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**OVACARUS PEELLEI, A NEW SPECIES OF MITE
(ACARINA: PODAPOLIPIDAE) ASSOCIATED WITH
THE CARABID PASIMACHUS ELONGATUS**

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Recently, a new genus and species of mite was discovered in association with the vaginal membrane or aedeagus of *Clivina impressifrons*, a pest which damages corn seed and seedlings in the midwest (Stannard and Vaishampyan 1971). This mite, *Ovacarus clivinae*, was described as a monotypic species of the genus *Ovacarus*. In the process of examining another midwestern carabid beetle, *Pasimachus elongatus* LeConte, an undescribed species of *Ovacarus* was discovered. Larviform females were found near the external genitalia. All stages were found associated with oviducts and vaginal membranes, in a manner similar to that described by Stannard and Vaishampyan (1971). The new mite is here described as *Ovacarus peellei*.

METHODS

Beetles from which mites are to be removed are placed in individual beakers containing distilled water at 60°C for approximately 1/2 hour. The beetle is removed from the water and excess water is removed with tissue paper. The elytra are lifted, hind wings are moved aside and the beetle is visually inspected for mites. Seventy percent alcohol is forcefully sprayed on the beetle from a 1/2 pint squeeze bottle. This is done over a petri dish two inches in diameter. A second visual inspection of the beetle is made. The beetle is dried again with tissue paper and the wings are returned to the original position.

The contents of the petri dish are examined under a dissecting microscope at 10 to 30 magnifications. Podapolipid mites such as those found in this study are usually small, white and possess three pairs of legs. Males and larviform females vary from 100-200 microns in length. Adult females are larger, 300-2400 microns, may be round or oval and may have from zero to three pairs of legs. Relatively few setae are found on all stages of these mites.

Pyemotidae, Tarsonemidae and acarid deutonymphs are approximately the same size but have four pairs of legs. Acarid deutonymphs (hypopi) are very common. A ventral posterior cluster of suction discs characterize this stage. Remaining groups of mites are larger and usually more heavily sclerotized than podapolipid mites.

Once found, mites are placed in vials containing 70% alcohol or placed directly on slides. Mites to be mounted directly are picked up with fine tip forceps, excess alcohol is carefully blotted away and mites are placed on slides in Hoyer's mounting medium. After the coverslips are placed in position, slides are placed on a warming tray (40°-45°C) at least overnight. The next day, slides are labeled completely and edges of coverslips are ringed with lacquer (nail polish).

All measurements and drawings are made with the aid of a Wild microscope drawing apparatus.

OVACARUS PEELLEI, n. sp.

O. peellei is distinguished from *O. clivinae* by the following characteristics: larviform female with length of setae verticales internae nearly as long as setae verticales externae and setae scapulares externae, setae verticales externae nearly 1/2 the distance between setae verticales internae and setae scapulares externae; male with fourth pair of legs more developed and more lateral in position than the fourth pair of legs of the male of *O. clivinae*; one pair of propodosomal setae in contrast to three pairs in *O. clivinae*; no coxal setae apparent in contrast to four pairs in *O. clivinae*; spicules at apex of aedeagus longer than corresponding spicules in *O. clivinae*. Table 1 gives ranges and means of measurements of the adult female, larviform female, male and egg.

Table 1. Measurements (in μ) of *O. peellei*

Character	Range	Mean
Adult Female (n = 10)		
Idiosoma length	884-1712	1226.8
Idiosoma width	640-2412	1092.3
Gnathosoma length	46-60	53.7
Gnathosoma width	51-78	61.0
Chelicera length	21-34	28.2
Male (n = 10)		
Idiosoma length	190-270	235.5
Idiosoma width	125-167	152.5
Gnathosoma length	28-37	33.6
Gnathosoma width	28-46	37.2
Chelicera length	15-22	18.8
Aedeagus length	24-40	31.5
Aedeagus width	35-50	42.7
Leg I	56-93	80.4
Leg II	85-107	93.6
Leg III	90-130	101.3
Larviform Female (n = 10)		
Idiosoma length	124-215	187.5
Idiosoma width	154-191	173.7
Gnathosoma length	35-45	38.3
Gnathosoma width	39-50	43.3
Chelicera length	18-29	24.8
Opisthosomal setae	13-26	21.6
Leg I	76-106	91.8
Leg II	101-127	112.8
Leg III	109-116	112.6
Setae verticales internae	5-6	5.4
Egg (n = 10)		
Length	192-280	251.5
Width	130-225	176.2

