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DESCRIPTIONS OF MALES AND IMMATURE STAGES
(ACARINA: CHEYLETIDAE)

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ROBERT L. SMILEY AND JOHN C. MOSER

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REDESCRIPTION OF *EUTOGENES VICINUS* SUMMERS AND PRICE,
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(ACARINA: CHEYLETIDAE)

ROBERT L. SMILEY

Systematic Entomology Laboratory, IIBH, Agr. Res. Serv., USDA,
Beltsville, Maryland 20705

and

JOHN C. MOSER

Southern Forest Experiment Station, Forest Service, USDA,
Pineville, Louisiana 71360

ABSTRACT—*Eutogenes vicinus* Summers and Price is redescribed. Illustrations and descriptions are presented for the first time of the male and immature stages of this polymorphic species. Variation in length of palpi of the heteromorphic males is discussed.

The mite *Eutogenes vicinus* was described by Summers and Price (1970) from 2 females collected from leaf mold beneath *Acer macrophyllum* Pursh in California. Subsequently, Moser and Roton (1971) and Moser (unpublished) recorded it from *Pinus taeda* L. infested with the bark beetles *Dendroctonus frontalis* Zimmerman and *Ips avulsus* (Eichhoff); 176 specimens were collected from outer surfaces of loblolly pine and the beetles' boring dust in rearing containers. Individuals were seen feeding on 2 other mites, *Histiogaster arborisignis* Woodring and *Paraleius* n. sp., commonly associated with pine bark beetles. Both males and females of *Eutogenes vicinus* were reported phoretic on *Ips avulsus* by Moser and Roton (1971).

Because all stages of the mite were collected, and because the males exhibit marked polymorphism, we believe that a redescription of *E. vicinus* is warranted. The redescription is based on a sample of specimens consisting of 22 larvae, 28 protonymphs, 25 deutonymphs, 45 females, 19 homeomorphic males, 16 heteromorphic males (small form) and 21 heteromorphic males (large form).

Oudemans (1906) was first to note that species of Cheyletidae had

heteromorphic males, i.e. a male form larger than the normal male with elongated palpi. The polymorphism exhibited by *E. vicinus* males is of the type defined by Wilson (1953) as "allometry occurring over a sufficient range of size variation within a normal mature colony to produce individuals of detectably different form at the extremes of the size range." It is not the discontinuous polymorphism described by Woodring (1969) where distinct, genetically determined, heteromorphs are present. In this study we particularly noted the gradation in size of the palpi of the heteromorphic male and arbitrarily designated a small and a large form based on variations in the palpi length. The variation in palpal length is noted.

