

THE SUBSPECIES OF THE PSEUDOSCORPION *DACTYLOCHELIFER*

LATREILLEI IN THE NETHERLANDS (PSEUDOSCORPIONES: CHELIFERIDAE)

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Pseudoscorpions have been rather poorly investigated in the Netherlands. The main cause of this is the small size of the animals and their cryptic habits. When studied in close range they prove to be beautiful creatures, resembling true scorpions because of their pincerlike modified pedipalps. In this study the occurrence of *Dactylochelifer latreillei* in the Netherlands has been clarified. Both the 'southern' subspecies *latreillei* and the 'northern' subspecies *septrionalis* occur in the Netherlands, the nominate subspecies in the interior of the country, whereas *septrionalis* is exclusively coastal.

INTRODUCTION

In a faunistic survey of a collection of pseudoscorpions from the Netherlands Van der Hammen (1969) reported *Dactylochelifer latreillei* (Leach, 1817) (fig. 1) as a species. Data of subspecies were not available. The present paper reports a line of demarcation in the length/depth ratio of the male first pedal tarsus between the nominate subspecies *D. l. latreillei* and the 'northern' subspecies *D. l. septrionalis* (Beier, 1932) in Dutch specimens. The motive to start this study has been that relying on existing literature (Beier 1932, 1963) identification to subspecies level (based on features of the male first pedal leg) of specimens from the Westfrisian island of Terschelling ended at first in a dead lock. A sample was studied out of a collection of some hundreds of specimens taken from the nature reserve 'De Boschplaat', situated in the eastern part of the island, by Van Heerdt and others in august 1957. This collection was consigned to the present writer and has now been transferred to the National Museum of Natural History in Leiden. This locality was already known as a result of a three-year biocenological investigation on the island (1950-1952) by Van Heerdt & Mörzer Bruyns (1960).

The depth/length ratio of the male first pedal tarsus found in the studied males from 'De Boschplaat' was 2.80 (2.60-2.93). This result doesn't exclude either species, since Beier (1932a,

1932b, 1963) used in making a separation between the subspecies from central and southern Europe, and northern Europe, of respectively 2.7 and 2.9. Also the slenderer and longer tarsal claws of the forelegs in *septrionalis* turned out to be a difficult character without any well identified specimens for comparison. So the only remaining character was the well marked sinus in the extensor margin of the male first pedal tarsus, reaching from the distal half to the distal third of length which should be present in *latreillei* and absent in *septrionalis*. Starting from this principle identification of the material from 'De Boschplaat' would lead exclusively to the nominate subspecies.

It appears however that voucher specimens from the south coast of Finland, present in the National Museum of Natural History in Leiden, and identified by Beier as *septrionalis* (fig. 5b), demonstrates a length/depth ratio of the first pedal tarsus of: 2.84 (2.79-2.91), values agreeing practically with those of the studied material from eastern Terschelling: 2.80 (2.69-2.93) (fig. 4a, 5a). Further examination was done of the male first pedal tarsus with other material present in this museum and in a private collection, from seven different localities along the Dutch and Belgian dune coast and from two inland localities. The ratios mentioned for these coastal areas and those of the material from Terschelling are compared with the corresponding ratios of the inland

material. A similar comparison has taken place with reference to the length of the longest and most curved inner claw of the first leg. The results are presented in table 1 and figure 2 and 3.

Summarizing the ratios for the eight Dutch and one Belgian dune coast locations (35 males examined), gives a length/depth ratio of the first pedal tarsus of 2.825 (2.69-2.99) versus 2.52 (2.45-2.60) for the two inland locations (eight specimens examined). It suggests that the subspecies *septentrionalis* and the nominate subspecies *latreillei* may be separated on account of these differences in depth/length ratio of the male first pedal tarsus.

A recapitulation of the length of the inner claw of the male first pedal tarsus for the same localities demonstrates the following overlapping values: 0.125 (0.10-0.14) (coastal areas) versus 0.10 (0.09-0.11) (inland areas), from which only may be concluded that the male inner claw on the average is somewhat longer in *septentrionalis* than in *latreillei*. In case of the Finnish material (length: 0.13 (0.12-0.13) the difference is more distinct.

METHODS

The methods used here are according to Van den Tooren (2001). Measurements are in mm, ratios and counts with minimum and maximum values between brackets, number of specimens, slide numbers and aberrant data in parentheses. L = length, W = width, D = depth, P = 'pseudo-tactile' seta. Abbreviations used to indicate trichobothria on palpal fingers (Chamberlin 1931): movable finger (exterior surface): t = terminal, st = subterminal, sb = subbasal, b = basal; fixed finger (exterior surface): et = exterior terminal, est = exterior subterminal, esb = exterior subbasal; eb = exterior basal; fixed finger (interior surface): it = interior terminal; ist = interior subterminal; isb = interior subbasal; ib = interior basal.

SYSTEMATICS

Family *Cheliferidae* Hagen, 1879

Subfamily *Cheliferinae* E. Simon, 1879

Tribus *Dactylocheliferini* Beier, 1932

Genus *Dactylochelifer* Beier, 1930

Diagnosis (according to Beier 1963). The most striking character (in short) to separate this genus from the remaining six other European genera of the *Cheliferidae* are: rather slender pedipalps, cheliceral flagellum of three setae, galea of one seta, pedal tarsal claws not cleft and subterminal seta of pedal tarsi not toothed; then in male: abdominal tergites without or with only obscure lateral keels, coxal sacs with atrium in modified fourth pair of pedal coxae, tibia and tarsus of forelegs strongly modified; in female: one medial cribriform plate in genital area.

Dactylochelifer latreillei latreillei

Material

Nijmegen, 25.VIII.1929: 1 ♂ (Blauw). Heerlen, 1959: 7 ♂ and 5 ♀ (Br. Arnoud).

Diagnosis

According to Beier (1963) the nominate subspecies differs from the 'northern' subspecies *septentrionalis* (Beier 1932) by having a length/depth ratio of the male first pedal tarsus of 2.7 versus 2.9, respectively. Moreover the middle part of the extensor margin of the male first pedal tarsus in *latreillei* would be weakly rounded and widened and behind it more strongly narrowed, in contrast to *septentrionalis* in which the middle part of the extensor margin of the male first pedal tarsus is hardly widened and less narrowed behind it. As noticed before these features are not adequate to identify Dutch specimens of *Dactylochelifer latreillei* to the subspecies level. In this study it is pointed out that a useful character to determine the subspecies *latreillei* is a length/depth ratio of the male first pedal tarsus of 2.52 (2.45-2.60) versus 2.85 (2.69-2.99) for *septentrionalis*.

Description

Male

Description based on three specimens from Heerlen (fig. 4b).

