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## A NEW DEUTEROGYNOUS ERIOPHYID MITE (ACARI: ERIOPHYIDAE) WITH DIMORPHIC MALES FROM *CAESALPINIA ECHINATA* (CAESALPINIACEAE) FROM BRAZIL: DESCRIPTION AND BIOLOGICAL OBSERVATIONS

Erika P. J. Britto<sup>1</sup>, Manoel G. C. Gondim Jr.<sup>1</sup>, Denise Navia<sup>2</sup> and Carlos H. W. Flechtmann<sup>3</sup>

1. Universidade Federal Rural de Pernambuco - UFRPE, Departamento de Agronomia, Área de Fitossanidade, 52171-900, Recife, PE, Brazil (e-mail: erikapessoa@pop.com.br; mguedes@depa.ufrpe.br); 2. Laboratório de Quarentena Vegetal, EMBRAPA Recursos Genéticos e Biotecnologia, C. Postal 02372, 70.770-900 Brasília, DF, Brazil (e-mail: navia@cenargen.embrapa.br); 3. CNPq-Brazil-Researcher, Universidade de São Paulo - ESALQ, Departamento de Entomologia, Fitopatologia e Zoologia Agrícola, C. Postal 9, 13418-900 Piracicaba, SP, Brazil (e-mail: chwflech@esalq.usp.br).

**ABSTRACT** - *Aceria inusitata* Britto and Navia **n. sp.** (Acari: Eriophyidae) is described from protogynes, deutogynes and two forms of males occurring under a “patches of webbing” from “pau-brasil,” *Caesalpinia echinata* L. (Caesalpinaceae), leaves. This is the first example of a deutergynous eriophyid mite in tropical regions with two forms of males, one resembling the protogyne and the other the deutogyne. In addition, biological observations are presented. *Aberoptus cerostructor* Flechtmann, is given a new generic assignment, *Aceria cerostructor* **n. comb.**

**Key words** - Acari, Eriophyidae, *Aceria*, “pau-brasil”, deutergyny, Neotropical, biology, taxonomy, new species, Brazil.

### INTRODUCTION

Brazil, the name of the South American country, is derived from the common name of a tree, “pau-brasil”, *Caesalpinia echinata* Lam. (Caesalpinaceae), native of the Atlantic Forest biome (Carvalho, 2003). First exploited as a dyewood through the extraction of “brasilina”, its wood is presently regarded worldwide as the best material for bows of stringed musical instruments (Pivetta, 2003). Nowadays, “pau-brasil” is rarely found in what remains of the Atlantic Forest (Romano, 2000).

Three eriophyoid mite species have been reported from Caesalpinaceae from Brazil: *Aculops caesalpiniae* Keifer from “pau-ferro” *Caesalpinia ferrea* Mart., *Aberoptus cerostructor* Flechtmann from “jatobá”; *Hymenaea courbaril* L. and *Aceria anisodorsum* Flechtmann from “sibipiruna” *Caesalpinia peltophoroides* Benth. (Keifer, 1977; Flechtmann, 2001; Flechtmann and Santana, 2007).

Until recently, *Aberoptus samoae* Keifer, *Aberoptus platessoides* Meyer and *A. cerostructor* were the only eriophyid species characterized by having a spatulate or shovel-shaped projection on the tarsus of the forelegs. They live under a waxlike layer on leaves of their host plants (Flechtmann, 2001). Deutogynes of the new spe-

cies, herein described, also present a spatulate projection on tarsus I. Hassan and Keifer (1978) have already considered the form of *A. samoae* as a deutogyne that presents a spatulate projection on tarsus I.

Deutergyny is primarily an evolutionary adaptation for survival of eriophyoid mites on deciduous plants in regions with well-defined winters, though it is found secondarily in milder regions and infrequently, even in tropical regions (Manson and Oldfield, 1996). Some reports of deutergynous species in tropical areas are *Aceria binarius* Keifer on *Peltophorum pterocarpum* Backer (Caesalpinaceae) in Thailand (Manson and Oldfield, 1996), *Aceria kenya* (Keifer) (Navia and Flechtmann, 2000; Amrine *et al.*, 2003) on mangoes throughout the tropics, *A. cerostructor* on *H. courbaril* (Flechtmann, 2001) and *A. anisodorsum* on *C. peltophoroides* (Flechtmann and Santana, 2007) - the last two in Brazil.

However, a unique feature of deutergyny is mentioned by Shevchenko and De-Millo (1968) in *Trisetacus kirghisorum* Shev. having two forms of females and two forms of males, infesting *Juniperus semiglobosa* Rgl. (Cupressaceae) in Russia.