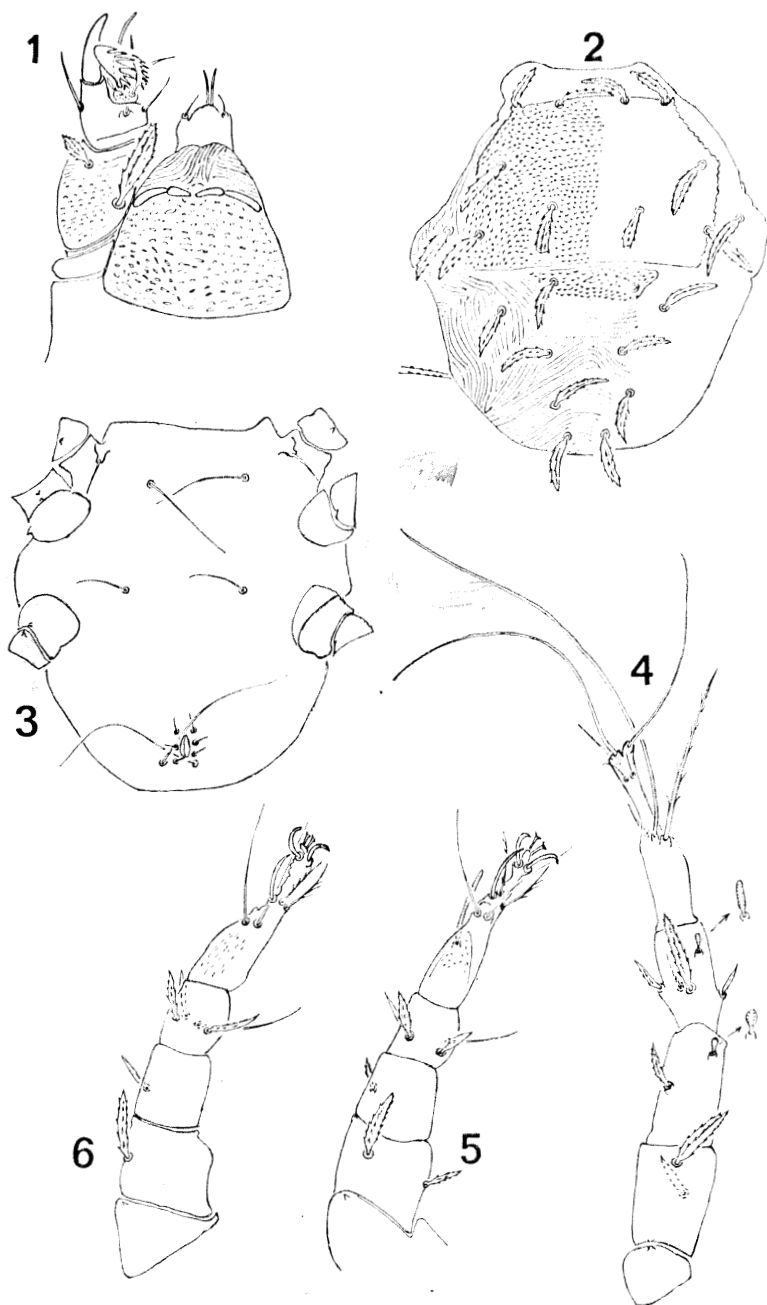
Eutogenes vicinus Summers and Price

Larva (fig. 1-6): Palpal femur longer than wide; dorsal seta serrated and spatulate, ventral seta absent; genu seta spatulate-serrate dorsally and without setae ventrally; tibial setae simple; tibial claw without teeth; palpi tarsus with 2 sicklelike and 2 comblike setae; outer comb large with 9 strong teeth and about $\frac{1}{3}$ longer than inner comb; inner comb with about 12 teeth. Stylophore with striae and tubercles as figured. Peritreme simple, composed of 2 pairs of segments. Propodosomal shield subrectangular, with tuberculate striae and 5 pairs of spatulate-shaped serrate setae. Humeral setae similar in size and shape. Hysterosoma with elongate median shield bearing a single pair of spatulate-serrate setae, with 4 pairs of subequal spatulate-serrate setae adjacent and below median shield. Venter as figured. Leg I longest; legs II and III similar in size and length. Coxa I with 1 simple seta; trochanter without setae; femur with 2 spatulate-serrate setae; genu with 1 spatulate-serrate seta and 1 capitate solenidion; tibia with 3 spatulate-serrate setae, 1 simple and 1 elongate solenidion; medial surface of tarsus with 1 simple seta ventrally and 1 serrate seta and 1 whiplike simple seta dorsally; distally with 2 parallel short simple setae; and terminally with 1 outer long simple seta and 1 long whiplike seta on inner surface; below this seta, a shorter simple seta. Coxa II without setae; trochanter without setae; femur with 2 spatulate-serrate setae; genu with 1 spatulate-serrate seta; tibia with 1 simple and 3 spatulate-serrate setae; tarsus with 1 mediolateral long solenidion; distally with 1 pair subequal simple setae; terminally with 2 finely serrate setae and 1 saberlike seta. Chaetotaxy for leg III same as for leg II, except femur with 1 spatulate-serrate seta and tarsus without solenidion. All tarsal claws smooth and with a padlike empodium with tenent hairs. Anal area with 4 pairs of simple setae; distal pair longest. Length of body, excluding gnathosoma, 140 μ ; width 134 μ .

Protonymph (fig. 7-13): Palpal femur longer than wide, dorsally with 1 spatulate-serrate seta; ventral seta simple; genu with 1 dorsal spatulate-serrate seta; tibia with 3 simple setae; tibial claw without teeth; palpal tarsus with 2 sicklelike and 2 comblike setae; outer comb large with 4-5 strong teeth; inner comb

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Fig. 1-6. *Eutogenes vicinus*, larva. 1, gnathosoma. 2, dorsum. 3, venter. 4, right leg I. 5, right leg II. 6, right leg III.



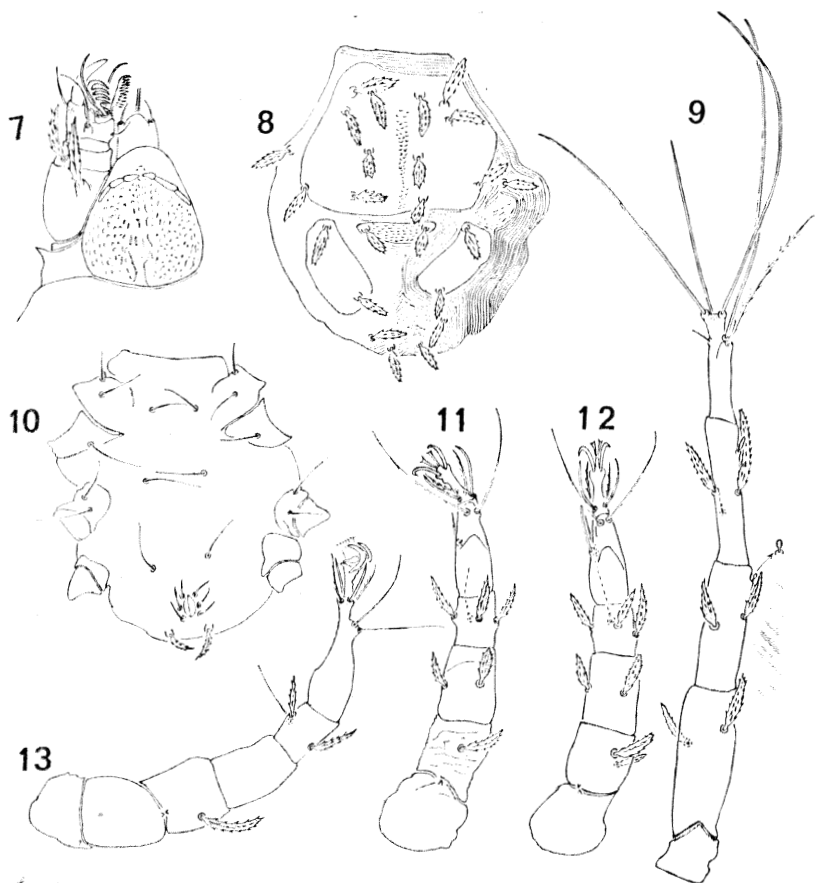


Fig. 7-13. *E. vicinus*, protonymph. 7, gnathosoma. 8, dorsum. 9, right leg I. 10, venter. 11, right leg III. 12, right leg II. 13, right leg IV.