Carapace, abdomen and pedipalps (in not conserved material) scarlet orange, chelicerae and legs much paler of colour, more orange-like.

Entire body and appendages with the exception of chelicerae equally finely granulated. Tergites, sternites (especially 11th sternite) and posterior part of carapace closely stuck with numerous microfissures.

Body L 2.65 (2.61-2.67).

Carapace L 0.825 (0.80-0.84), greatest width 0.81 (0.79-0.84), L/W 1.02(1.00-1.05); a distinct transverse groove about half way along the carapace length, a second groove situated in the basal part of carapace much less distinct; Eyes: one pair, well developed; anterior margin with two small medial setae and on each side one or two lateral setae, posterior margin with up to six setae on either side of midline, setae on the face somewhat longer than marginal setae.

Abdomen tergites I-XI and sternites III-X weakly longitudinally divided, division often indistinct; chaetotaxy, tergites I-XI (of both entire scuta): 5.7(5-6)/5.3(5-6): 7.7(6-9)/6.3(6-7): 7.0(6-8)/6.3(6-7): 7.7(7-8)/7.0(6-8): 7.3(7-8)/8.7(8-9): 8.3(8-9)/9.0(8-9): 8.7(8-9)/9.0(7-12): 8.3(8-9)/9.3(9-10): 8.7(7-10)/8.0(5-9): 6.7(5-9)/8.3(8-9): 1P4/4-5P1-2; sternites IV-XI (of both entire scuta): 6.0(5-7)/6.33(6-7): 7.33(7-8)/6.67(6-8): 8.0(7-8)/8: 8/7.33(7-8): 7.0(6-8)/7.7(7-8): 5.67(4-7)/5.67(4-7): 5.67(5-6)/6.33(5-8): 2P2-4/2-3P1-2 (P = 'pseudo-tactile' seta).

Chelicera 0.245(0.24-0.25)/0.13, L/W 1.84 (1.82-1.87), and 0.28 to 0.29 x carapace L; movable finger L 0.18(0.17-0.19); galea L 0.03-0.035, straight with tapering stem, two small rami on top and no or two lateral rami near distal end; movable finger with conical subapical lobe with rounded top; serrula interior, arising antio-ventrally near the base of the fixed finger, consists of four or five very narrow ligulate blades ending apically in distinct lobes and forming, together with about seven larger simple blades, a velum

by lateral fusion; serrula exterior, arising antio-dorsally near the base of the movable finger, consists of a longitudinal contiguous row of 19 translucent ligulate blades of about same length, with the exception of posteriormost one, which is about 1½ times as long; flagellum of three thorny setae, anteriormost one longest, length of setae respectively: 0.07, 0.05-0.06 and 0.035-0.05; apical tooth of fixed finger with two small knobs on the inside margin followed by two to four retroconical teeth of which usually only the first one is sclerotic. Chaetotaxy: five setae on exterior surface of hand and one on movable finger near finger tip.

Pedipalp trochanter 0.40(0.40-0.41)/0.24, L/W 1.64(1.64-1.73); femur 0.74(0.72-0.76)/2.07(2.0-2.1), L/W 3.54(3.51-3.57); patella 0.66/0.25(0.24-0.26), L/W 2.63(2.56-2.69); chela without pedicel 1.06(1.05-1.07)/0.33, L/W 3.25(3.22-3.26); chela with pedicel 1.14(1.12-1.15)/0.33, L/W 3.48(3.44-3.50); hand without pedicel 0.54(0.53-0.55)/same, L/W 1.65(1.63-1.67); same/0.28 (1), L/W 1.89; hand with pedicel 0.63(0.62-0.65)/0.33, L/W 1.92(1.88-1.96); same/0.28 (1), L/D 2.18; movable finger L 0.58(0.57-0.59), 1.07(1.06-1.08) x L hand without pedicel, and 0.92(0.91-0.92) x L hand with pedicel. Fixed finger with 40 (1) and movable finger with 43 (1) marginal teeth. Locations of trichobothria and nodus ramosus on fixed finger (in 2♂), given as distances from base apical tooth on outside curve and expressed as ranges: et 0.09/0.13, it 0.20/0.22, ist 0.31/0.34, est 0.295/0.34, isb 0.45/0.47, esb 0.45/0.51, ib 0.47/0.49, eb 0.49/0.53, nodus ramosus 0.19/0.23. These data show that trichobothria and nodus ramosus of palpal fixed finger are located as follows: et and it within the distal third of finger length (arbitrarily considered equal to movable finger length), ist and est very close together about halfway the finger length, isb, ib, esb and eb also very close together near finger base, and nodus ramosus at about same level as it. Locations of trichobothria and nodus ramosus on movable finger (in 2♂) given as before: t 0.27/0.28, st 0.37/0.385, sb 0.47/0.50, b 0.50/0.53, and nodus ramosus 0.19/0.245.

Interpreting these measures it appears that the trichobothria and nodus ramosus of the movable finger are located as follows: t within distal third of finger length, st about halfway finger length, sb and b in basal part of finger and separated from each other by a distance of about 1.5 areolar diameter, and nodus ramosus somewhat distal to the level of t.

Legs first and second leg with regard to third and fourth leg with a distinctly different femoral articulation (heterofemorate), i.e. forelegs supplied with a mobile oblique ginglymous, whereas hind-legs only have an oblique immobile symphysis; tarsal claws are unequal, the inner claw is stouter and more regularly curved than the about 1/3 slenderer and somewhat shorter outer claw; in addition the outer claw of the first pair of legs is provided mediodistal with a longitudinal row of up to about 15 small sharp conical teeth forming a comb. These teeth area are often worn off.

First leg (fig. 4b) trochanter 0.16(0.16-0.17)/0.14 (0.13-0.14), L/D 1.21(1.15-1.28); femur 0.245(0.24-0.25)/0.14(0.14-0.15), L/D 1.73(1.67-1.81); patella 0.32(0.31-0.33)/0.14(0.13-0.14), L/D 2.33(2.21-2.42); femur + patella 0.435(0.43-0.44)/0.14(0.14-0.15), L/D 3.045(2.92-3.11); tibia 0.26(0.25-0.27)/0.12(0.11-0.12), L/D 2.23(2.19-2.27); tarsus 0.29/0.11(0.11-0.115), L/D 2.56(2.54-2.57); L inner claw 0.10(0.09-0.11); L arolium from base inner claw 0.09/0.095 (2), and 0.87/0.92 (2) x L inner claw. Marginal 'pseudo-tactile' seta at about 2/3 L leg from base.

