

A NEW SPECIES OF *PLEURONECTOCELAENO*
(ACARINA : CELAENOPSIDAE)
ASSOCIATED WITH BARK BEETLES IN NORTH
AND CENTRAL AMERICA¹

BY

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ABSTRACT.

Descriptions and figures of adults and all immature instars are given for a new species of mite belonging to the genus *Pleuronectocelaeno* associated with bark beetles of the genera *Ips* and *Dendroctonus*. The genus is defined, and a key to its species and subspecies is included. *Pleuronectocelaeno austriaca barbara* Athias-Henriot is recognized as a species distinct from *P. austriaca* Vitzthum, and includes two subspecies: *P. barbara barbara* and *P. b. borealis* nomen novum for *P. austriaca* sensu Sellnick (1951).

TRÄGÅRDH (1951) believed celae-nopsid mites would be found with bark beetles in North America if collections were made from trees attacked by the beetles. Recently, surveys of mite associates of bark beetles have been undertaken by several North American acarologists and, true to TRÄGÅRDH's prediction, celae-nopsids were encountered. Unlike the previously described species, all instars and both sexes of the new species were collected and are described and illustrated herein. All instars of the mite occur in the galleries and frass produced by the host beetles, but only males and females are phoretic.

Pleuronectocelaeno was first proposed by VITZTHUM (1926) as a subgenus of *Anoplocelaeno* Berlese. TRÄGÅRDH (1941) retained the name in the family Celae-nopsidae when he transferred *Anoplocelaeno* to the Diplogyniidae.

SELLNICK (1951) based his redescription of *P. austriaca* Vitzthum on Swedish specimens which differed in several respects from Vitzthum's original specimens, and which actually represented a separate species. A comparison of the type specimens prepared by VITZTHUM and ATHIAS-HENRIOT with SELLNICK's illustra-

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tions has led me to conclude that the subspecies *P. austriaca barbara* Athias-Henriot (1959) is a separate species, *P. barbara*; and the specimens of SELLNICK are subspecies of *P. barbara* for which I propose the name *borealis*. The most obvious difference between females of *P. barbara* and *P. austriaca* is the presence of a fissure on the anterior margin of the ventrianal plate, which separates the remnants of the latigynial shields in the latter species. The anterior margin of the ventrianal plate of *P. barbara* is convex with no indication of the fused latigynial shields (Fig. 1 B). Other differences are given in Table 1.

TABLE 1. — Some characteristics differentiating *Pleuronectocelaeno austriaca*, *P. drymoecetes*, and the subspecies of *P. barbara*.

FEMALES	<i>P. austriaca</i>	<i>P. drymoecetes</i> ¹	<i>P. barbara barbara</i>	<i>P. barbara</i> ² <i>borealis</i>
Body length	641	604	670	738
Length of { telofemur	—	55.5 ± 1.9	51 ²	60
Leg I { genu	—	54.2 ± 1.5	51	62
{ tibia	—	61.1 ± 2.1	54	72
{ telotarsus	—	70.7 ± 1.4	76	84
Distance between anterior angles of sternal plate.	140	135	138	158
Ratio : length of sternal plate/medial edge of metasternal plate.	> 1	< 1	< 1	> 1
Ratio : length of V ₁ /half the distance between V ₁ — V ₂ .	> 1	> 1	> 1	< 1
Ratio : length of V ₃ /half the distance between V ₁ — V ₂ .	> 1	< 1	> 1	< 1
Ratio : paranal setae/distance between anus and posterior margin of ventrianal plate.	< 1	Variable	> 1	<< 1
Ratio : length of distal hypostomal setae/medial setae.	< 1	<< 1	<< 1	>> 1
Transverse suture separating podonotum and opisthonotum.	Apparent	Apparent	Obscure	Apparent

Of the previously known species and subspecies of the genus *Pleuronectocelaeno*, the only described immature instar is the deutonymph of what TRÄGÅRDH (1950 a) called *P. austriaca*. In all likelihood, the specimens which TRÄGÅRDH described were *P. barbara borealis*. The deutonymphs of *P. barbara* and the new species, *P. drymoecetes*, are quite similar.

Males are known for only a few species of the Celaenopsidae. In all cases

1. Mean values with fiducial intervals at .01 level.

2. Measurements given by ATHIAS-HENRIOT (1959).

there is a marked sexual dimorphism of the hypostome which is probably associated with transfer of spermatophores. In *Ceratocelaenopsis wormersleyi* (TRÄGÅRDH 1950 b) the distal hypostomal setae take the form of tapering " tusks " which extend posteriorly to the middle of coxae II. The distal setae of *P. barbara barbara* Athias-Henriot are in the form of shorter sclerotized appendages which bear leaf-like, hyaline membranes. The hypostome of the male of *P. drymoecetes* is similar to that of *P. barbara*, with the distal hypostomal setae being rod-shaped and bearing leaf-like membranous lobes. Unfortunately, males of the other genera (*Celaenopsis* and *Brachycelaenopsis*) and of other species of *Pleuronectocelaeno* are unknown. Differences among the females of *P. austriaca*, *P. drymoecetes* and the two subspecies of *P. barbara* are listed in Table 1.

Collections of *P. drymoecetes* have been made in the southeastern United States, Texas, California and Honduras. Specimens from each of these areas are identical morphologically, with the exception of those from Oakhurst, California, in which V_1 is much longer than in the other specimens.

Pleuronectocelaeno Vitzthum, 1926.

Shape oval. Ventral and anal shields fused, narrowing posteriorly with parallel lateral margins in anal region and extending to posterior margin of body ; postanal shield absent. Female with large, triangular metasternal shields. Palpal claw bifid ; chaetotaxy of palpal trochanter, femur and genu : 2, 5, 7. Gnathosomal chaetotaxy of male atrophied, with only gnathosomal setae distinct ; distal hypostomal setae articulated, rod-shaped, with leaf-like hyaline membranes.