Female. As reproductive organs of female develop, the shape progresses from egg-shaped to spherical and genital opening anterior to opisthosomal setae elongates. Chelicerae and gnathosomas of adult females of *Archipolipus canthoni* develop inside exoskeletons of larviform females of this species. Lack of this phenomenon in *O. peellei* and nearly equal size of chelicerae in both mature and immature females indicate neotenus development in *O. peellei*.

Male. (Figs. 1, 2). Gnathosoma. Width about 1/4 that of idiosoma; wider than long, ventral microsetae, dorsal setae inconspicuous. Pedipalps reduced, rounded; length of chelicerae ca. 1/2 width of gnathosoma.

Propodosoma. Propodosomal plate hemispherical, with one pair of setae.

Metapodosoma. Plates I and II fused. Setae humerales internae and setae dorsales short but conspicuous, setae humerales externae short, less conspicuous. No plate discernable in association with fourth pair of legs, posteriorly directed aedeagus with three pairs of sclerotized spicules.

Sternum. Coxal plates I and II fused mesally, separated from III by an area of non-sclerotized integument. Coxae III separated from each other by non-sclerotized integument. No setae apparent on coxae.

Legs. Shorter than width of idiosoma; chaetotaxy as in Table 2. Two anterior spines and one posterior spine on tibia I, three spines on each of tibiae II and III. Tarsus I with

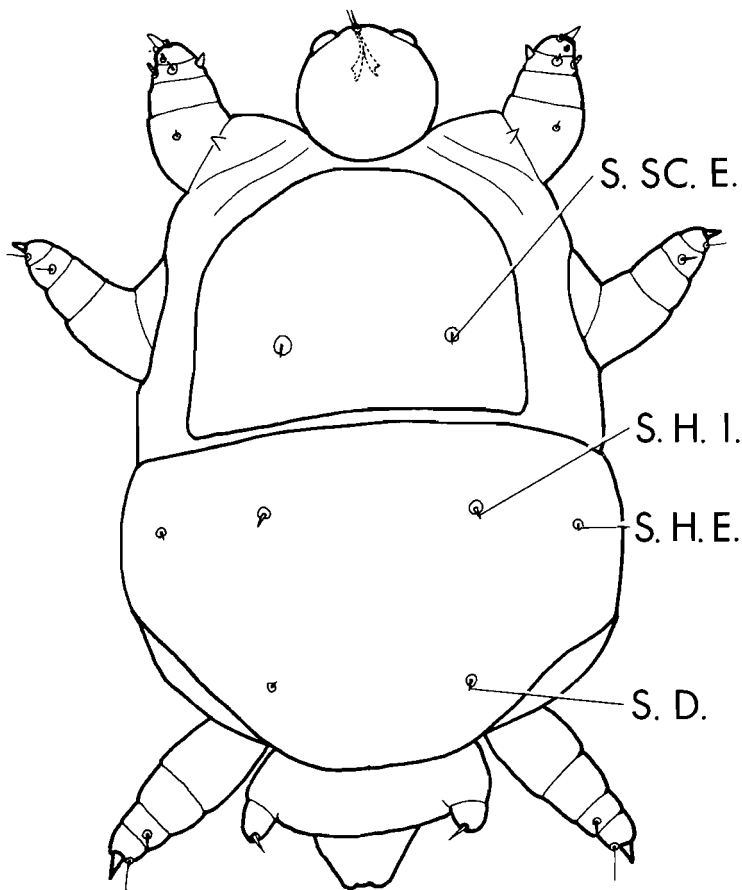


Fig. 1. *Ovacarus peellei*. n. sp. Dorsum of male. Setae: S.S.C.E., scapulares externae; S.H.I., humerales internae; S.H.E., humerales externae; S.D., dorsales.

a stout claw, tarsi II and III with two stout terminal spines, ambulacra much reduced. Tarsus IV with a mesally directed, needle-like spine.