Fourth leg trochanter 0.27(0.26-0.27)/0.14 (0.13-0.14), L/D 1.965(1.90-2.055); femur 0.22 (0.21-0.22)/0.15(0.15-0.16), L/D 1.42(1.39-1.46); patella 0.50(0.49-0.505)/0.19(0.19-0.20), L/D 2.55 (2.47-2.59); femur + patella 0.62(0.60-0.635)/0.195 (0.19-0.20), L/D 3.17(3.07-3.26); tibia 0.435(0.42-0.45)/0.12, L/D 3.64(3.59-3.71); tarsus 0.38(0.375-0.39)/0.09, L/D 4.14(4.06-4.24); L inner claw 0.08(0.07-0.08); arolium L 0.07/0.07 (2) from base inner claw, and 0.86/0.93 (2) x L inner claw. Marginal 'pseudo-tactile' seta at about 3/4 L leg from base.

Chaetotaxy and internal structure of male genital area anterior operculum with up to about 18

setae, anterior lip supplied with a cluster of about 20 to 25 curved setae in its centre, passing to each side into a row of about 10 acuminate lateral setae, posterior operculum with about six scattered setae on face and a row of four setae along posterior margin on each side of the midline.

A terminally rounded stratum convolutum on the median line is reaching from the posterior part of the posterior operculum or from halfway sternite iv next to the anterior margin of the anterior operculum, while an obscure weakly pigmented tridental rod of the stratum convolutum extends to about halfway the length of the latter. A median accessory gland, lateral genital sacs and well-developed coxal sacs are present.

Female

Description based on one specimen (RMNH colnr. 177-8) from Heerlen (fig. 6a).

Except different genitalia and a larger body (3.50 versus average 2.65), female and male demonstrate differences respectively in the length/depth ratio of next segments of the first leg: L/D trochanter 1.375 versus average 1.21; L/D patella 2.52 versus average 2.33; L/D femur + patella 3.27 versus average 3.045; L/D tibia 2.98 versus average 2.23; L/D tarsus 4.24 versus average 2.56; as well as in the length of the inner claw 0.07 versus average 0.10, and the arolium 0.07 versus 0.09/0.095. Besides in female no medial distal row of small teeth (forming a comb) on the outer claw is present.

Body L: 3.50.

Carapace 0.94/greatest W 0.96, L/W 0.97; eyes: one pair, well developed; anterior margin of carapace with two medial setae and on each side two lateral setae, posterior margin with respectively six setae to the left and seven setae to the right from midline. Abdomen: tergites 1-x1 divided, but division of sternites iv-x1 only obscure; chaetotaxy tergites 1-x1 (of both entire scuta): 5/5: 6/6: 5/6: 7/6: 8/8: 7/8: 8/7: 8/10: 8/8: 3P/3P3 (P = 'pseudo-tactile' seta); chaetotaxy of sternites v-x1 (of both entire scuta): 4/4: 6/6: 6/6: 8/8: 7/7: 7/7: 6/6: 2P2/2P2. Each scutum of sternite x1 with about 50 scattered microfissures and one lyrofissure.



Figure 1. *Dactylochelifer latreillei septentrionalis*. Photo Chris Molin.

Figuur 1. *Dactylochelifer latreillei septentrionalis*. Foto Chris Molin.

Chelicera 0.28/0.15, L/W 1.93, and 0.30 x carapace L; movable finger L 0.17; galea L 0.04, thick set with six short rami on top; serrulae as in ♂, serrula exterior with 19 blades; flagellum about as in ♂, length thorny setae respectively 0.08, 0.075 and 0.06, the anteriormost one with at least four small spines in the distal half of anterior margin; teeth on fixed finger and subapical lobe on movable finger as in ♂. Chaetotaxy as in ♂. *Pedipalp*: trochanter 0.42/0.27, L/W 1.58; femur 0.78/0.24, L/W 3.29; patella 0.74/0.27, L/W 2.74; chela without pedicel 1.19/0.40, L/W 3.0; chela with pedicel 1.28/0.40, L/W 3.24; hand without pedicel 0.625/0.40, L/W 1.57; same/0.33, L/D 1.91; hand with pedicel 0.74/0.40, L/W 1.86; same/0.33, L/D 2.26; movable finger L 0.63, 1.01 x L hand without pedicel, and 0.85 x L hand with pedicel; fixed finger with about 40 (plus six less developed) basal marginal teeth, movable finger with 44 marginal teeth. Locations of trichobothria and nodus ramosus on fixed finger given as in ♂: et 0.10, it 0.21, est 0.33, ist 0.35, isb 0.51, esb 0.51, eb 0.53, ib 0.52, nodus ramosus 0.19, i.e. et and it in distal third of finger length (arbitrarily considered equal to movable finger length), est and ist close together about halfway finger length,

isb, esb, ib and eb very close together near finger-base, and nodus ramosus at about same level as it. Locations of trichobothria and nodus ramosus on movable finger given as in ♂: t 0.31, st 0.36, sb 0.48, b 0.53, nodus ramosus 0.20, i.e. t about halfway finger length, st at about 3/5 finger length from fingertip, sb and b close to finger base, and nodus ramosus distal to t.

Legs differentiation of femoral articulation in fore- and hind legs as in ♂.

First leg (fig. 6a): trochanter 0.19/0.14, L/D 1.375; femur 0.26/0.15, L/D 1.74; patella 0.36/0.14, L/D 2.53; femur + patella 0.49/0.15, L/D 3.27; tibia 0.32/0.11, L/D 2.98; tarsus 0.34/0.08, L/D 4.24; L inner claw 0.07; L arolium from base inner claw 0.07, and 0.96 x L inner claw. Outer claw about 1/7 slenderer than inner claw. Marginal 'pseudo-tactile' seta about 7/8 L leg from base.

Fourth leg trochanter 0.34/0.16, L/D 2.06; femur 0.255/0.16, L/D 1.58; patella 0.58/0.21, L/D 2.78; femur + patella 0.73/0.21, L/D 3.51; tibia 0.51/0.13, L/D 3.97; tarsus 0.42/0.09, L/D 4.49; L inner claw 0.08; L arolium 0.065 from base inner claw, and 0.86 x L inner claw. Outer claw scarcely perceptible slenderer. Marginal 'pseudo-tactile' seta at about 2/3 L leg from base.

Chaetotaxy and internal structure of female genital area anterior operculum on both sides of midline with ten setae, and posterior operculum on both sides of midline with three setae; two big medial cribriform plates close together, and on each side of midline a transverse very small oval plate.

Dactylochelifer latreillei septentrionalis

Material (coastal areas)

Finland. Island about 100 km SW of Helsinki, second flood-mark, near Zoological Station Tvärminne, 17.VIII.1954: 3 ♂ (115-1-3), 2 ♀ and 5 nymphs (Exc. Leyden Biologists).