Type species : *Pleuronectocelaeno austriaca* Vitzthum, 1926.

KEY TO THE SPECIES AND SUBSPECIES OF *Pleuronectocelaeno*, BASED ON FEMALES.

1. Anterior margin of ventrianal plate with tongue-like projections ; sternal setae smooth ; pore I more elongate than pores II and III ; appendages of digitus mobilis cylindrical, without pilose fringes..... *P. africana*.
- Anterior margin of ventrianal shield truncate or convex ; sternal setae pectinate ; pore I equal in size to pore II ; longer appendage of digitus mobilis pilose on distal half 2.
2. Length of sternal shield greater than medial edge of metasternal shield ; paranal setae shorter than distance between anus and apical end of ventrianal plate..... 3.
- Length of sternal shield less than medial edge of metasternal shield ; paranal setae may be longer than distance between anus and apical end of ventrianal plate.... 4.
3. All sternal setae longer than half the distance between V_1 and V_2 ; medial hypostomal setae longer than distal setae ; anterior margin of ventrianal shield with prominent cleft ; circular-shaped pores discernible in anterior region of metasternal shields....
P. austriaca.
- Sternal setae shorter than half the distance between V_1 and V_2 ; medial hypostomal setae shorter than distal setae ; anterior margin of ventrianal shield without cleft ; circular-shaped pores on metasternal shields absent..... *P. barbara borealis*

4. All sternal setae longer than half the distance between V_1 and V_2 ; opisthonotum not separated from podonotum by a transverse suture..... *P. barbara barbara*
 — V_1 longer and V_3 shorter than half the distance between V_1 and V_2 ; opisthosoma separated from podonotum by a prominent transverse suture..... **P. drymoeetes**

Little is known of the biology of mites of the genus *Pleuronectocelaeno* and nothing is known of their trophic habits. *Pleuronectocelaeno africana* is found under the bark of *Chaja ivorensis* in Cameroun and *P. barbara barbara* is found under the bark of dead *Pinus halepensis* in Algeria. *Pleuronectocelaeno barbara borealis* inhabits the galleries of *Ips acuminatus* Gyll. which attacks pine and in the galleries of *Pityogenes* sp. attacking spruce in Sweden. VITZTHUM described *P. austriaca* from specimens collected from *Scolytus laevis* (Chapuis) in *Ulmus montana* in Austria. *Pleuronectocelaeno drymoeetes* is associated with *Dendroctonus frontalis* Zimmerman and numerous *Ips* spp. which attack pines in North and Central America. The adults of *P. drymoeetes* are known to be phoretic on *Ips* bark beetles and *P. austriaca* females are phoretic on *Scolytus laevis*. Phoresy has not been observed in the case of *P. barbara* and *P. africana*.

Pleuronectocelaeno barbara Athias-Henriot.

FEMALE (Fig. 1 B). Dorsal shield 670-738 μ long, ovoid, clothed with 70 or more setae; marginal shields each with 10 setae, which increase in length posteriorly. Sternal setae pectinate. Anterior margin of ventrianal shield sinuous, lacking medial cleft; with numerous irregularly placed setae and circular-shaped pores; para- and postanal setae longest.

***Pleuronectocelaeno drymoeetes* nov. spec.**

FEMALE (Fig. 2).

Length of idiosoma 573 μ (569-658); *width* 442 μ (388-481).

Idiosomal dorsum. Shape oblong, oval; broadly rounded anteriorly and posteriorly; in life, slightly more pointed anteriorly. Widest above coxae IV. Markedly convex; covered by a single shield which displays traces of a suture separating podonotal and opisthonotal regions. More than 70 short, simple setae clothe dorsum and 18 pairs of stouter setae which increase in length posteriorly project laterally; anterolateral setae pectinate and posterolateral setae smooth. Five short, dorsally curving vertical setae lie anterior to podonotal shield. Eleven pairs of slit-shaped pores present. Pores I lie anterolaterally on podosoma; pores V-XI lie on opisthosoma. Pores V-VI lie in a transverse line near anterior margin of opisthosoma and pores VII-VIII lie midway between anterior margin of opisthosoma and posterior margin; pores VII marginal and VIII medial. Pores IX-XI lie posterolaterally. In addition, numerous more or less randomly scattered circular-shaped pores present. Marginal plates situated lateral to and fused with