A similar life history to that of *T. kirghisorum* was observed in the new eriophyid species collected in the tropics in association with “pau-brasil” - that is a deu-

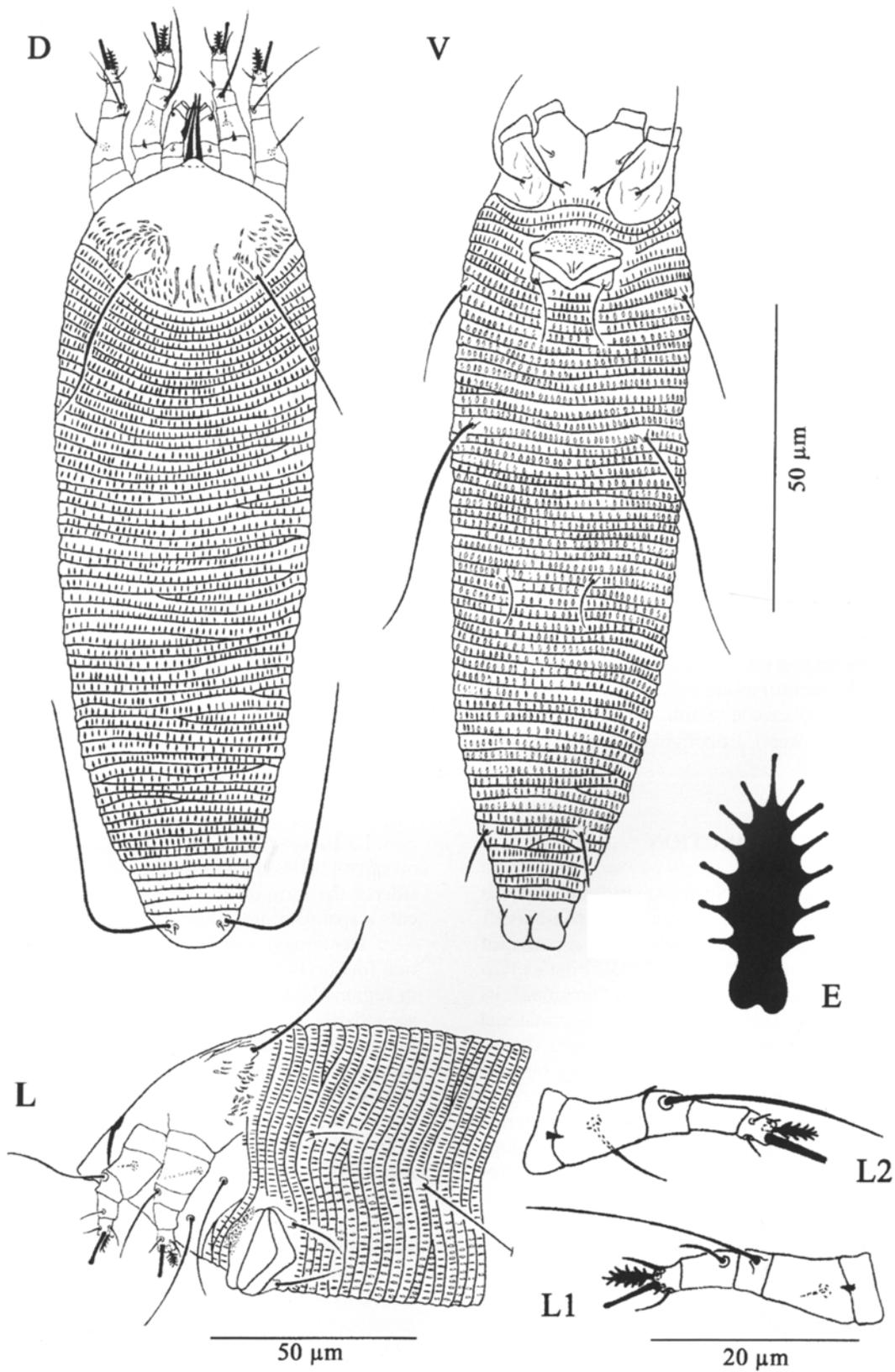


Fig. 1. *Aceria inusitata* n. sp. (protogyne) - D. dorsal habitus; E. empodium (enlarged); L. anterior semilateral habitus; L<sub>1</sub>. leg I; L<sub>2</sub>. leg II; V. ventral habitus.

terogynous species with two forms of males, one resembling the protogyne and other the deutogyne. Its colonies develop under "patches of webbing" and the protogyne is an *Aceria* Keifer. In this paper, the new species is described from the protogynes, deutogynes, and the two forms of males. In addition, biological observations are presented.

## MATERIALS AND METHODS

**Taxonomic studies** - In the laboratory, mites were collected from leaf samples of *C. echinata* by direct examination under a stereoscope, mounted in Hoyer's medium and studied under a phase-contrast microscope.

Morphology and nomenclature follows that of Lindquist (1996). Systematic classification follows that of Amrine *et al.* (2003). Measurements are given in micrometers ( $\mu\text{m}$ ) and, unless stated otherwise, refer to the length of the structure. Holotype measurements precedes the corresponding range for the paratypes. Some measurements could not be taken because of body position they were mounted. In the description, opisthosomal annuli count is from the genitalia rear margin and dorsal opisthosomal annuli count is from the mid-rear margin of the prodorsal shield.