The Netherlands. Schiermonnikoog, dunes, no date: 1 ♂ (3) (Berg). Terschelling, 'de Boschplaat', 9.IX.1952: 1 ♂ (320-1) and 1 ♀, in marram tuffets (*Ammophila arenaria* (L.)) and under sea-buck-thorn (*Hippophae rhamnoides* L.) in

	Length/depth ratio of male first pedal tarsus	Length inner claw of male first pedal tarsus
Inland		
Nijmegen (n=1)	2.45	0.11
Heerlen (n=7)	2.53 (2.45-2.60)	0.10 (0.09-0.12)
Coastal		
Tvärminne (Finland) (n=3)	2.84 (2.79-2.90)	0.13 (0.12-0.13)
Schiermonnikoog (n=1)	2.98	0.13
Terschelling East (n=10(+1))	2.80 (2.69-2.93)	0.12 (0.10-0.135)
Terschelling West (n=1)	2.92	0.13
Texel (n=2)	2.875 (2.84-2.91)	0.13 (0.12-0.14)
Huisduinen (n=1)	2.80	0.13
Schoorl (n=1)	2.84	0.13
Goedereede (n=15)	2.83 (2.70-2.99)	0.13 (0.12-0.14)
Renesse (n=3 cq. 2)	2.79 (2.71-2.86)	0.12 (0.11-0.13)
Koksijde (n=1) (near Belgian/French border)	2.81	0.125

Table 1. Length/depth ratio of male first pedal tarsus and length of the inner claw of male first pedal tarsus of *Dactylochelifer latreillei latreillei* from two inland localities and *Dactylochelifer latreillei septentrionalis* from ten coastal localities.

Tabel 1. Lengte/hoogteverhouding van de tarsus van de eerste voorpoot bij het mannetje en de lengte van de binnenste tarsale klauw van de eerste voorpoot bij het mannetje van *Dactylochelifer latreillei latreillei* van twee in het binnenland gelegen locaties en van *Dactylochelifer latreillei septentrionalis* van tien langs de kust gelegen locaties.

sea-strip (Leyden Biologists); same, VIII.1957, some hundreds of specimens in leaf sheaths of dry dead marram tuffets, 50-100 m from flood-mark (Van Heerdt); same, 15.VIII.1982: 1 protonymph (431) (Molin); Hoorn, dunes, underneath bark dead branch, 13.VII.1982: 1 ♀ (433) (Molin); Midsland, on lower side of decayed wooden pole, 15.VII.1979: 1 tritonymph (430) (Molin); Noordvaarder, 23.VII.1982: 1 ♀ (429) (Molin); same, 15.X.2003: 1 ♂ (67) and 1 ♀ (Weyerman/Berg). Texel, Slufter, 7.V.1949: 1 ♂ (179-1) and 1 ♀ (Exc. RMNH); same, small dunes at the north side, no date: 1 ♀ (14) (Berg); same, underneath flood-mark, 29.IX.1997: 1 ♀ (45) (Berg); same, in marram tuffet, 10.IX.1998: 1 ♂ (86) (Berg). Huisduinen, boundary dune/pasture, 8.VII.1950: 1 ♂ (175-1) and 1 tritonymph (Roosdorp & Delfos). Schoorl, sea-strip, no date: 1 ♂ (22) (Berg). Noordwijk/Katwijk, dunes, 22.IX.1943: 1 ♀ (176) (Vervoort). Katwijk, 7.IX.1935: 1 ♀ (180) (Van der Maaden). Wassenaar, Meyendel (Populus 2), no date: 1 ♀ (321). Goedereede (Goeree), De Kwade Hoek, landside sea-strip,

23 and 27.VII.1978: 15 ♂ (374-1/15) and 8 ♀ (De Jong); same, underneath board in drift-zone dunes, 1.IX.1984: 1 ♀ (432) (Molin). Renesse (Schouwen), in concrete block-house behind the dunes, 16.V.1949: 1 ♂ (173) (Vervoort); same, 'Verklikkerduinen', 15.V.1949: 1 ♂ (174-1) + 2 ♀ (Vervoort). Jacobahaven (Noord-Beveland), in marram tuffet, no date: 1 tritonymph (20) (Berg). Belgium. Koksijde, coast, about 6 km from Belgian/French border, 9.IX.1951: 1 ♂ (111) (Meeuse).

Diagnosis
According to Beier (1963) the subspecies *Dactylochelifer latreillei septentrionalis* would differ from the nominate subspecies *Dactylochelifer latreillei latreillei* by having a length/depth ratio of the male first pedal tarsus of 2.9 versus 2.7 in *latreillei*, and further an extensor margin of the male first pedal tarsus being scarcely widened in its middle part and less narrowed behind it, versus weakly rounded and widened and behind it more strongly narrowed in *latreillei*.

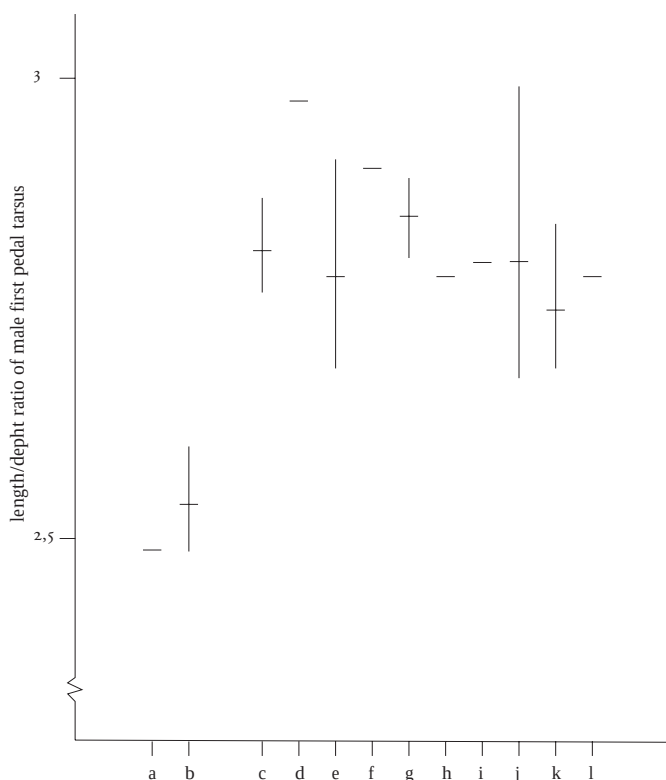


Figure 2. Identification of the nominate subspecies *Dactylochelifer latreillei latreillei* from the Netherlands (a-b) and the subspecies *Dactylochelifer latreillei septentrionalis* from the Netherlands (d-k) and Belgium (l), based on the length/depth ratio of the male first pedal tarsus. Material of *septentrionalis* from Finland (c), identified by Beier, has served as starting point. a = Nijmegen, b = Heerlen, c = Tvärminne (Finland), d = Schiermonnikoog, e = Terschelling East, f = Terschelling West, g = Texel, h = Huisduinen, i = Schoorl, j = Goedereede, k = Renesse, l = Koksijde (Belgium).