Larviform Female (Figs. 3, 4). Gnathosoma. About 1/4 width of idiosoma; ventral microsetae, dorsal setae inconspicuous. Pedipalps reduced, rounded. Chelicerae smooth, more than 1/2 width of gnathosoma.

Propodosoma. Rectangular, three pairs of setae; setae verticales internae ca. equal in length to other propodosomal setae; setae verticales externae nearly equidistant between setae verticales internae and setae scapulares externae.

Metapodosoma. Plates I and II fused, three pairs of thick setae.

Opisthosoma. Plate I subquadrate to oval, with a pair of slender setae. Plate II ventral, bearing a pair of slender setae and a genital opening.

Sternum. Coxal plates I and II fused mesally, separated from III by an area of non-sclerotized integument. Coxae III separated from each other by non-sclerotized integument. Each of coxal plates I and II with a short thick seta, each of coxal plates III with two short thick setae.

Legs. Three pairs, shorter than width of idiosoma; chaetotaxy as in Table 2. Stout ventral spine on femur I, three spines on tibiae I, II and III; tarsi II and III with two

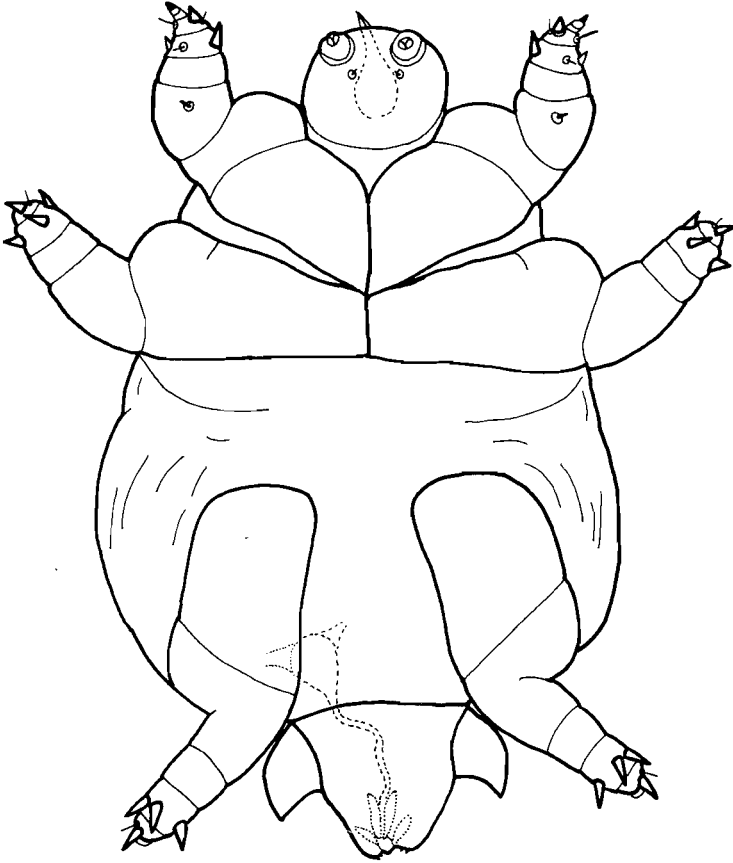


Fig. 2. *Ovacarus peellei*, n. sp. Venter of male.

Table 2. Leg chaetotaxy of male and larviform female of *O. peellei*.

