475; Simon, 1937, pp. 1048, 1051, figs. 1615, 1616; Palmgren, 1943, pp. 6, 7, fig. 2, map 2; Locket & Millidge, 1951, p. 293, figs. 141, 142 A, B.

Length: ♀ 9.0-13.0 mm, ♂ 9.4-10.5 mm. Carapace grey-brown, with whitish pubescence, and black radiating striae. Around the fovea there is a narrow white region, which extends to the posterior eyes in some specimens. Between cephalic and thoracic parts of the carapace a broad dark region is present. Some specimens have two lateral light bands on each side, one half-way between median band and margin, and one along the margin. Abdomen more greyish, long and tapering behind. Pattern, for the greater part consisting of pubescence only, variable; a dorsal light stripe is present in most specimens, grey-brown in colour, and extending to half the length of the abdomen, its greyish border extends to the very top of the abdomen. In some male specimens this median streak is broken into chevrons. Laterally, there are some greyish, rather broad bands, extending to the top of the abdomen, and forming together the peculiar leaf-like figure, which is called "folium". Ventral surface of the same colour as the dorsal surface, with whitish markings, especially in the median region and in the genital area. Eyes small, in characteristic pisaurid configuration. Clypeus brown, very broad, edged laterally by regions with rich white pubescence. Chelicerae reddish brown, with dark streaks. Inner rows with three teeth in larger specimens, with only two in small spiderlings. Mandibulae and labium light brown. Sternum black-brown, with a central light streak. Legs dark brown, uniform in colour but for the darker patches on the ventral surfaces of the femora in some specimens. Male palp (fig. 110) with a long tibial apophysis, bulbus large. Epigyne (fig. 91) large, and very characteristic. Cocoons greyish white, spherical, 5.0-9.0 mm in diameter, containing approximately 200 eggs (although one cocoon, from August 19th, contained only 40 eggs).

Dutch records. *Ocyale mirabilis* Six, 1858<sup>b</sup>, p. 297 (Driebergen); van Hasselt, 1870<sup>c</sup>, p. 30 (Molencate); 1871<sup>b</sup>, p. 46 (Wassenaar); 1876<sup>c2</sup>, p. lii (Hilversum); 1877<sup>e</sup>, p. xxvi (excursion to Domburg, Oost-Capelle, and Woensdrecht<sup>1)</sup>); Becker, 1879<sup>f</sup>, p. xl; 1882<sup>a</sup>, p. 84 (Maastricht, Oirschot, between Hilversum and Amersfoort, vicinity of The Hague); van Hasselt, 1886<sup>a</sup>, p. 78; 1890<sup>a</sup>, pp. 210, 211 (Beverwijk); Bouwman-Buis, 1939, pp.

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1) Van Hasselt published a list of species collected on a trip to these three localities, he did not specify the exact finding-place for *P. mirabilis*.



171-176, figs. 1-5 (Bilthoven); *Dolomedes mirabilis* Snellen van Vollenhoven, 1859, p. 60 (Driebergen); *Ocyale rufofasciata* Six, 1863, p. 127 (Driebergen); *Pisaura mirabilis* Chrysanthus, 1950, pp. 68, 69; 1951<sup>b</sup>, p. 99 (Rijckholt, Gronsveld, Brunssum).

Distribution: palearctic region. Dutch localities: see map, fig. 111.

Occurrence. Widespread and very common in almost all localities provided with a high vegetation such as long grasses, shrubs, and the like. Adults throughout the summer, period of copulation in May. Females with cocoons from May till August.

Courtship and mating habits of this species are described by van Hasselt (1884<sup>c</sup>, pp. 200-204), an account of the life history is given by Bouwman-Buis (1939, pp. 171-176).

#### Genus **Dolomedes** Latreille

Latreille, 1804<sup>a</sup>, p. 135.

Typus generis *Araneus fimbriatus* Clerck (1757, pp. 106, 107, Pl. 5 fig. 9)

Carapace broad, dark brown, with two longitudinal, light lateral bands. These bands are, in some specimens of *D. plantarius*, broken into patches, or are scarcely visible. Abdomen of the same colour as the carapace, with a short median lanceolate stripe, and two longitudinal, lateral light bands, continuous with those of the carapace. Dorsal surface in some specimens with small white spots. Ventral surface grey-brown, with two or four longitudinal light bands. Eyes as in fig. 95. Clypeus wide, two to three times the diameter of an anterior eye. Chelicerae with four teeth in the inner row, three in pulli. Legs robust, yellow. Ventral surfaces of femora darkened in some female specimens. Basal joints, especially femora, with many spines. Male palp: tibia with a characteristic apophysis. Epigyne trapezoid or triangular, vulva with two tubular spermathecae.