Figuur 2. Identificatie van de nominaatvorm *Dactylochelifer latreillei latreillei* uit Nederland (a-b) en de ondersoort *Dactylochelifer latreillei septentrionalis* uit Nederland (d-k) en België (l), op basis van de lengte/hoogteverhouding van de tarsus van de eerste voorpoot bij het mannetje. Materiaal van *septentrionalis* uit Finland heeft gediend als uitgangspunt.

Description

Male

Description based on ten specimens from Terschelling (fig. 4a, 5a).

Carapace, abdomen and pedipalps scarlet orange, chelicerae and legs much paler of colour, more orange-like (in not KOH- treated material). Entire body and appendages with the exception of chelicerae equally finely granulated. Tergites, sternites (especially 11th sternite) and posterior part of carapace closely stuck with numerous microfissures.

Body L 2.71(2.555-2.88).

Carapace L 0.87(0.82-0.95), greatest width 0.87(0.82-0.91), LW 1.0(0.97-1.03); distinct transverse groove about halfway carapace length, second groove, situated in basal part of carapace much less distinct; eyes: one pair, well developed;

anterior margin with two small medial setae and on each side one or two lateral setae; posterior margin with three to six small setae on each side of midline, setae on face somewhat longer than marginal setae.

Abdomen tergites I-XI and sternites III-X weakly longitudinally divided, division often indistinct; chaetotaxy, tergites I-XI (of both entire scuta): 5.6(4-8)/5.5(4-7): 6.4(5-7)/5.8(4-7): 8.7(7-11)/8.8(8-10): 9.0(8-10)/8.7(7-11): 7.7(6-9)/7.5(6-10): 1.2(1-2)P4.4(2-7)/4.3(3-6)P1.2(1-2); 6.7(5-8)/6.4(5-7): 7.5(5-10)/6.6(6-8): 8.0(6-10)/8.1(6-10): 8.3(7-10)/8.5(7-10): 8.1(6-9)/8.3(7-10); sternites IV-XI (of both entire scuta): 5.9(4-8)/6.2(5-8): 7.3(6-8)/7.6(6-9): 7.4(6-9)/7.8(6-9): 7.6(7-8)/7.6(7-8): 7.2(6-8)/7.3(6-8): 7.1(6-9)/6.7(6-8): 5.9(5-7)/6.1(5-7): 2.0(1-3)P2.9(1-4)/2.6(1-4)P1.7(1-3)

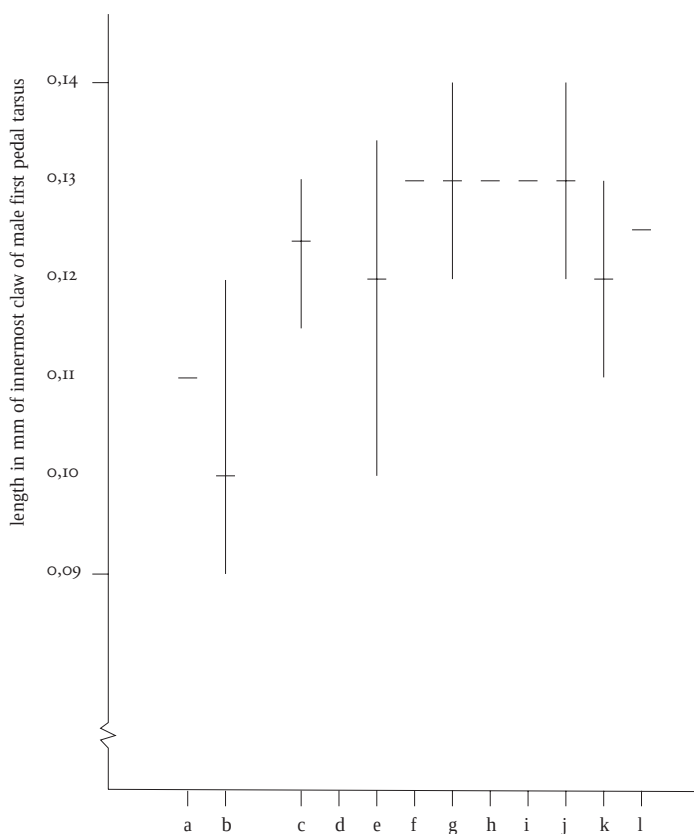


Figure 3. Identification of the nominate subspecies *Dactylochelifer latreillei latreillei* from the Netherlands (a-b) and the subspecies *Dactylochelifer latreillei septentrionalis* (Beier) from the Netherlands (d-k) and Belgium (l), based on the length of the innermost claw of the male first pedal tarsus. Material of *septentrionalis* from Finland (c), identified by Beier, has served as starting point. a = Nijmegen, b = Heerlen, c = Tvärminne (Finland), d = Schiermonnikoog, e = Terschelling East, f = Terschelling West, g = Texel, h = Huisduinen, i = Schoorl, j = Goedereede, k = Renesse, l = Koksijde (Belgium).
 Figuur 3. Identificatie van de nominaatvorm *Dactylochelifer latreillei latreillei* en de ondersoort *Dactylochelifer latreillei septentrionalis* uit Nederland (d-k) en België (l), op basis van de lengte van de binnenste klauw van de eerste voorpoot bij het mannetje. Materiaal van *septentrionalis* uit Finland heeft gediend als uitgangspunt.

(P = 'pseudo-tactile' seta). *Chelicera*: 0.26(0.24-0.28)/0.14(0.12-0.15), L/W 1.90(1.78-1.97), and 0.27 to 0.32 x carapace L; movable finger L 0.18(0.15-0.21); galea L 0.04(0.03-0.05), straight, tapering to distal end, lateral rami short and often obscure, number up to three along outer and one along inner margin; movable finger with conical subapical lobe with rounded top; serrula interior and serrula exterior as in ♂ *latreillei*; flagellum of three thorny setae, anteriormost one longest and furnished with two to four small spinules along anterior margin in distal third or distal fourth of length, length of setae respectively: 0.08, 0.06 and 0.05; apical tooth as in ♂ *latreillei*. Chaetotaxy as in ♂ *latreillei*.