with about 12 teeth. Stylophore distally (protegmen) with microtuberculate striae; proximally (tegmen) with striae broken into small rods near midline; gradually becoming rotund tubercles laterally; venter with 1 pair long simple setae. Peritreme simple, composed of 3 pairs of segments. Propodosomal shield subrectangular; with tuberculate striae and 6 pairs spatulate-serrate setae. Humeral setae similar in size and shape to other dorsal setae. Hysterosoma with 1 elongate median shield and 1 pair lateral shields. Each shield bearing 1 pair of setae as figured; below lateral shield 2 pairs of spatulate-serrate setae medially. Leg I longest; legs II-IV similar in size and length. Coxae I with 2 simple setae; trochanter without setae; femur with 2 spatulate-serrate setae; genu with 2 spatulate-serrate setae and 1 peglike solenidion; tibia with 3 spatulate-serrate setae, 1 simple seta and 1 solenidion; tarsus medial surface with 1 simple setae

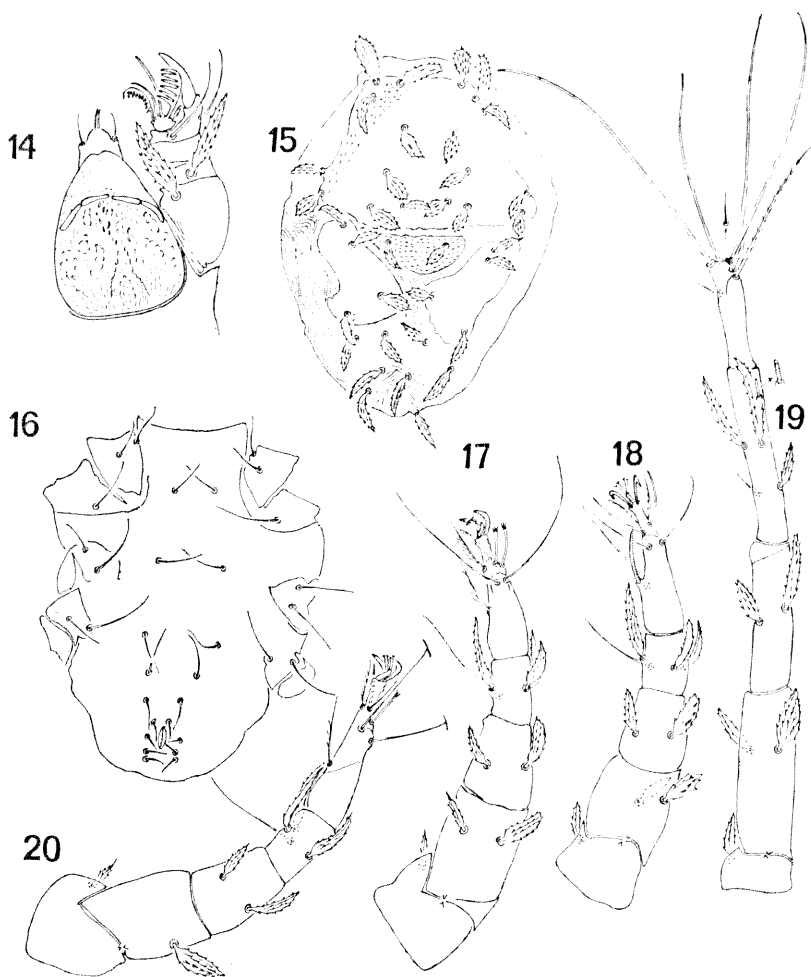


Fig. 14-20. *E. vicinus*, deutonymph. 14, gnathosoma. 15, dorsum. 16, venter. 17, right leg III. 18, right leg II. 19, right leg I. 20, right leg IV.

ventrally and 1 serrate seta and 1 whiplike seta dorsally; distally with 2 parallel, subequal, long simple setae; and 1 short simple seta medially. Coxa II with 1 simple seta; trochanter without setae; femur with 2 spatulate-serrate setae; genu with 2 spatulate-serrate setae; tibia with 3 spatulate-serrate setae and 1 simple seta; tarsus with 1 mediolateral simple seta and 1 elongate solenidion; dorso-medially with 2 parallel simple setae; terminally with 2 serrate setae and 2 saber-like setae. Coxa III with 2 simple setae; trochanter without setae; femur with 1 spatulate-serrate seta; genu with 2 spatulate-serrate setae; tibia with 3 spatulate-serrate setae and 1 simple seta; tarsus with 1 medioventral simple seta; dorso-