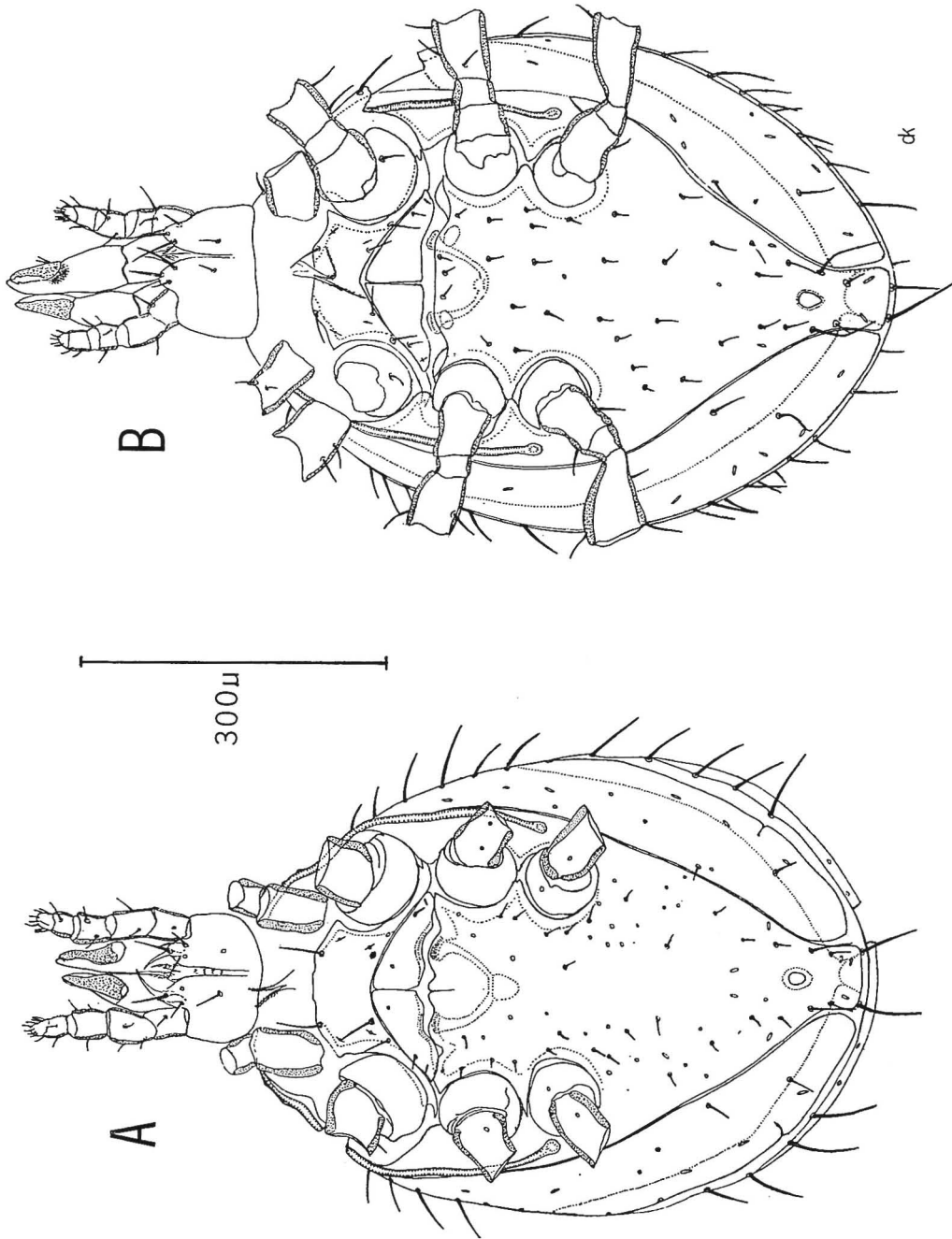


FIG. 1. — A : Ventral aspect of female of *Pleuronectoclaeno austriaca* Vitzthum.
B : Ventral aspect of female of *Pleuronectoclaeno barbara* Athias-Henriot.

dorsal plate at level of coxae III-IV; 9 pairs of simple setae project laterally (Fig. 2 C). Posteriorly marginal plates separated by intermediate plate, having rounded dorsal margin and truncate posteroventral margin.

Idiosomal venter. Tritosternal base hyaline, arising adjacent to anterior margin of sternal plate; lacinae free and pilose (Fig. 2 A). Sternal plate wider than long, with a slight concavity in anterior margin; posterior margin steeply concave.

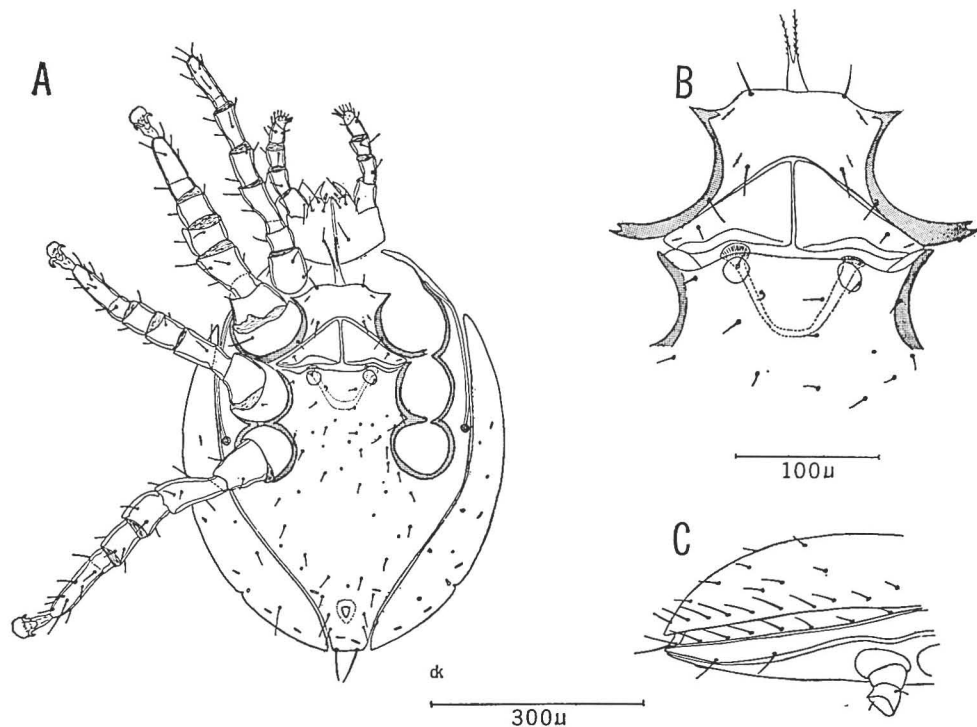


FIG. 2. — *Pleuronectocelaeno drymoecetes*, paratype.
A : Ventral aspect of female. B : Sterno-genital region. C : Lateral aspect.