Pedipalp trochanter (9) 0.43(0.36-0.455)/0.24

(0.22-0.28), L/W 1.76(1.62-1.93); femur 0.82(0.78-0.88)/0.22(0.21-0.25), L/W 3.74(3.52-3.97); patella 0.73(0.685-0.77)/0.26(0.24-0.28), L/W 2.84(2.67-2.90); chela without pedicel 1.18(1.14-1.23)/0.34(0.29-0.38), L/W 3.50(3.08-3.89); chela with pedicel 1.26(1.21-1.33)/W same, L/W 3.75(3.31-4.18); hand without pedicel 0.61(0.57-0.65)/0.34(0.295-0.38), L/W 1.80(1.57-1.90); L same/ 0.30(0.28-0.34), L/D 2.03(1.72-2.19); hand with pedicel 0.70(0.66-0.76)/0.34(0.295-0.38), L/W 2.08(1.82-2.26); L same/0.30(0.26-0.34), L/D 2.36(1.95-2.54); movable finger L 0.64(0.62-0.66), 1.05(0.98-1.11) x L hand without pedicel, and 0.90(0.86-0.95) x L hand with pedicel. Fixed finger with 43.9(41-45) and movable finger with 45.4(43-47) marginal teeth.

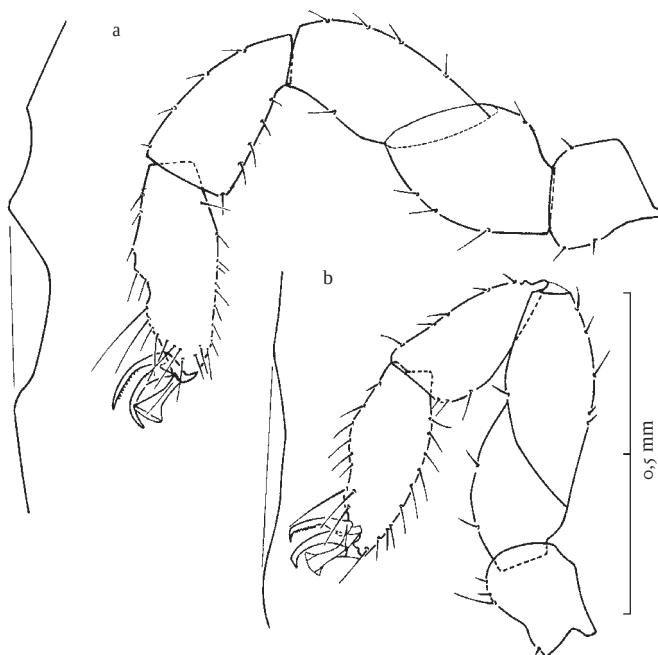


Figure 4. *Dactylochelifer latreillei septentrionalis* (a). Male from Terschelling (4): posterior aspect of right leg I (L/D tarsus: 2.69). *Dactylochelifer latreillei latreillei* (Leach) (b). Male from Heerlen (177-8): posterior aspect of right leg I (L/D tarsus: 2.45).
 Figuur 4. *Dactylochelifer latreillei septentrionalis* (a). Mannetje van Terschelling (4): achteraanzicht van rechterpoot I (L/D tarsus: 2.69). *Dactylochelifer latreillei latreillei* (b). Mannetje uit Heerlen (177-8): achteraanzicht van rechterpoot I (L/D tarsus: 2.45).

Locations of trichobothria and nodus ramosus on fixed finger given as distances from base apical tooth on outside curve about as in ♂ *latreillei*: et 0.11(0.09-0.14), it 0.21(0.17-0.24), ist 0.34(0.30-0.37), est 0.35(0.30-0.395), isb 0.49(0.47-0.52), esb 0.50(0.47-0.54), ib 0.51(0.48-0.54), eb 0.53(0.48-0.57), and nodus ramosus 0.21(0.18-0.225). Locations of trichobothria and nodus ramosus on movable finger given as distances from base apical tooth on outside curve also about as in ♂ *latreillei*: t 0.24(0.22-0.28), st 0.37(0.31-0.41), sb 0.47(0.43-0.50), b 0.52(0.45-0.55), and nodus ramosus 0.20(0.18-0.25).

Legs preceding observations as in ♂ *latreillei*. *First leg* trochanter 0.16(0.14-0.17)/0.14(0.13-0.17), L/D 1.09(1.03-1.125); femur 0.27(0.26-0.28)/0.17(0.15-0.19); L/D 1.64(1.50-1.835); patella 0.345(0.31-0.36)/0.145(0.13-0.17), L/D 2.40(2.11-2.60); femur + patella 0.48(0.47-0.50)/0.17(0.15-0.19), L/D 2.93(2.62-3.15); tibia 0.30(0.29-0.305)/0.13(0.12-0.14), L/D 2.32(2.11-2.52); tarsus 0.33(0.31-0.35)/0.12(0.11-0.13), L/D 2.76(2.64-

2.93); L inner claw 0.12(0.10-0.135); L arolium from base inner claw 0.10(0.07-0.12), and 0.82(0.67-0.93) x L inner claw. Marginal 'pseudo-tactile' seta 2/3 to 3/4 L leg from base. *Fourth leg* trochanter 0.29(0.26-0.32)/0.15(0.12-0.17), L/D 1.96(1.76-2.16); femur 0.22(0.20-0.24)/0.16(0.15-0.18), L/D 1.41(1.25-1.50); patella 0.56(0.53-0.59)/0.20(0.18-0.205), L/D 2.72(2.57-3.0); femur + patella 0.695(0.66-0.73)/0.20(0.18-0.205), L/D 3.50(3.22-3.70); tibia 0.495(0.47-0.52)/0.13(0.12-0.14), L/D 3.82(3.56-4.07); tarsus 0.40(0.35-0.44)/0.09(0.08-0.10), L/D 4.40(3.93-4.77); L inner claw 0.09(0.08-0.10); arolium L 0.07(0.055-0.09), and 0.85(0.71-0.94) x L inner claw. Marginal 'pseudo-tactile' seta about 3/4 to 4/5 L leg from base.

Chaetotaxy and internal structure of male genital area about as in ♂ *latreillei*.

Female

Description based on three specimens from Terschelling ('De Boschplaat') (fig. 6b).