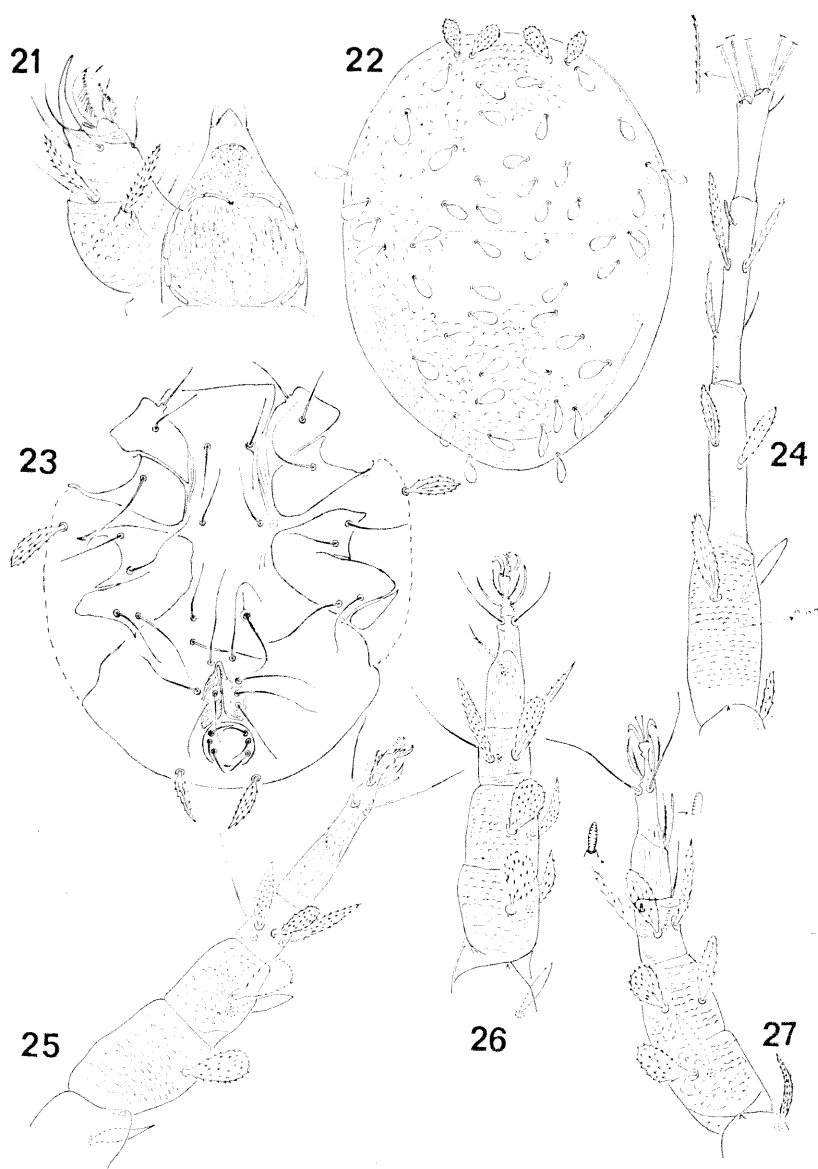


Fig. 21-27. *E. vicinus*, female. 21, gnathosoma. 22, dorsum. 23, venter. 24, left leg I. 25, left leg IV. 26, left leg III. 27, left leg II.

medially with 2 parallel simple setae; terminally with 2 serrate setae and 2 saber-like setae. Coxa IV without setae; trochanter without setae; femur with 1 spatulate-serrate setae; genu without setae; tibia with 2 spatulate-serrate setae and 1 simple seta; tarsus dorsomedially with 2 parallel simple setae; terminally with 2 serrate setae and 2 saberlike setae. Tarsi II-IV with 2 smooth claws and padlike empodium with tenent hairs. Venter of idiosoma with 4 pairs of setae medially; posterior distal pair serrate. Anal area with 3 pairs of simple setae. Length of body, excluding gnathosoma, 185 μ ; width 165 μ .

Deutonymph (fig. 14-20): Gnathosoma same as for protonymph except inner comb of palpal tarsus bears 14 teeth, and the outer comb has 7 strong teeth; and 2 segmented peritreme. Dorsal idiosoma same as protonymph except the propodosomal shield bears 9 pairs of spatulate-serrate setae; and the hysterosoma lateral shield bears 2 pairs of setae; with 4 medial pairs of setae below lateral shields. Legs similar in size and shape to those of protonymph; chaetotaxy similar except trochanter I-IV each with 1 seta; tarsus II has 6 setae; femur III has 2 setae, whereas there is only 1 on this segment in the protonymph. Ventral idiosoma dissimilar from protonymph; with 5 pairs of median simple setae and 4 pairs of anal setae. Length of body, excluding gnathosoma, 223 μ ; width 165 μ .

Female (fig. 21-27): Palpal femur robust, wider than long; dorsal seta situated on protuberance, spatulated and serrated; ventrally with 2 simple setae; setae of genu spatulate-serrate dorsally, ventral seta simple; tibia with 3 simple setae; tibial claw without teeth; inner comb with 18 teeth; outer comb with 12 strong teeth. Stylophore protegmen with microtuberculate striae; tegmen with striae broken into small rods, becoming larger on lateral margins; venter with 1 pair long, slender, simple setae. Peritreme simple, composed of 5-6 segments. Propodosomal and hysterosomal shields roughened with tuberculate striae varying in size and shape. Each shield with 12 pairs dorsal fan-shaped serrate setae. Humeral setae similar in shape, but slightly larger than other dorsal setae; situated on lateroventral platelets. Leg I longest; legs II-IV alike in size and length. Coxa I with 2 simple setae; trochanter with 1 spatulate-serrate seta; femur with 2 spatulate-serrate setae; genu with 2 spatulate-serrate setae; tibia with 1 simple seta. 1 solenidion, and 3 spatulate-serrate setae; tarsus with 1 medioventral simple seta; dorsomedially a protuberance bearing 1 long acuminate solenidion and 1 serrate guard seta; terminally with 2 subequal finely serrate setae and 1 long medial acuminate solenidion. Coxa II with 1 simple seta; trochanter with 1 spatulate-serrate seta; femur with 1 palmate-serrate and 1 spatulate-serrate seta; genu with 1 palmate-serrate and 1 spatulate-serrate seta; tibia with 1 peglike solenidion, 1 spatulate-serrate seta dorsally, 1 simple seta ventrally and spatulate-serrate setae laterally; tarsus with 1 finely serrate seta and 1 acuminate solenidion lateroventrally; dorsodistally with 2 parallel simple setae; terminally with 2 serrate and 2 saberlike setae. Coxa III with 2 simple setae; trochanter with 1 spatulate-serrate seta; femur with 1 palmate-serrate and 1 spatulate-serrate seta; genu with 1 palmate-serrate and 1 spatulate-serrate seta; tibia with 1 simple seta ventrally, 1 palmate-serrate seta dorsally and 2 spatulate-serrate setae laterally; tarsus with 1 finely serrate seta ventrally, dorsally with 2 parallel simple setae, terminally with 2 serrate and 2 saberlike setae. Coxae IV with 2 simple setae; trochanter with 1 spatulate-serrate seta; femur with 1 palmate-serrate seta; genu with 1 palmate-serrate and 1 spatulate-serrate seta; tibia with 1 simple seta ventrally, 1 palmate-serrate seta dorsally and 2 spatulate-serrate setae laterally; tarsus