Setae I slightly pectinate, thicker and longer than others, borne submarginally on anterior edge; setae II situated directly posterior to setae I near posterior margin. Setae III shorter, situated near intercoxal projection between coxae II and III. Pores I situated anterolaterally near intercoxal projection between coxae I and II. Pores II located laterally and slightly anterior to setae II. Posterolateral intercoxal projections of sternal plate between coxae II and III terminating in 2 sclerotized points; posterior one longer (Fig. 2 B). Metasternal plates triangular, lying between coxae II. Setae IV near acute lateral angle. Pore III slit-shaped, and lateral to setae IV. Posterior margin sinuous, with heavily sclerotized indentations to accommodate heads of vaginal sclerites (Fig. 2 B). Ventral, anal, parapodal, peritremal and metapodal plates fused. Anterior margin of ventrianal shield sinuous, slightly convex medially; paired concavities lie submar-

ginally on anterior margin. Vaginal sclerites, with ribbed clubs, lie internally. Shield with more than 20 pairs of setae which increase in length posteriorly (paranal setae longest) and with numerous, irregularly placed, circular-shaped pores and two pairs of slit-shaped pores (one anterolateral to anal orifice and another posterior to anus near posterior margin of shield). One pair of setae, longer than ventral setae, borne in membrane posterior to ventrianal plate. Stigmata lateral to coxae IV; peritremes extend anteriorly, beyond anterior margin of coxae I (Fig. 2 A). Ventrimarginal shields border ventrianal shield from level of coxae II to posterior margin. Each shield with two simple setae of which posterior seta longer and level with anterior margin of anus; with five slit-shaped pores, 4 of which lie posterior to coxae IV, and 7 irregularly shaped pores, one marked by a slit-like indentation on shield margin.

Legs. Armed primarily with simple setae; chaetotaxy given in Table II, using the system of EVANS (1963). Leg I without claws, with conspicuous solenidia on truncate end of tarsus. Distal posterodorsal setae of femur II and genua III-IV longer than other leg setae; tarsi II-IV with dorsal slit-shaped pores. Leg II stouter than others.

TABLE II. — Leg chaetotaxy, exclusive of coxa and tarsus,
of *Pleuronectocelaeno drymoecetes*.

Trochanter	I	II	III	IV
L,P	(1-0/1,0/1-1)	(1-0/1,0/1-1)	(1-0/1,0/1-0)	P(1-1/1,0/1-0)
D,A	(1-1/1,1/1-1)	(1-0/1,0/2-1)	(1-0/2,0/1-0)	(1-1/2,0/1-0)
Femur				
L,P	(1-0/1,0/1-1)	(1-0/1,0/1-1)	(1-1/1,0/1-0)	P(0-0/1,1/0-0)
D,A	(1-2/1,2/3-1)	(2-2/1,2/2-1)	(1-2/1,2/1-0)	(1-2/1,3/1-0)
Genu				
L,P	(1-2/1,2/1-1)	(1-2/0,2/0-1)	(1-2/0,2/0-1)	P(1-2/0,2/0-0)
D,A	(1-3/1,2/1-1)	(1-3/1,2/1-1)	(1-2/1,2/1-1)	(1-2/1,3/1-1)
Tibia				
L,P	(1-2/1,2/1-1)	(1-1/1,2/1-1)	(1-1/1,2/1-1)	P(1-1/1,2/1-1)
D,A	(2-3/2,2/2-2)	(1-1/1,2/1-1)	(1-1/1,2/1-1)	(1-1/2,2/1-1)

Gnathosoma. Tectum broadly triangular, and keeled (Fig. 4 A). Digitus fixus with about 22 small teeth; anterior 10 teeth slanted posteriorly. Digitus mobilis with about 9 teeth; last tooth much larger than others; with two appendages ventrally, shorter biramous apically and longer distinctly pilose on distal half (Fig. 4 B). Deutosternum narrow, with four rows of teeth between gnathosomal and proximal hypostomal setae. Distal hypostomal setae stouter than others, lateral shortest, and median longest. Hypopharyngeal processes pilose; corniculi stout, heavily sclerotized (Fig. 4 C). Chaetotaxy of palpal trochanter, femur and genu: 2, 5, 7. Palpal tarsal claw two-tined.

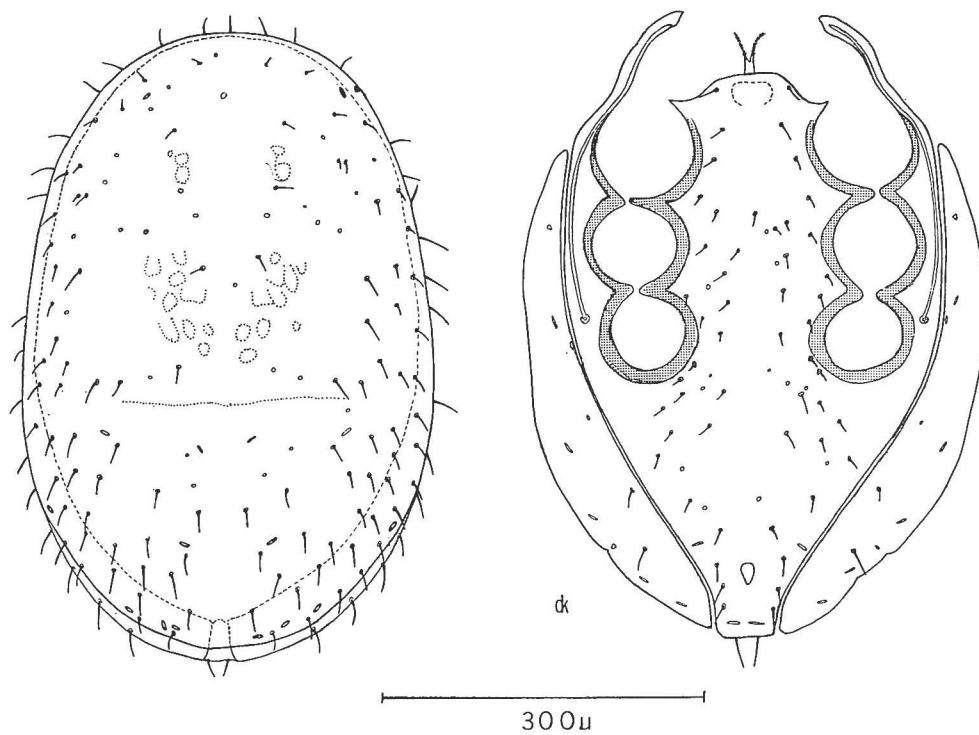


FIG. 3. — Dorsal and ventral aspects of male of *Pleuronectocelaeno drymoecetes*.