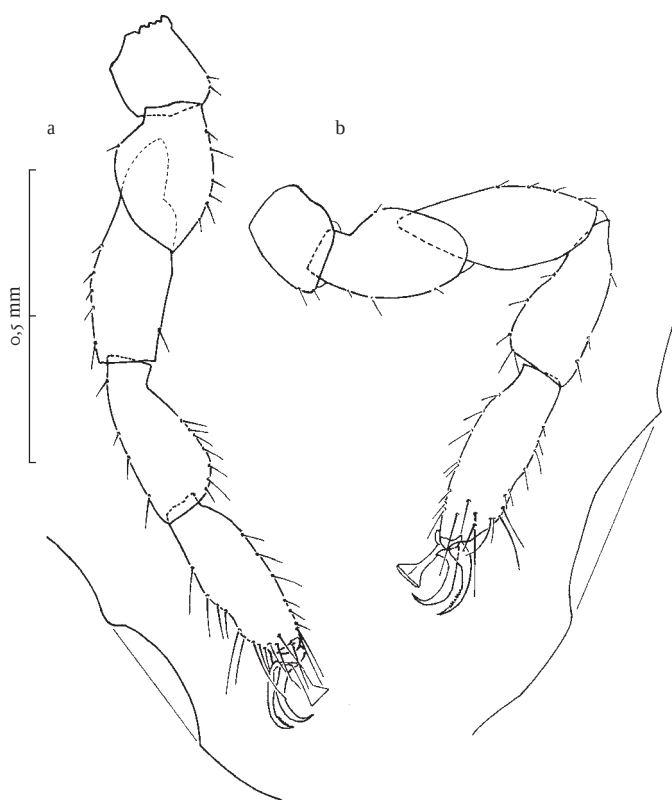


Figure 5. *Dactylochelifer latreillei septentrionalis* (a). Male from Terschelling (6): posterior aspect of right leg I (L/D tarsus: 2.93).

Dactylochelifer latreillei septentrionalis (Beier) (b). Male from Tvärminne (Finland) (1): anterior aspect of right leg I (L/D tarsus: 2.98).

Figuur 5. *Dactylochelifer latreillei septentrionalis* (a). Mannetje van Terschelling (6): achteraanzicht van rechterpoot I (L/D tarsus: 2.93).

Dactylochelifer latreillei septentrionalis (b). Mannetje uit Tvärminne (Finland) (1): vooraanzicht van rechterpoot I (L/D tarsus: 2.98).

Female not entirely similar to male, not only by having different genitalia and a larger body (average 3.38 versus 2.71), but above all by showing considerable differences in the average length/depth ratio (L/D) of the segments of the first leg: L/D patella 2.625 versus 2.40, L/D femur + patella 3.25 versus 2.93, L/D tibia 3.02 versus 2.32, L/D tarsus 4.34 versus 2.80, and in its average length of the longest inner claw (0.07 versus 0.12) and the arolium (0.06 versus 0.10). In addition a medial distal row of small teeth forming a comb on the outer claw is lacking.

Body L: 3.38(3.30-3.49).

Carapace 0.90(0.87-0.93)/greatest width 0.80(0.75-0.89), L/W 1.14(1.05-1.21); eyes: one pair, well developed; anterior margin of carapace with two medial setae and on each side two lateral setae, posterior margin of carapace with

4.7(4-6) setae to the left and 3.7(3-4) setae to the right from midline, respectively. Abdomen: tergites I-XI and sternites III-XI divided, about as in ♂; chaetotaxy of tergites I-XI (of both entire scuta): 4.7(4-6)/5.3(5-6): 5.67(5-6)/6.33(6-7): 7.0/6.67(6-8): 7.67(6-9)/7.33(7-8): 8.33(6-11)/7.67(6-10): 7.33(4-10)/7.67(7-8): 8.0(7-9)/8.67(7-10): 8.33(7-10)/8.0(7-10): 8.33(7-9)/7.8(7-10): 7.67(7-8)/7.67(7-8): 1.67(1-3)P4.33(3-6)/4.33(3-5)P1.67(1-2); chaetotaxy of sternites IV-XI (of both entire scuta): 4.0/3.67(3-4): 7.56(5-7)/6.67(5-7): 6.33(5-7)/7.0(6-8): 6.67(6-7)/8.0: 7.0(6-8)/7.33(6-8): 7.0/7.0: 5.67(5-7)/6.0(5-7): 2P3-2P3.67-2P4/3P2-3.33P2-4P2 (P = 'pseudo-tactile' seta).

Chelicera 0.28(0.27-0.29)/0.14 (2), L/W 1.91-2.09 (2), and 0.30 to 0.32 x L carapace; movable finger L 0.18(0.175-0.19); galea L 0.05-0.06, stem straight or weakly curved with two to four curved

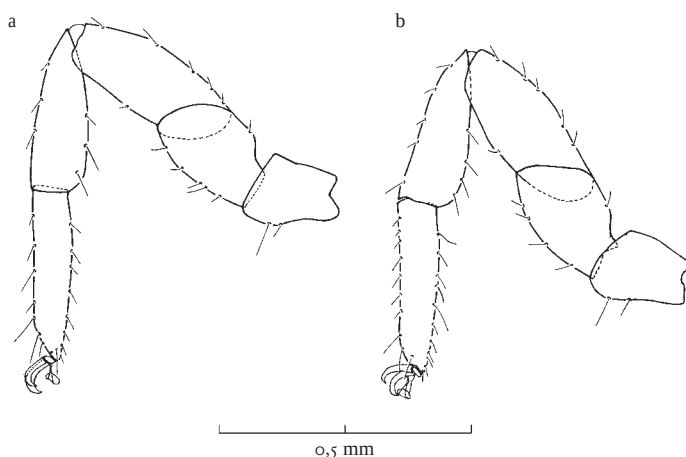


Figure 6. *Dactylochelifer latreillei septentrionalis* (a). Female from Terschelling (13): posterior aspect of right leg I (L/D tarsus: 4.38). *Dactylochelifer latreillei latreillei* (Leach) (b). Female from Heerlen (177-8): posterior aspect of right leg I (L/D tarsus: 4.24).
 Figuur 6. *Dactylochelifer latreillei septentrionalis* (a), Vrouwtje van Terschelling (13): achteraanzicht van rechterpoot I (L/D: 4.38). *Dactylochelifer latreillei latreillei* (b). Vrouwtje uit Heerlen (177-8): achteraanzicht van rechterpoot I (L/D tarsus: 4.24).

rami on top and one to three lateral rami just below top or in distal third; serrulae about as in ♂, serrula exterior with 19 blades; flagellum about as in ♂, length of setae (from longest anteriormost one) respectively: 0.07-0.08, 0.06-0.07, and 0.04-0.06; apical tooth of fixed finger with three tiny retroconical marginal knobs, followed by three larger retroconical marginal teeth (1); movable finger with subapical lobe as in ♂. Chaetotaxy as in ♂.