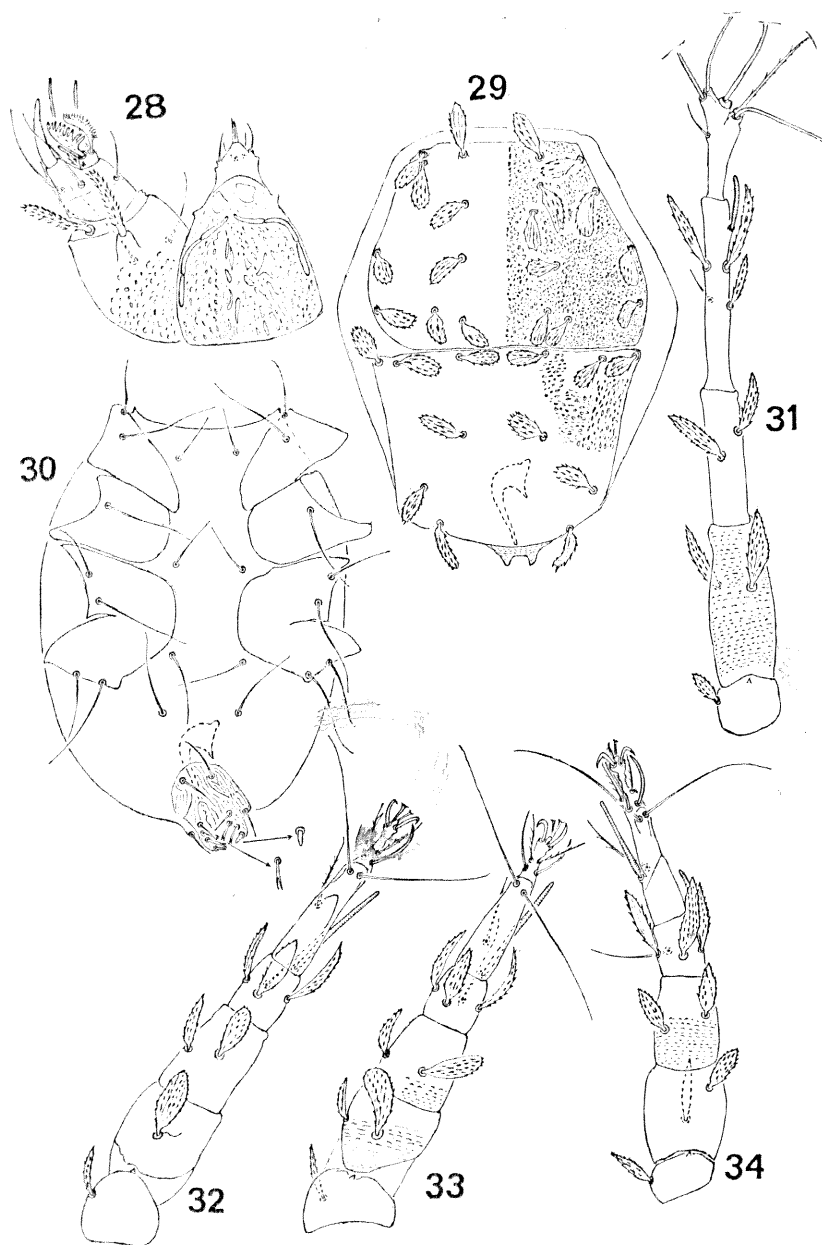


Fig. 28-34. *E. vicinus*, male. 28, gnathosoma. 29, dorsum. 30, venter. 31, right leg I. 32, right leg IV. 33, right leg III. 34, right leg II.

with 1 finely serrate seta ventrally, dorsally with 2 parallel simple setae, terminally with 2 serrate and 2 saberlike setae. Tarsi II–IV with 2 smooth claws and padlike empodium with tenent hairs. Venter of idiosoma as figured. Length of body, excluding gnathosoma, 319 μ ; width 268 μ .