*Dolomedes* lives on banks of stagnant waters, and is often seen walking on the surface of the water, and even climbing down the stems of plants below the surface. Its life cycle lasts, according to Dahl (1908<sup>f</sup>, p. 256), two years, but Chrysanthus (1949, p. 136) supposes a shorter period for dutch specimens. Systematical, ecological, and physiological monographs of *Dolomedes* have been published by Bonnet (1930<sup>e</sup>), Palmgren (1939<sup>a</sup>), and Schmidt (1957). Van Hasselt (1858<sup>a</sup>) published an account on the variability in colour in various stages of *Dolomedes*, and its significance for specific discrimination.

## Key to the species.

1. Lateral light bands on carapace distinct, as broad as or broader than the marginal light bands. Ventral surface of abdomen with four longitudinal light bands. Apophysis of the male palpal tibia triangular (fig. 109). Epigyne (fig. 98) trapezoid, with rich pubescence.  
1. *D. fimbriatus*, p. 70.
- Lateral light bands on carapace less broad than marginal dark bands, often broken or absent. Ventral surface of abdomen with two longitudinal light bands. Tibial apophysis of male palp (fig. 108) bifurcate. Epigyne triangular, with thin pubescence (fig. 99).  
2. *D. plantarius*, p. 71.

## Dutch species.

1. *Dolomedes fimbriatus* (Cl.)

*Araneus fimbriatus* <sup>1)</sup> Clerck, 1757, pp. 106, 107, Pl. 5 fig. 9; *Dolomedes limbatus* Becker, 1882<sup>a</sup>, pp. 85, 86, Pl. 7 fig. 2; *Dolomedes fimbriatus* (p.p.) Dahl, 1908<sup>f</sup>, pp. 251, 252-258, figs. 18-20; de Lessert, 1910<sup>c</sup>, pp. 476, 477, figs. 215-217; (p.p.) Dahl, 1927, pp. 8, 9, 75, figs. 10-13; Simon, 1937, pp. 1049, 1050, 1052, figs. 1617, 1618; Holm, 1947, pp. 40-42, figs. 19, 20<sup>a</sup>, Pl. 8 figs. 86-88; (p.p.) Palmgren, 1943, pp. 5, 6, fig. 1, map 1; Chrysanthus, 1949, p. 138, figs. 1B, 2b, c; Locket & Millidge, 1951, pp. 293-295, figs. 142C, D.

Length: ♀ 13.0-15.0-16.0 mm (three females only), ♂ 11.5 mm (one male). Carapace oval, long and convex. Lateral light bands present in all specimens, as broad as or broader than the dark marginal bands. Abdomen nearly as broad as or broader than carapace. Ventral surface with four longitudinal light bands. Legs brown, ventral surfaces of femora darkened in some female specimens. Tibial apophysis of male palp (fig. 109) with straight upper margin, without incisions. Epigyne (fig. 98) trapezoid, with very rich pubescence. Cocoon yellow-brown, spherical, 9.5 mm in diameter, containing nearly 300 eggs.

Dutch records. *Dolomedes fimbriatus* van Hasselt, 1857<sup>b</sup>, p. 41; 1858<sup>a</sup>,

<sup>1)</sup> In the same publication, on an earlier page (p. 100), Clerck described *Araneus undatus*, which seems to be a juvenile of one of the species of *Dolomedes*. According to Bonnet (1930<sup>c</sup>, p. 33) it is probably "un jeune de l'une ou de l'autre espèce et plutôt de *plantarius*"; in his catalogue (1956, p. 1527), however, he places *A. undatus* in the synonymy of *D. fimbriatus*: "*A. undatus* est certainement le jeune de *A. fimbriatus*". Because "il est tout naturel de donner la priorité à *fimbriatus* qui est décrit sur des spécimens adultes", he maintains *fimbriatus* instead of *undatus*. Although this procedure is not supportable nomenclatorically, I follow Bonnet and use the names *plantarius* and *fimbriatus* for our dutch species, because I do not know which one to synonymize with *undatus*.