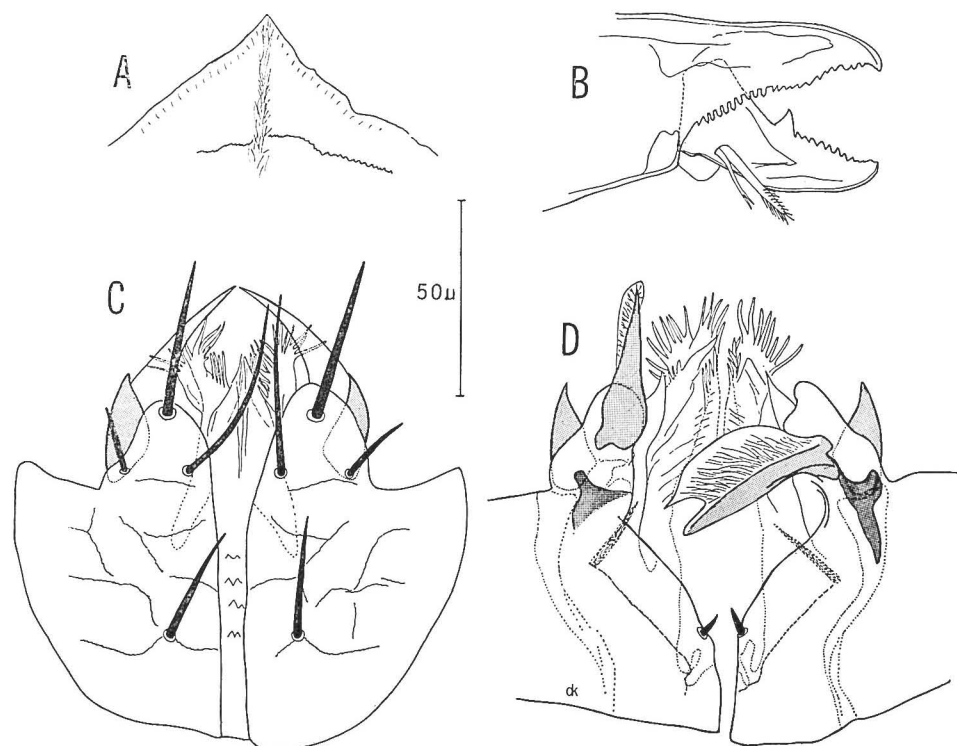


FIG. 4. — *Pleuronectocelaeno drymoecetes*.
A : Tectum of female. B : Chelicera of female. C : Hypostome of female. D : Hypostome of male.

MALE (Fig. 3).

Length of idiosoma 599 μ (568-654) ; *width* 411 μ (379-491).

Idiosomal dorsum. Like that of female.

Idiosomal venter. Tristosternal base under anterior margin of holoventral plate ; lacinae free, pilose. Holoventral plate with 28-30 pairs of short, simple setae, which increase in length posteriorly ; with numerous circular-shaped pores, and two pairs of slit-shaped pores of which one pair anterior to anus and other submarginal on posterior edge of plate. Ventrimarginal plates like those of female.

Legs. Like those of female.

Gnathosoma. Tectum and chelicerae similar to those of female. Gnathosomal setae short, only about one-fourth as long as those of female (Fig. 4 D). Deutosternum wider than that of female, lacking teeth and appearing as if anterior portion folded inward and posterolaterally. Hypostomal setae indistinguishable as such. Proximal setae rotated inward and projecting anterodorsally, appearing as sclerotized rods through integument. Medial hypostomal setae absent, possibly represented by paired sclerotized tubercles which project ventrally from level of corniculi bases. Paired, heavily sclerotized, articulated rods with a membranous expansion on dorsal surface lie in the region of, and are probably homologous with, the distal hypostomal setae. Corniculi heavily sclerotized and similar to those of female ; hypopharyngeal processes like those of female.

DEUTONYMPH (Fig. 5).

Mean *length* of idiosoma 540 μ (479-544) ; mean *width* 384 μ (334-455).

Idiosomal dorsum. Shape oblong, oval ; broadly rounded anteriorly and posteriorly ; widest over coxae IV. Covered by 3 shields. Podonotal shield with a broadly rounded anterior margin, truncate posterior margin, and bearing 14 pairs of simple setae. Anterior opisthosomal shield almost twice as wide as long ; with 11 pairs of simple setae ; lateral margins broadly rounded, tapering posteriorly. Posterior opisthosomal or pygidial shield broader than long, with anterior margin broadly convex and acute anterior angles ; lateral margins taper posteriorly to truncate posterior margin ; with 2 pairs of setae, one pair in anterior half and second pair, 3-4 times longer than other dorsal setae, projecting posterolaterally from posterior angles ; three pairs of pores on lateral margins. Two small platelets, each with one seta, lie in membranous area between opisthosomal and pygidial shields ; setal length equals that of anterior pygidial setae. Five vertical setae on membrane anterior to podonotal shield. Twelve pairs of setae, increasing in length posteriorly, and on small platelets project laterally from podonotal region. Margin of opisthosoma also with 12 pairs of platelets, each with one simple seta, clumped in groups of two ; one platelet of each pair being marginal and the other submarginal. Marginal and submarginal setae increase in length posteriorly.