Male (fig. 28–34): Similar to female by having palmate-serrate setae on the dorsum and by having identical chaetotaxy for leg I. Palpal femur robust (63 μ long and 51 μ wide), dorsal setae situated on protuberance, rodlike, stout, long and serrated, ventrally with 2 simple setae; genu dorsal seta rodlike, stout, long and serrated, ventrally with 1 simple seta; tibia with 3 simple setae, tibial claw without teeth, inner comb with 18 teeth, outer comb with 10 stronger teeth. Stylophore protegmen and tegmen striae as found in female. Peritreme simple, composed of 3–5 segments. Propodosomal and hysterosomal shields roughened with tuberculate striae varying in size and shape. Propodosomal shield with 9–10 pairs of palmate-serrate setae. Hysterosomal shield with 6 pairs of palmate-serrate setae. Humeral setae similar in size and shape to other dorsal setae. Leg I longest; legs II–IV alike in size and length. Coxa I with 2 simple setae; trochanter with 1 spatulate-serrate seta; femur with 2 spatulate-serrate setae; genu with 2 spatulate-serrate setae; tibia with 1 simple seta, 1 long rodlike solenidion and 3 spatulate-serrate setae; tarsus with 1 medioventral simple seta, dorsomedially with a protuberance bearing 1 long acuminate solenidion and 1 serrate guard seta, terminally with 2 subequal finely serrate and 1 long medial acuminate solenidion and 1 minute simple seta. Coxa II with 1 simple seta; trochanter with 1 spatulate-serrate seta; femur with 1 palmate-serrate and 1 spatulate-serrate seta; genu with 1 palmate-serrate and 1 spatulate-serrate seta; tibia with 1 long rodlike solenidion, 1 ventral simple seta and 3 spatulate-serrate setae; tarsus with 1 long, stout, rodlike solenidion and 1 serrate seta ventrally, dorsodistally with 2 parallel simple setae, terminally with serrate and 2 saberlike setae. Coxa III with 2 simple setae; trochanter with 1 spatulate-serrate seta; femur with 1 palmate-serrate and 1 spatulate-serrate seta; genu with 1 palmate-serrate and 1 spatulate-serrate seta; tibia with 1 simple seta ventrally and 3 spatulate-serrate setae; tarsus with 1 stout, long, rodlike solenidion ventroproximally and 1 medioventral serrate seta, dorsodistally with 2 parallel simple setae, terminally with 2 serrate and 2 saberlike setae. Coxa IV with 2 simple setae; trochanter with 1 spatulate-serrate seta; femur with 1 palmate-serrate and 1 spatulate-serrate seta; tibia with 1 simple seta ventrally and 3 spatulate-serrate setae; tarsus with 1 stout, long rodlike solenidion ventroproximally and 1 medioventral serrate seta, dorsodistally with 2 parallel simple setae, terminally with 2 serrate and 2 saberlike setae. Tarsi II–IV with 2 smooth claws and padlike empodia with tenent hairs. Venter as figured. Genital cleft flanked on each side with a row of 4 pairs of setae, 1st anterior pair simple, 2nd and 3rd fish-tail or Y-shaped, 4th pair bullet shaped. Length of body, excluding gnathosoma, 255 μ ; width 204 μ .

Heteromorphic male, small form (fig. 35–41): Gnathosoma same as for normal male except palpal tarsus inner comb bears 14 teeth and the outer comb bears 11 strong teeth. Palpal femur 70 μ long and 38 μ wide, larger than femur of normal male; protuberance bearing rodlike serrate seta, exceeding the length of protuberance and seta on normal male; rodlike setae may be forked or normal in some specimens; usually unforked; or vary (i.e. normal on 1 palpal femur and forked on the other). Peritreme varying with 4–5 segments. Dorsal propodosomal and hysterosomal shields with same number of serrate setae as shields of normal