Leg	Femur	Genu	Tibia	Tarsus
	1		2	2
I	0—0	0	2—1	2—1
	1		1	1
			1	1
II	0	0	1—1	1—1
			1	1
				1
III	0	0	1—1	1—1
			1	1
			0	1
IV (♂ only)	0	0	0—0	0—0
			0	0

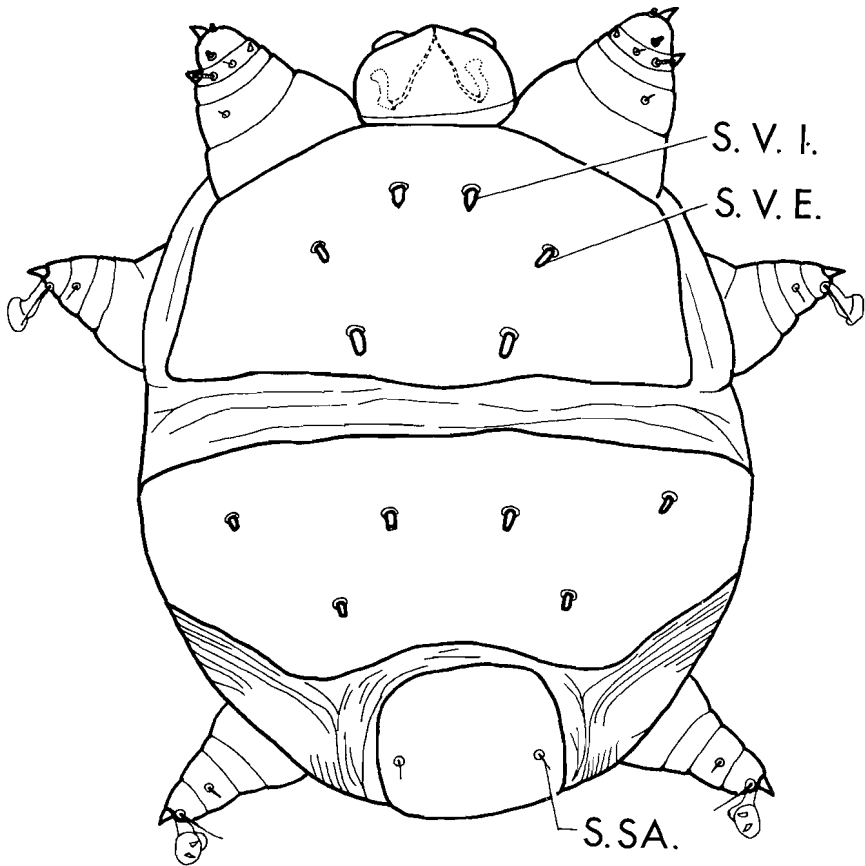


Fig. 3. *Ovacarus peellei*, n. sp. Dorsum of larviform female. Setae: S.V.I., verticales internae; S.V.E., verticales externae; S.SA., sacrales.

terminal spines. Solenidion on tibia I ca. 1/4 width of tibia I, solenidia on tarsus I ca. 1/3 as long as solenidion on tibia I. Claw on leg I with a single spine; two claws on each of legs II and III, often retracted into sucker like empodium.

Egg. One to nine oval eggs found within the bodies of the largest females.

Type data. Holotype, ♂; 25 ♀, 30 ♂ and 30 larviform female paratypes in sacs associated with the oviducts of *Pasimachus elongatus* LeConte; Valley City, North Dakota, 28 August 1917; collector P. W. Fattig. The holotype is deposited in the Acarology Collection of the University of Georgia.

Paratypes are to be distributed to each of the following: Adrian College, Adrian, Mich.; Bernice P. Bishop Museum, Honolulu, Hawaii; British Museum (Natural History), London, England; Canadian National Collection, Entomology Research Institute, Ottawa; University of Georgia, Athens; Acarology Laboratory of the Ohio State University, Columbus; L'Institut Royal des Sciences Naturelles, Bruxelles, Belgium; Hebrew University, Jerusalem, Israel; Le Museum National d'Histoire Naturelle, Paris, France; Institute of Zoological Research, Potchefstroom, South Africa; Research Station, Canada Department of Agriculture, Winnipeg; Snow Entomological Museum, Lawrence, Kansas; South Australian Museum, Adelaide, Australia; National Museum of Natural History,