Pedipalp trochanter 0.44(0.42-0.45)/0.26(0.25-0.27), L/W 1.68(1.62-1.78); femur 0.84(0.80-0.91)/0.24(0.23-0.25), L/W 3.52(3.37-3.68); patella 0.765(0.75-0.785)/0.28(0.27-0.29), L/W 2.74(2.71-2.79); chela without pedicel 1.24(1.20-1.31)/0.38(0.37-0.40), L/W 3.23(3.14-3.28); chela with pedicel 1.36(1.29-1.475)/0.38(0.37-0.40), L/W 3.46(3.37-3.54); hand without pedicel 0.66(0.645-0.68)/0.39(0.37-0.40), L/W 1.70(1.68-1.74); hand with pedicel 0.76(0.74-0.79)/0.39(0.37-0.40), L/W 1.97(1.93-2.04); movable finger L 0.63(0.61-0.68), 0.96(0.94-0.99) x L hand without pedicel, and 0.83(0.80-0.86) x L hand with pedicel. Fixed finger (1) with 49 and movable finger (1) with 47 marginal teeth. Locations of trichobothria and nodus ramosus on fixed finger (2) given as distances from base apical tooth on outside curve: et 0.16-0.16, it 0.23-0.25, ist 0.38-0.45, est 0.39-0.40, isb 0.52-0.55, ib 0.54-

0.57, esb 0.56-0.59, eb 0.59-0.64, nodus ramosus 0.255-0.26. This means that et and it are inserted in the distal 2/5 of finger length (arbitrarily considered equal to movable finger length), ist and est at about 1/3 finger length from finger tip, and isb, ib, esb and eb close together near finger base, and nodus ramosus at about same level as it. Locations of trichobothria and nodus ramosus on movable finger (2) determined by similar measuring: t 0.31-0.315, st 0.44-0.44, sb 0.55-0.56, b 0.59-0.62, and nodus ramosus 0.24-0.25. It may be concluded that t is inserted about halfway the finger length, st at about 3/5 finger length from finger tip, sb and b very close to the finger base, and nodus ramosus a little distal to t.

Legs differentiation of femoral articulation in fore- and hindlegs as in ♂.

First leg (fig. 6b): trochanter 0.175(0.17-0.18)/0.13(0.13-0.14), L/D 1.28(1.24-1.33), femur 0.26(0.24-0.28)/0.15(0.15-0.16), L/D 1.70(1.16-1.74); patella 0.36(0.35-0.37)/0.14, L/D 2.625(2.60-2.675); femur + patella 0.50(0.48-0.525)/0.15, L/D 3.25(3.18-3.29); tibia 0.32/0.11(0.10-0.11), LD 3.02(3.00-3.05); tarsus 0.34/0.08, L/D 4.34(4.28-4.35); L inner claw 0.07(0.07-0.075); L arolium from base inner claw 0.06(0.06-0.07), and 0.86(0.76-0.95) x L inner claw. Outer claw about 1/5 slenderer than inner claw. Marginal 'pseudo-tactile' seta at about 2/3 to 3/4 L leg from base.

Fourth leg: trochanter (2) 0.34-0.36/0.16-0.19, L/D 1.87-2.07; femur 0.255(0.245-0.27)/0.175(0.165-0.19), L/D 1.46(1.41-1.49); patella 0.58(0.56-0.62)/0.22(0.21-0.23), L/D 2.67(2.66-2.68); femur + patella 0.735(0.71-0.78)/0.22(0.21-0.23), L/D 3.39(3.34-3.44); tibia 0.52(0.51-0.54)/0.13(0.13-0.14), L/D 3.90(3.475-4.00); tarsus 0.42(0.40-0.44)/0.09, L/D 4.66(4.62-4.71); L inner claw 0.09(0.085-0.09); L arolium from base inner claw 0.07(0.065-0.075), and 0.81(0.77-0.86) x L inner claw. Outer claw about 1/5 slenderer than inner claw. Marginal 'pseudo-tactile' seta at about 3/4 to 4/5 L leg from base. *Chaetotaxy and internal structure of female genital area* anterior operculum on both sides of midline with up to 11 setae, same on posterior operculum with up to four setae; a medial cluster of three or four more or less rounded cribriform plates, and on each side of midline a transverse very small oval plate is perceptible.

Starting from the up to now available data an over-all comparison of palpal and pedal proportions in males of *D. l. latreillei* and *D. l. septentrionalis* gives the following idea: in both subspecies the palpal lower extremes of variation are on about the same level, while higher extremes in *septentrionalis* fall outside, so the means in *septentrionalis* are somewhat higher than in *latreillei*; means of pedal first leg are on about the same level, except the tarsus (mean L/D ratio in *latreillei* 2.52 versus 2.825 in *septentrionalis*); means of the pedal fourth leg only partly agree because means of patella, femur + patella, tibia and tarsus are on a distinct higher level in *septentrionalis* (mean L/D ratio tarsus in *latreillei* 4.14 versus 4.40 in *septentrionalis* (from Terschelling).

In the studied female of *latreillei* the palpal L/W ratios agree about with the lower extremes in females of *septentrionalis*. In the first pedal leg these ratios fall about within both extremes of *septentrionalis* (L/D ratio tarsus 4.24 versus mean 4.34 in *septentrionalis*) and in the fourth pedal leg these ratios fall just within both extremes of *septentrionalis* or just outside its higher extremes,

except tarsus (L/D ratio 4.49 in *latreillei* versus mean 4.66 in *septentrionalis*).

REMARKS

In many cheliferid pseudoscorpions (and also here) only the characteristics of pedal tarsus and tarsal claws of the male are regarded as being of considerable taxonomic importance and in consequence identification of isolated females and nymphs, which are not accompanied by males is disputable. Nevertheless, it sounds acceptable to suppose that also isolated females and nymphs from other Dutch coastal dune localities as Noordwijk/Katwijk, Katwijk, Wassenaar (Meyendel) and Noord Beveland (Jacobahaven) belong to the subspecies *septentrionalis*. A third described subspecies: *D. l. cephalonicus* (Beier, 1929) from southeastern Europe is not treated here on account of different length/width ratio of the palpal femur (3.2 versus 3.4-3.7) and different length/depth ratio of the first pedal tarsus in the male (2.5 versus 2.7-2.9).

CONCLUSION

This examination leads to the ascertainment that the nominate subspecies of *D. latreillei* is only present in the interior of the country, while the 'northern' *septentrionalis* occurs exclusively along the coast from the West Frisian Isles up to the province of Zeeland, and farther southward at least up to the Belgian/French border. Apparently, the latitude is not exclusively important for distribution of *septentrionalis*, but also and perhaps above all the presence of coastal dunes, especially with the occurrence of the dune plant *Ammophila arenaria*, is an important factor.

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SAMENVATTING

De ondersoorten van de pseudoscorpioen *Dactylochelifer latreillei* in Nederland
(Pseudoscorpiones: Cheliferidae)

Van de pseudoscorpioen *Dactylochelifer latreillei* zijn twee ondersoorten bekend, de 'zuidelijke'
latreillei en de 'noordelijke' *septentrionalis*. Onderzoek aan het Nederlandse collectiemateriaal
bracht aan het licht dat *D. l. latreillei* in het binnenland voorkomt en *D. l. septentrionalis* in
de kustduinen. Mogelijk is de aanwezigheid van helm *Ammophila arenaria* van doorslaggevend
belang voor het voorkomen van *D. l. septentrionalis*.

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