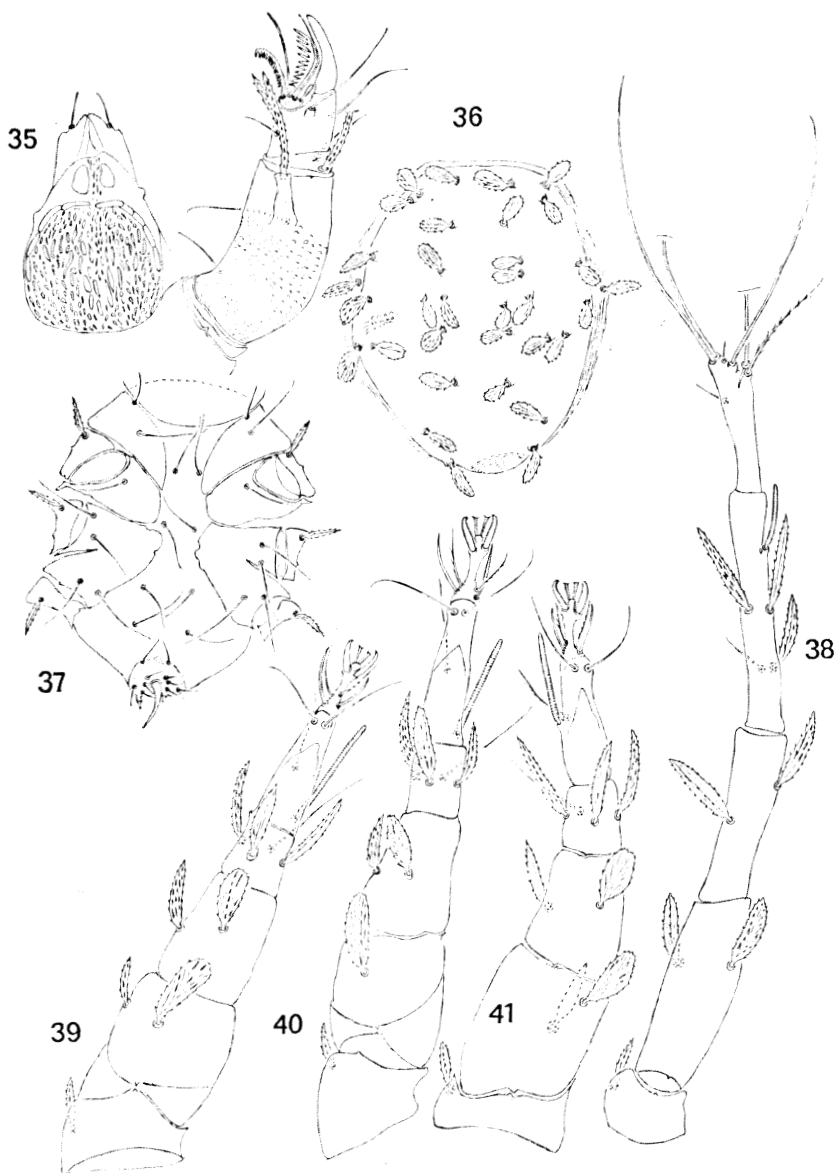


Fig. 35-41. *E. vicinus*, heteromorphic male, small form. 35, gnathosoma. 36, dorsum. 37, venter. 38, right leg I. 39, right leg IV. 40, right leg III. 41, right leg II.

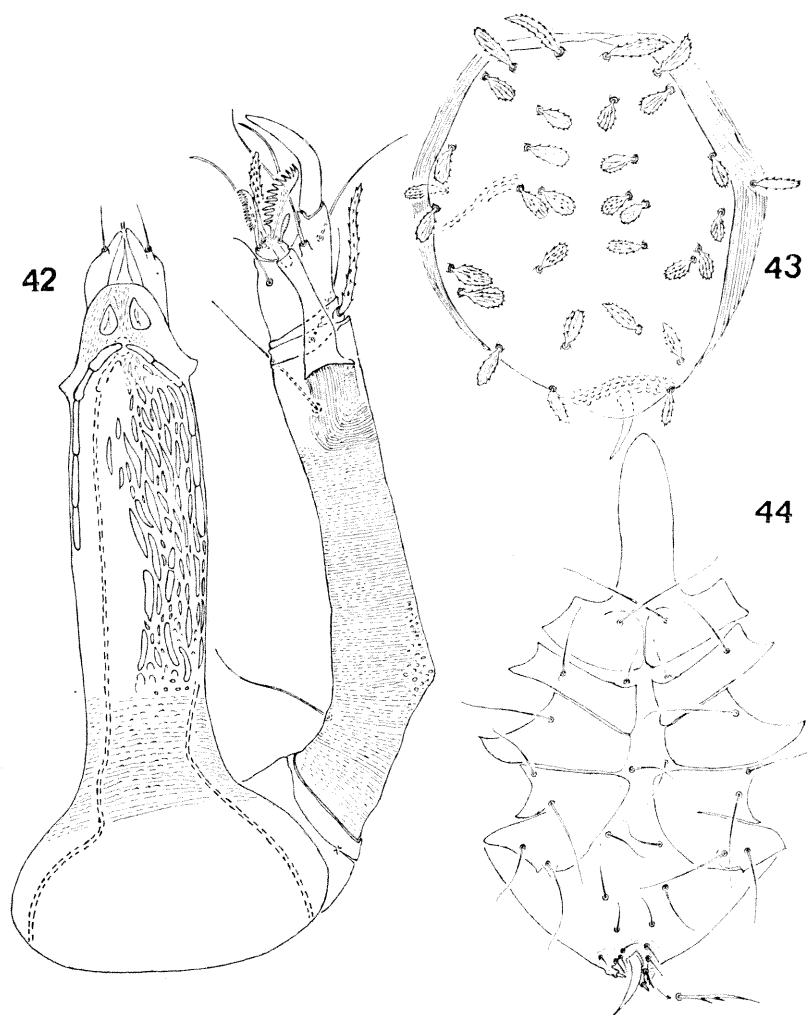


Fig. 42-44. *E. vicinus*, heteromorphic male, large form. 42, gnathosoma. 43, dorsum. 44, venter.

male. Legs like those of normal male, similar in size and shape, chaetotaxy same as those of normal male. Ventral idiosoma same as normal male and as figured. Length of body, excluding gnathosoma, 255 μ ; width 204 μ .

Heteromorphic male, large form (fig. 42-44): Gnathosoma similar to normal male and heteromorphic male small form except being conspicuously elongated. Inner comb of palpal tarsus with 18 teeth; outer comb with 15 stronger teeth. Palpal femur 172 μ long and 70 μ wide; protuberance bearing rodlike serrate seta