pp. 164, 166 (prov. Utrecht); Six, 1858<sup>b</sup>, p. 298 (Driebergen, IJsselstein); Snellen van Vollenhoven, 1859, pp. 60, 61, Pl. 5 fig. 2; Becker, 1879<sup>f</sup>, p. xl (prov. Utrecht, Holland, Noord-Brabant, Limburg); van Hasselt, 1886<sup>a</sup>, p. 79 (Westbroek, Wilnis, Tienhoven, Vossegat, Vreeland, Zwolle, Breda, Cuyck, Oirschot, Maastricht); Waage, 1938, p. 181 (St.-Pietersberg); Pinkhof, 1941, p. 228, Pl. 14 (vicinity of Amsterdam); Chrysanthus, 1949, p. 138<sup>1</sup>); 1950, pp. 69, 70; 1957, p. 31 (Wellerlooi); *Dolomedes limbatus* van Hasselt, 1893<sup>c</sup>, p. xxxii (Oisterwijk).

Distribution: palearctic region and some oriental parts of Asia. Dutch localities: Noord-Holland: Amsterdam (P.); Utrecht: Vreeland (v.H.), Tienhoven (v.H.), Oud-Maarseveen, Westbroek (v.H.), Wilnis (v.H.), Vossegat (v.H.), Driebergen (S.), IJsselstein (S.); Overijssel: Dwarsgrachten, Zwolle (v.H.), Denekamp, Enschede; Gelderland: Wooldse Veen; Noord-Brabant: Cuyck (v.H.), Breda (v.H.), Oisterwijk, Oirschot (v.H.), Esbeek, Baarle-Nassau; Limburg: Vlodrop, Wellerlooi, Sint Pietersberg (W.), Maastricht (v.H.).

## 2. *Dolomedes plantarius* (Cl.)

*Araneus plantarius* Clerck, 1757, pp. 105, 106, Pl. 5 fig. 8; *Dolomedes fimbriatus*<sup>2</sup>) Becker, 1882<sup>a</sup>, pp. 86-88, Pl. 7 fig. 1; (p.p.) Dahl, 1908<sup>f</sup>, pp. 252-258; (p.p.) Dahl, 1927, pp. 8, 9, 75; (p.p.) Palmgren, 1943, pp. 5, 6, fig. 1, map 1; *Dolomedes plantarius* de Lessert, 1910<sup>c</sup>, p. 477, 478, figs. 218, 219; Simon, 1937, pp. 1051, 1052; Holm, 1947, p. 42, fig. 20<sup>b</sup>, Pl. 8 fig. 89; Chrysanthus, 1949, p. 138, figs. 1A, 2a, 3a.

Length: ♀ 15.0-21.0 mm, ♂ 21.0 mm (one male only). Carapace oval, broad and flattened. Lateral light bands absent in some specimens, broken into patches in others, if present, they are not nearly as broad as the dark marginal bands. Abdomen in males less broad than the carapace. Ventral surface with two longitudinal light bands. Legs brown. Male palp (fig. 108): tibial apophysis bifurcate. Epigyne nearly triangular, with rather thin pubescence (fig. 99). Cocoon yellow-brown, spherical. Two cocoons measured 13.0 and 16.0 mm in diameter, containing 575 eggs and nearly 600 pulli respectively.

Dutch records. *Dolomedes plantarius* van Hasselt, 1858<sup>a</sup>, p. 166 (prov. Utrecht); 1886<sup>a</sup>, p. 79 (Westbroek, Wilnis, Tienhoven, Vossegat, Vreeland);

1) Chrysanthus's localities are not separated as to species. He recorded the captures of "*Dolomedes*" from Oisterwijk, Dwarsgracht (Ov.), Vlaarding, Nieuwkoop (Z.Holl.), Plasmolen, Denekamp, Ginniken, Eerbeek (Gld.), Rijssen (Ov.), Kortenhoeft (N.Holl.), Ankeveen (N.Holl.), Gagelpolder (Utr.), Enschede, Terheyden (N.Br.), and Helena-veen (N.Br.).

2) Judging from Becker's description of the male.

Chrysanthus, 1949, p. 138<sup>1)</sup>; *Dolomedes fimbriatus* 2) Becker, 1882<sup>a</sup>, p. 87 (Utrecht, Vreeland, Oirschot, Maastricht).

Distribution: palearctic region (the species was recently recorded from Britain by Duffey, 1957), some oriental parts of Asia. Dutch localities: Noord-Holland: Ankeveen; Zuid-Holland: Nieuwkoop; Utrecht: Vreeland (B., v. H.), Westbroek (v. H.), Tienhoven (v. H.), De Gagel, Utrecht (B.), Wilnis (v. H.), Vossegat (v. H.); Friesland: Eernewoude; Overijssel: Waneperveen; Noord-Brabant: Oirschot (B.); Limburg: Maastricht (B.).