Idiosomal venter. Tritosternal base lying in membrane between coxae I; lacinae pilose and free. Sternal shield lightly sclerotized, extending posteriorly to posterior margin of coxae III; longer than wide, being widest between coxae II and III; anterior margin deeply cleft, lateral margins sinuous and posterior margin broadly rounded, sometimes with an indentation. Sternal setae I-III on shield. Setae I submarginal on anterior angles; setae II level with coxae II and setae III level with coxae III. Pores slit-shaped; pores I immediately posterior and lateral

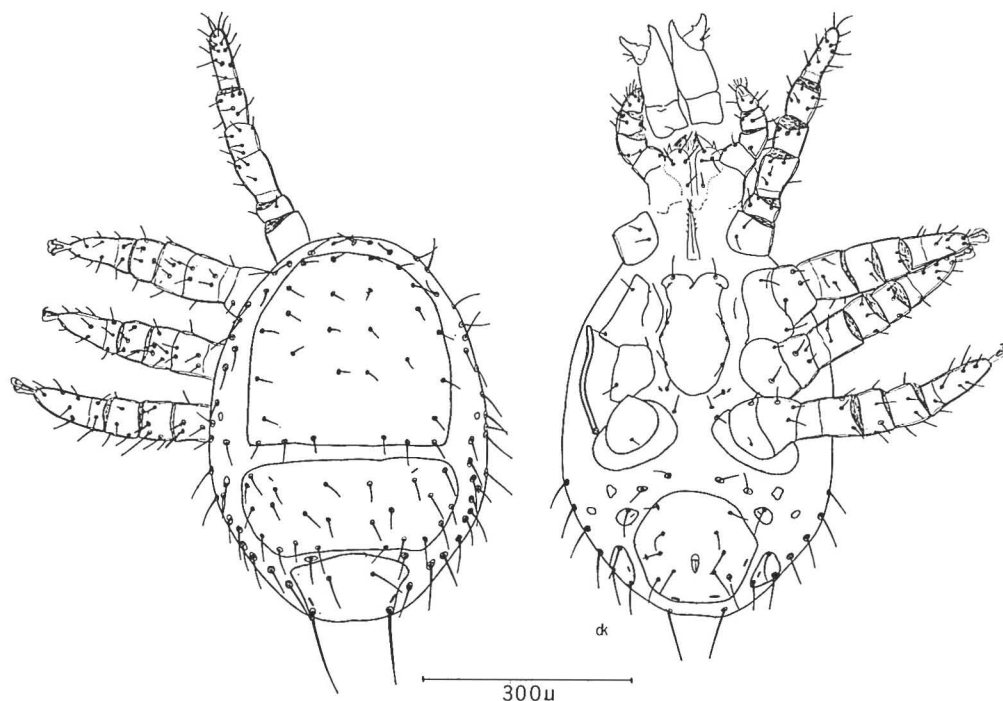


FIG. 5. — Dorsal and ventral aspects of deutonymph of *Pleuronectocelaeno drymoecetes*.

to setae I; pores II situated marginally at widest point of sternal shield. Sternal setae IV on membrane between coxae III and IV. Pores III lie anterolaterally to setae IV. Epigynial setae lie in membrane between coxae IV. Posterior half of coxae IV surrounded by metapodal shields which lack setae but have a pore on posterior margin. Membranous area between coxae IV and anterolateral margin of anal plate with 4 pairs of platelets, 3 of which each have a simple seta, and the largest of which also has a pore. Anal shield pentagonal, with 5 pairs of setae and 2 pairs of submarginal pores, one pair near posterior edge and another pair laterally; paranal setae longer than anterior 3 pairs of setae; posterior pair almost as long as paranals. One pair of longer caudal setae in membrane posterior to anal shield. One pair of large triangular plates, each with 3 long setae and a

pore, in membrane lateral to anal shield. Stigmata lateral to coxae IV ; peritremes extending anteriorly almost to middle of coxae II.

Legs. With simple setae ; chaetotaxy given in Table II. Distal posterodorsal setae of femur II and genua III and IV about twice as long as other leg setae. Distal posterodorsal setae of genu IV longer than similar setae on femur II and genu III. Tarsi II-IV bear slit-shaped pores dorsally.

Gnathosoma. Similar to that of adult female ; distal hypostomal setae stouter than others ; medial setae longest. Chaetotaxy of palpal trochanter, femur and genu : 2, 5, 7.

PROTONYMPH (Fig. 6).

Mean *length* of idiosoma 409 μ (327-455) ; mean *width* 283 μ (240-319).

Idiosomal dorsum. Shape similar to that of deutonymph. Covered by 4 plates and numerous small platelets. Podosomal shield largest, with 10 pairs of simple setae ; anterior margin broadly rounded and posterior margin truncate at level of coxae IV. Opisthosoma covered by paired mesonotal plates and pygidial shield. Mesonotal plates oblong, each with a simple seta medially and a pore laterally. Pygidial shield with sinuous anterior margin ; with 5 pairs of simple setae, the pos-