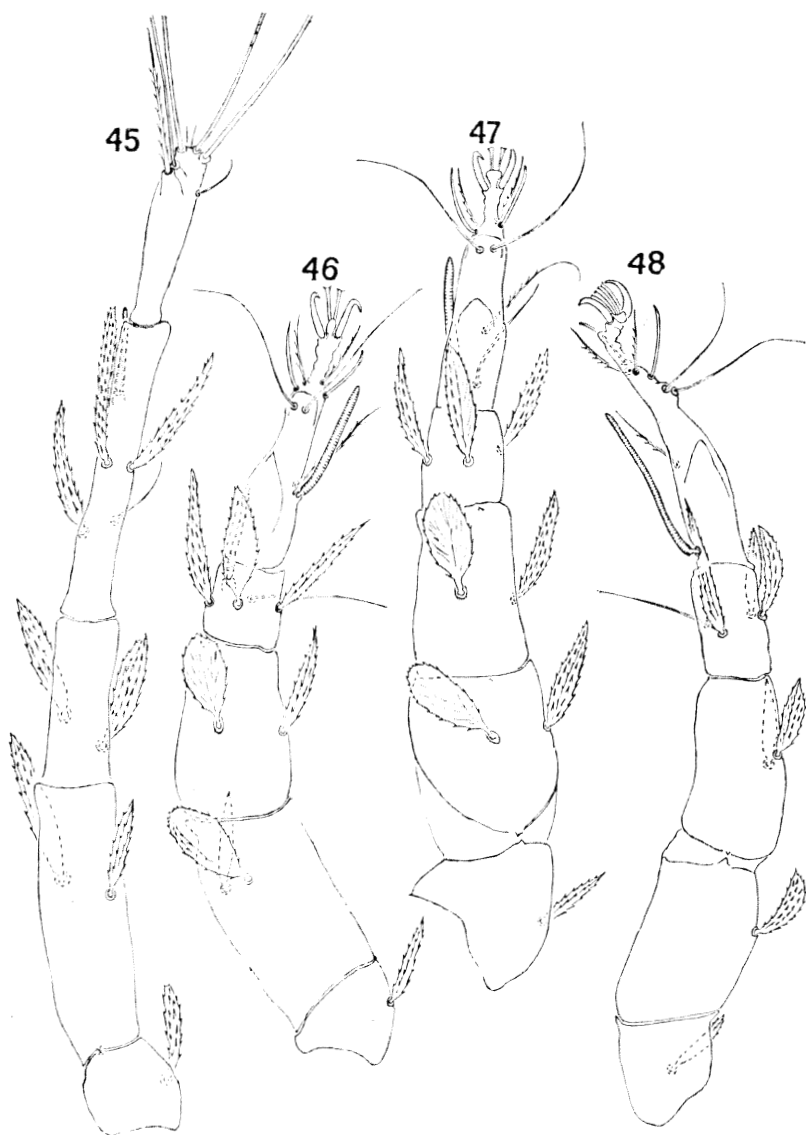
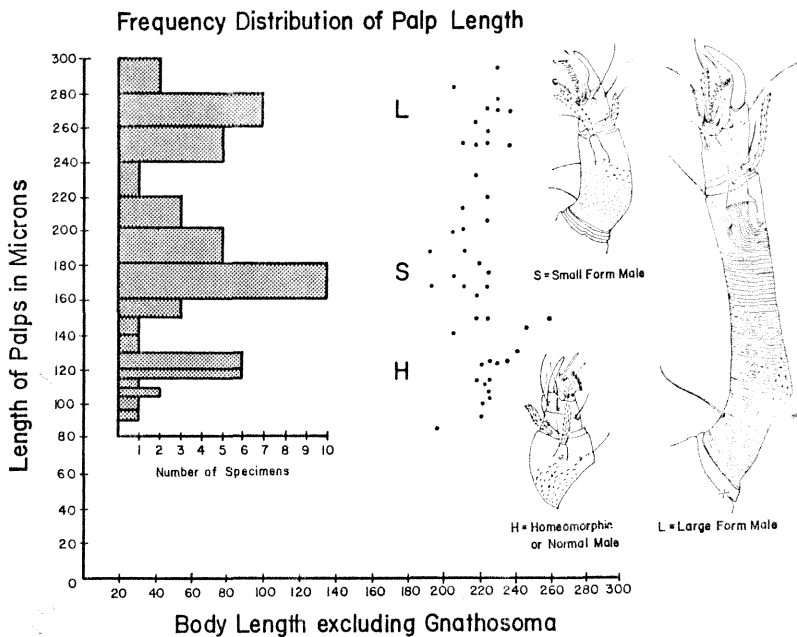


Fig. 45-48. *E. vicinus*, heteromorphic male, large form. 45, left leg I. 46, left leg II. 47, left leg III. 48, left leg IV.



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Fig. 49. Simple allometry and frequency in *Eutogenes vicinus*. Dorsal views of palpi of homeomorphic male (H), small form (S), and large form (L) are shown, along with placement of these specimens on allometric regression line. Several specimens of each form had the same dimensions and when calculated fell on the same point of the regression in each curve.

as found on other smaller male forms. Peritreme with 5 segments. Striae on tegmen composed of large fusiform rods as figured; gradually becoming rotund tubercles proximally. Dorsal propodosomal shield with 9 pairs of setae, whereas 9–10 pairs of setae are found on this shield of normal male and heteromorphic male small form. Hysterosomal shield with 6 pairs of setae, same number as found in all other males. Legs like other forms of species, similar in size and length; chaetotaxy for legs I–IV same as for other males, except 2 minute setae found on distal portion of tarsus I; only 1 minute seta is found on this segment for females and other males. Chaetotaxy of ventral idiosoma same as for other males. Length of body, excluding gnathosoma, 268 μ ; width 204 μ .

The frequency distribution of palp length among the 3 adult male forms is illustrated in fig. 49.

REFERENCES

- Moser, J. C. and L. M. Roton. 1971. Mites associated with southern pine beetles in Allen Parish, Louisiana. *Can. Entomol.* 103:1775–1798.

- Oudemans, A. C. 1906. Révision des chéletines. Mem. Soc. Zool. Fr. 19:36-218.
- Summers, F. M. and D. W. Price. 1970. Review of the mite family Cheyletidae. Univ. Calif. Pub. Entomol. 61:1-153.
- Wilson, E. O. 1953. The origin and evolution of Polymorphism in ants. Q. Rev. Biol. 28:136-156.
- Woodring, J. P. 1969. Environmental regulation of Andropolymorphism in Tyroglyphids (Acari). Proc. 2nd Internatl. Cong. of Acarol. 433-439 p.