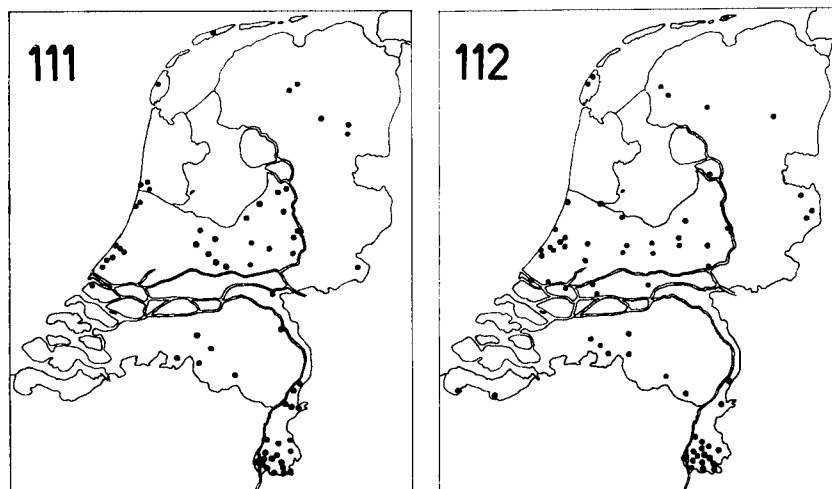


Fig. 111, distribution of *Pisaura mirabilis* in the Netherlands, 112, distribution of *Pardosa amentata* in the Netherlands.

### COLLECTION VAN HASSELT

List of dutch Lycosidae and Pisauridae, present in the collection of van Hasselt, with the synonyms used by van Hasselt (1886<sup>a</sup>, 1886<sup>b</sup>, 1890<sup>a</sup>, 1898<sup>a</sup>) in his catalogue of dutch spiders.

#### I. Lycosidae 3).

##### 1. *Alopecosa* Simon (sub *Tarentula*).

1. *A. cuneata* (Cl.), no. 790: 3 ♂♂; 791: 2 ♀♀, 1 ♀ juv.; 792: 1 ♀, 1 cocoon.

1) See foot-note 1 on p. 71.

2) Judging from Becker's description of the male.

3) Vial no. 826 contains 14 cocoons, sub *Lycosa vigilans*. These cocoons vary widely in shape, size, and colour, and they certainly do not belong to one and the same species. It is impossible, however, to identify them. *Lycosa vigilans* L. Koch (1881) is, according to Dahl (1908<sup>f</sup>, pp. 320, 519), a primary synonym of *Trochosa stigmosa* Thorell (1875), a species from Central Europe, now placed in the genus *Arctosa* C. L. Koch.