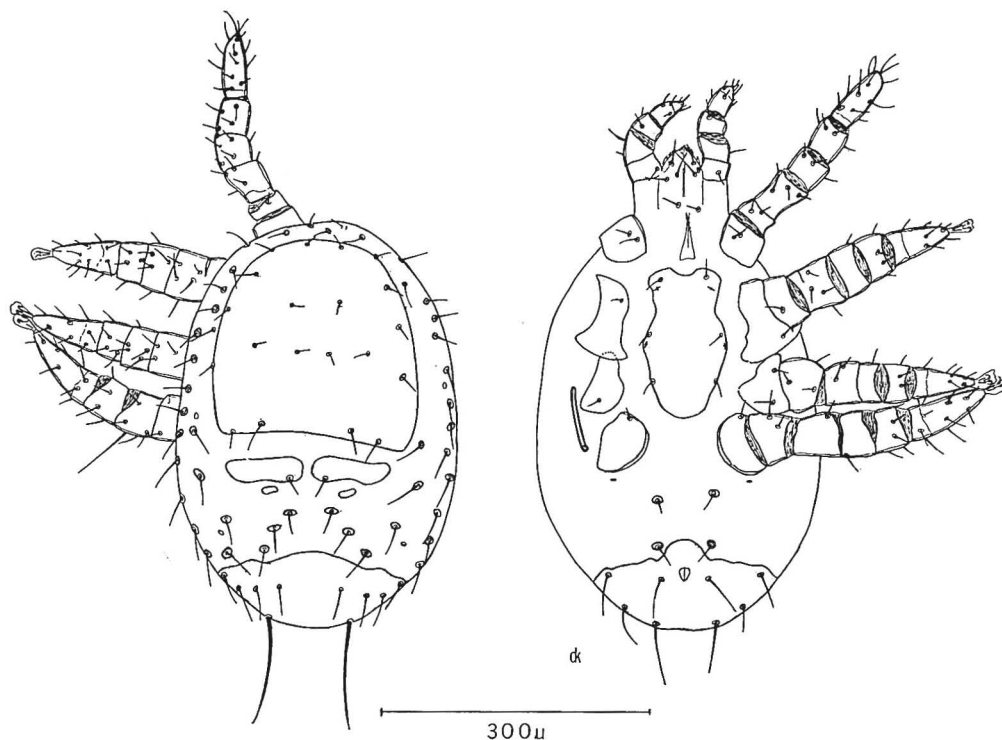


FIG. 6. — Dorsal and ventral aspects of protonymph of *Pleuronectocelaeno drymoecetes*.

terior pair about 3 times as long as others. Membrane between opisthosomal and pygidial shields with 7 pairs of platelets, all except pair immediately posterior to opisthosomal plates with a seta. Membrane anterior to podosomal shield with 5 verticals and lateral membrane with 14 pairs of small marginal platelets, each with a seta ; setal length increases posteriorly.

Idiosomal venter. Tritosternum as in deutonymph. Sternal shield lightly sclerotized ; anterior margin concave, lateral margins sinuous, posterior margin broadly rounded and not extending beyond anterior margin of coxae IV. Sternal setae I-III and pores I-II on sternal shield ; setae I submarginal on anterior angles ; setae II level with coxae II and setae III level with coxae III ; pores I immediately posterior to setae II on lateral margin of shield. Anal shield with 4 pairs of simple setae ; posterior pair longest, and 3 pairs of pores. Membranous area of opisthosoma with 2 pairs of platelets, each with a seta. A small metapodal platelet surrounds coxa IV ; membrane posterior to metapodal platelet with a small pore. Stigmata lateral to coxae IV ; peritremes extend to middle of coxae III.

Legs. With simple setae ; chaetotaxy given in Table II. Distal posterodorsal setae of femur II and genua III and IV at least twice as long as other leg setae ; seta of genu IV longest. Dorsally tarsi II-IV bear slit-shaped pores.

Gnathosoma. Similar to that of deutonymph. Chaetotaxy of palpal trochanter, femur and genu : 1, 3, 5.

LARVA (Fig. 7).

Mean *length* of idiosoma 319 μ (251-360) ; mean *width* 219 μ (170-258).

Idiosomal dorsum. Shape oblong, oval ; both anterior and posterior margins broadly rounded. Podosomal and mesonotal shields absent ; pygidial shield present. Podonotal region with 8 pairs of short, simple setae. Membranous area of opisthosoma with 6 pairs of simple setae, all longer than podonotal setae ; anterior opisthonotal setae longest. Pygidial shield broadly convex anteriorly, with paired setae on posterior angles and paired slit-shaped pores submarginally on anterior half of shield.

Idiosomal venter. Tritosternal base about twice as long as wide ; lacinae free and pilose. Sternal shield indistinct except for truncate anterior margin. Podosomal region with 3 pairs of simple setae. Pores I large, crescent-shaped, level with posterior margin of coxae I ; other pores inconspicuous. Opisthosomal region between anal plate and coxae III with 2 pairs of simple setae ; 2 pairs of setae lateral to anal plate. Anal plate markedly convex anteriorly and truncate posteriorly ; anus in anterior portion ; euanal setae present on anal sclerites. Lateral corners of anal plate with paired pores ; another pair of pores in membrane anterior to anal plate. Of 3 postanal setae, lateral ones longest, extending beyond posterior margin of body. Posterior margin of opisthosoma also with one pair of long setae.