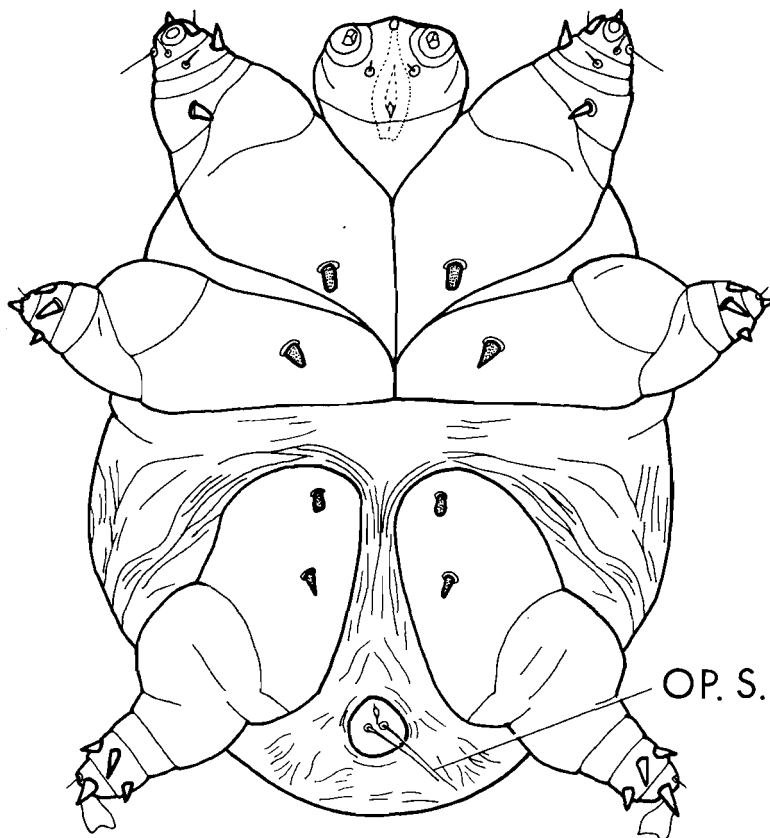


Fig. 4. *Ovacarus peellei*, n. sp. Venter of larviform female. Setae: OP.S., opisthosomal.

Washington, D. C.; Universitetes Zoologiske Museum, Copenhagen, Denmark; Zoological Institute of the Academy of Sciences, Leningrad, USSR; Zoologisches Institute der Universitat Freiburg, Germany; Instituto Sperimentale per la Zoologia Agraria, Firenze, Italy; Illinois Natural History Survey, Urbana, Illinois.

The species is named for Miles L. Peelle, Professor Emeritus of Adrian College, who for 34 years inspired young biologists at Adrian College.

DISCUSSION

Ovacarus, *Dorsipes* and *Eutarsopolipus* are three genera of podapolipid mites associated with Carabidae. *Dorsipes* and *Eutarsopolipus* are discussed by Regenfuss (1968). Keys to all stages of the genera are provided (Husband 1972). Males of *Eutarsopolipus* have three pairs of legs in contrast to four pairs of legs in *Ovacarus* and *Dorsipes*. In addition, the aedeagus of the *Ovacarus* differs in structure and orientation from the aedeagus of *Dorsipes*.

Larviform females of *Ovacarus*, with two pairs of coxae III setae, most closely resemble larviform females of *Eutarsopolipus* and *Dorsipes*. However, the development of tibial spines in this stage is unique to the family. Most setae of *Ovacarus* are shorter than setae in *Dorsipes* and *Eutarsopolipus*.

In general, male podapolipid mites are smaller than larviform female mites, chelicerae of males are less than 1/2 the length of the chelicerae of larviform females, males may

not feed and males may not leave the host insect. In contrast, males of *Ovacarus* are larger than larviform females, chelicerae are not reduced, and it is likely that male *Ovacarus* both feed and migrate to other hosts. Stannard and Vaishampayan (1971) present evidence for venereal transmission but suggest that this might not be sufficient for survival of the mites. It is not known how mites get from one generation to the next as egg masses, larvae and pupae have not been examined for mites. Cress and Lawson (1971) in discussing the biology of *P. elongatus* in Wyoming do not mention parasites. They note that *P. elongatus* is associated with moist habitats. It is possible that some mites may transfer from one host to another in such confined habitats as that found beneath cow chips.

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