2. *A. pulverulenta* (Cl.), no. 785: 1 ♂, 2 ♂ s. ad.; 786: 1 ♀ juv.
3. *A. trabalis* (Cl.), no. 787: 2 ♂ s.; 788: 2 ♀ s.; 789: pulli ?<sup>1)</sup>.
4. *A. fabrilis* (Cl.), no. 796: 2 ♂ s.; 797: 2 ♀ s.; 798: 1 ♀ juv., 2 ♂ s. ad.
5. *A. accentuata* (Latr.), no. 793: 3 ♂ s.; 794: 2 ♀ s., 1 ♀ juv.; 795: 1 ♀, 1 ♂ s. ad.; sub *T. andrenivora*.
6. *A. cursor* (Hahn), no. 784: 2 ♀ s. juv.
7. *A. inquilina* (Cl.), no. 799: 1 ♀.
2. *Xerolycosa* Dahl (sub *Tarentula*).
1. *X. nemoralis* (Westr.), no. 781: 2 ♂ s.; 782: 3 ♀ s.; sub *T. miniata*; no. 783: 2 ♂ s.
3. *Trochosa* C. L. Koch.
1. *T. ruricola* (de G.), no. 773: 2 ♂ s., 1 ♂ s. ad. ?; 774: 2 ♀ s., 1 juv. ?; 775: 1 ♀; 776: 1 cocoon ?, pulli ?
2. *T. terricola* Thor., no. 777: 2 ♂ s.; 778: 2 ♀ s.; 779: 1 cocoon ?
3. *T. robusta* (Simon), no. 780: 1 ♀, 1 ♂.
4. *Arctosa* C. L. Koch (sub *Trochosa*).
1. *A. leopardus* (Sund.), no. 770: 1 ♂, 1 ♀ juv.; no. 825: 1 juv.; sub *Lycosa vigilans*.
2. *A. perita* (Latr.), no. 771: 3 ♂ s., 1 ♂ s. ad.; 772: 4 ♀ s.; sub *T. picta*.
5. *Pardosa* C. L. Koch (sub *Lycosa*).
1. *P. monticola* (Cl.), no. 819: 3 ♂ s.; 820: 2 ♀ s.; 821: 1 ♀, 5 cocoons?
2. *P. palustris* (L.), var. *herbigrada* Blackw., no. 822: 3 ♀ s., 1 cocoon; sub *L. herbigrada*.
3. *P. paludicola* (Cl.), no. 803: 1 ♂ s. ad.; 804: 1 ♀.
4. *P. amentata* (Cl.), no. 800: 1 ♂; 801: 2 ♀ s.; 802: 1 ♀, 1 cocoon; no. 806: 1 ♀ juv., 1 ♂ juv., 2 juv.; sub *L. annulata*; no. 807: 1 ♀, 1 cocoon; sub *L. hortensis*; no. 823: 1 ♀ juv.; sub *L. agricola*.
5. *P. nigriceps* (Thor.), no. 816: 1 ♂; 817: 2 ♀ s.; 818: 2 ♀ s., 5 cocoons ?
6. *P. lugubris* (Walck.), no. 808: 3 ♂ s.; 809: 2 ♀ s.; 810: 3 cocoons ?; no. 811: 1 ♂ s. ad.; sub *L. pullata*.
7. *P. prativaga* (L. Koch), no. 805: 1 ♂ s. ad.; sub *L. annulata*; no. 813: 1 ♂; 814: 4 ♀ s. juv., 3 ♂ s. juv.; sub *L. riparia*; no. 815: 1 ♀, 1 ♂.
8. *P. pullata* (Cl.), no. 812: 2 ♀ s., 1 cocoon.
6. *Aulonia* C. L. Koch.
1. *A. albigana* (Walck.), no. 824: 1 ♀, 1 cocoon; 827: 3 ♂ s., 1 ♀ s. ad.; 828: 2 ♀ s., 1 ♀ juv.
7. *Pirata* Sund.
1. *P. piraticus* (Cl.), no. 766: 2 ♂ s.; 767: 3 ♀ s.; 768: 2 ♀ s., 2 cocoons, 15 pulli ?

1) ? = identification doubtful.

2. *P. piscatorius* (Cl.), no. 764: 1 ♀, 1 cocoon; no. 766: 1 ♂; sub *P. piraticus*.
3. *P. hygrophilus* Thor., no. 765: 2 ♀ ♀ s. ad., 4 ♂ ♂ s. ad.
4. *P. knorri* (Scop.), no. 769: 1 ♀, 1 ♂; sub *P. Knorrii*.

## II. Pisauridae.

### 1. *Pisaura* Simon (sub *Ocyale*).

1. *P. mirabilis* (Cl.), no. 748: 1 ♂; 749: 1 ♀; 750: 2 ♀ ♀; 751: 2 ♀ ♀; 752: 1 ♀; 753: pulli; 754: 2 ♀ ♀, 2 cocoons.

### 2. *Dolomedes* Latr.

1. *D. fimbriatus* (Cl.), no. 755: 1 ♂ s. ad.; 757: 1 ♀, 1 ♀ juv., 1 ♂ s. ad.; 758: 1 cocoon ?; no. 759: 1 ♀ s. ad., 1 juv.; sub *D. plantarius*.
2. *D. plantarius* (Cl.), no. 756: 1 ♀; sub *D. fimbriatus*; no. 760: 1 ♂; 761: 1 ♀; 763: 1 ♀, 2 cocoons?

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<sup>1)</sup> not in Bonnet (1945).

<sup>2)</sup> in Bonnet (1945, p. 279) sub Bouman.

<sup>3)</sup> in Bonnet (1945, p. 289) sub Buis.

<sup>4)</sup> in Bonnet (1945, p. 323) sub De Geer (cf. Bonnet, l.c., p. 81). As Geer is a geographic name (= Jeker), evidently the correct orthography is de Geer, and the name has to be listed under G.

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1) 1885<sup>b</sup>, according to Bonnet (1945, p. 573). In the publication (p. 345), however, I read Mars 1886.

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