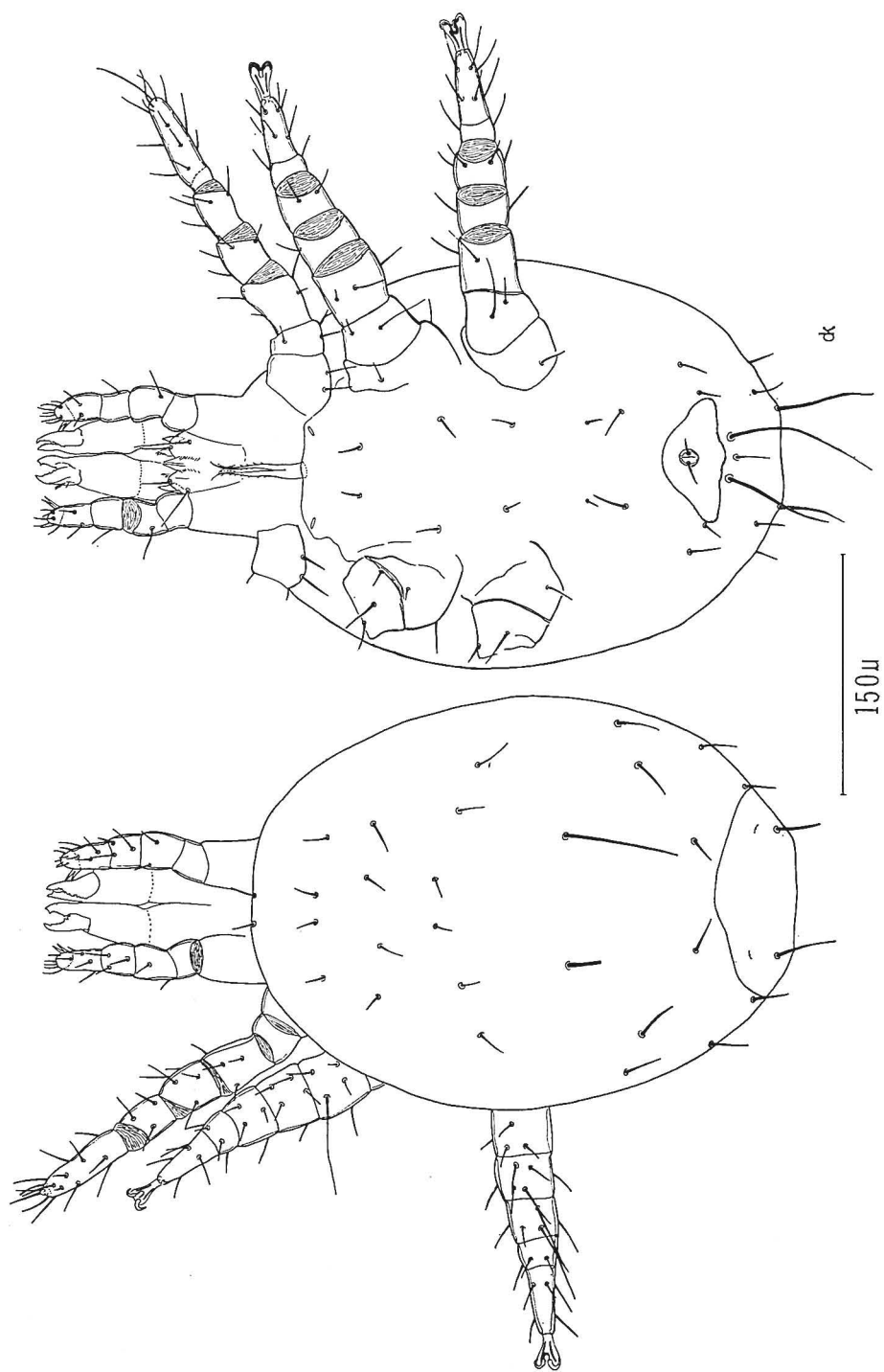


FIG. 7. — Dorsal and ventral aspects of larva of *Pleuronectocelaeno drymoecetes*.

Legs. With simple setae. Chaetotaxy like that of protonymph (Table II). Posterodorsal setae of distal pair on femur II and genu III more than 4 times as long as other setae. Tarsi II and III bear slit-shaped pores dorsally.

Gnathosoma. Medial hypostomal and gnathosomal setae absent. Proximal and distal setae simple, proximals almost twice as long as distals. Chaetotaxy of palpal trochanter, femur and genu : 0, 3, 4.

TYPE MATERIAL.

Holotype : female, Elizabeth, Allen Co., Louisiana, September 15, 1966, J. C. MOSER, from boring dust of *Dendroctonus frontalis* Zimmerman in *Pinus taeda* Linn. Allotype : same locality, same collection. Paratypes : larva (April 20), 1 female (May 9), 1 female (June 21), 1 female, 1 male (July 11), 5 females, 5 males (July 14), 4 females, 9 males (Sept. 15, 1966), same host, locality and collector ; 1 protonymph, 5 deutonymphs, 1 female (March 10, 1966), from *Pissodes nemorensis* Germar in *Pinus elliottii* Engelm., same locality and collector ; 1 male (Jan. 11, 1966), from outer bark of *Pinus taeda* Linn. infested with *Ips avulsus* (LeConte) and *Ips calligraphus* (Germar), same locality and collector ; 1 female, 1 male (Feb. 7), 1 female (June 1, 1966), from inner bark of *Pinus taeda* Linn. infested with *Ips avulsus* (LeConte) and *Ips calligraphus* (Germar), same locality and collector ; 6 deutonymphs, 1 female (Feb. 4, 1963), from *Ips calligraphus* (Germar) in *Pinus taeda* Linn., Tioga, Rapides Co., Louisiana, same collector ; 1 female (June 23, 1964), phoretic on *Ips avulsus* (LeConte), Dallas Co., Alabama, E. A. CARTER ; 6 females, 4 males (Nov., 1963), 1 female (June 23, 1964), Auburn, Lee Co., Alabama, same host and collector ; 1 female (Jan. 1, 1965), from galleries of *Dendroctonus frontalis* Zimmerman in *Pinus taeda* Linn., Newton, Newton Co., Texas, J. C. MOSER ; 2 larvae, 2 protonymphs, 1 deutonymph (March 25, 1964), from *Dendroctonus frontalis* Zimmerman boring dust in *Pinus taeda* Linn., Tyler Co., Texas, same collector ; 1 male (May 11, 1964), from *Ips confusus* (LeConte) in *Pinus ponderosa* Laws., Middletown, Lake Co., California, D. N. KINN and D. E. BRIGHT ; 3 females, 2 males (Aug. 14, 1966), from *Ips confusus* (LeConte) in *Pinus monophylla* Torr. & Frém., Kern Co., California, G. LANIER ; 2 females (Sept. 9, 1965), same host, Frazier Park, Kern Co., California, D. N. KINN ; 4 females, 8 males (Jan. 22, 1967), same host, 4.5 miles W. Chuchupate Ranger Station, Ventura Co., California, D. N. KINN, Y. KINN and N. KINN ; 3 females (April 10, 1964), from *Orthotomicus sabinianae* Hopping in *Pinus sabiniana* Dougl., Oakhurst, Mariposa Co., California, D. L. WOOD ; 1 female (Nov., 1963), same host and locality, D. L. WOOD and B. A. BARR ; 1 male (Feb. 16), 1 female (Feb. 25), 1 deutonymph, 1 female (March 3, 1966), from *Dendroctonus frontalis* Zimmerman and *Ips cribricollis* (Eichhoff) at midcrown of *Pinus oocarpa* Schiede, Tegucigalpa, Honduras, R. W. WILKINSON.

Holotype and paratypes are deposited in the United States National Museum, Washington, D. C. Paratypes are deposited in the British Museum (Natural

History), London, England; the Institute of Acarology, Columbus, Ohio; the Canadian National Collection, Ottawa, Ontario; and the author's collection.

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