**Biological observations** - *Caesalpinia echinata* mite-infested and mite-free leaflets were collected from the "in vivo" bank of germplasm of the Universidade Federal Rural de Pernambuco (UFRPE), Recife, Pernambuco, Brazil (8°01'00''S, 34°56'40''W). Six mite-free leaflets were washed with distilled water and placed with the axial surface against a paper disk, over a polyethylene foam disk. This set was placed inside a Petri dish, 16 cm in diameter (Fig. 5G and H), herein referred to as an arena. Leaflet borders were covered with absorbent paper strips and the petiole with hydrophilic cotton. To maintain appropriate humidity inside the dishes, the paper disks were moistened daily with distilled water. The arenas were kept inside a chamber under controlled conditions (temperature 26°C; photoperiod 12 h; and relative humidity  $60 \pm 10\%$ ).

**Development** - One deutogyne was transferred from an infested leaflet to each leaflet inside five arenas totaling 30 infested leaflets. After a 1-4 day period of randomized wandering around the leaflet surface, the deutogyne became nearly immobile swinging its opisthosoma sideways and a little upward, weaving strands of a material excreted at its caudal end into nest-like structures. These nests could be isolated individually or coalesced, as the result of the activity of more than one female. Soon afterwards they started laying eggs. The "nests" were examined at 24 hour intervals for observation of the viability and duration of the egg phase and of larva, nymph and adult stages. Observations were conducted by removing each leaflet to a microscope slide and examining the mites

under a compound microscope with a 20x objective and 10x ocular through the "nest".

**Reproduction** - Deutogynes removed from colonies in the field, 0-48h after emergence, were transferred individually to "pau-brasil" mite-free leaflets, as described above. Infested leaflets were observed each 24 h for the evaluation of deutogyne oviposition and survival. A total of 16 individuals were observed.

**Composition of colonies** - Sixty "nests" were measured for their greatest length and width under a microscope using a 4x objective and 10x ocular. Subsequently, all mites from each "nest" were transferred to and mounted in Hoyer's medium on a microscopic slide to assess their numbers and identification.

## RESULTS

### *Aceria inusitata* Britto and Navia n. sp. (Figs. 1-5)

Eriophyidae, Eriophyinae, Aceriini

**Diagnosis** - An *Aceria* with a 7-rayed (six paired and one apical single) empodium. Dorsal and lateral setae of tarsus I very short, subequal in length, approximately as long as solenidion. Prodorsal shield ornamentation restricted to posterior half and consisting of a few faint longitudinal lines and elongated granules; frontal lobe small, rounded. Epigynum with fine granules basally, smooth distally except for three short central convergent longitudinal lines.

**PROTOGYNE** (n = 10) (Figs. 1 and 4 A-E) - Body vermiform, 193 (171-193), 60 (52-60) wide; white when alive. **Gnathosoma** - projecting downward, 20 (16-20); basal seta (*ep*) 3 (2-3); antapical seta 4 (4); chelicerae 20 (18-20); oral stylets 11 (10-11). **Prodorsal shield** - 30 (30), 45 (40-47) wide, subcircular. Shield smooth on anterior half; medioposteriorly with 4 (3-4) strong, longitudinal lines. Posterior half with irregularly scattered elongate granules as in Fig. 1. Scapular seta (*sc*) 40 (40-46), directed backwards, slightly divergently, on prominent tubercles placed near posterior shield margin, 40 (40-46) apart. Frontal lobe small, rounded, 3 (3), 4 (4) wide. **Legs** - with all segments and usual setae present. Legs I 21 (21-24); femur 8 (8-11), femoral seta (*bv*) 4 (3-5); genu 4 (4), genual seta (*l''*) 22 (20-23); tibia 5 (5), tibial seta (*l'*) 6 (6-9); tarsus 4 (4), lateral seta (*ft''*) 6 (5-6), dorsal seta (*ft'*) 5 (5-6), unguinal seta (*u'*) minute, solenidion 6 (5-6); empodium 6 (6), 7-rayed, single apical ray. Legs II 23 (23-25); femur 10 (10-12), *bv* 6 (5-6); genu 4 (4), *l''* 15 (14-16); tibia 5 (5); tarsus 4 (4), *ft''* 4 (3-4), *f'* 2 (2), *u'* minute, 1, solenidion 6 (6); empodium 7-rayed as in leg I. **Coxae** - with faint lines. Sternal line conspicuous, 13 (11-13). Coxal seta I (*1b*) 4 (4), 6 (6) apart; coxal seta II (*1a*) 23 (20-23), 6 (6) apart; coxal seta III (*2a*) 30 (30-33), 27 (25-28) apart; 3 (3) coxigenital annuli, microtuberculate. **Genitalia** - 9 (9), 21 (20-21) wide; coverflap

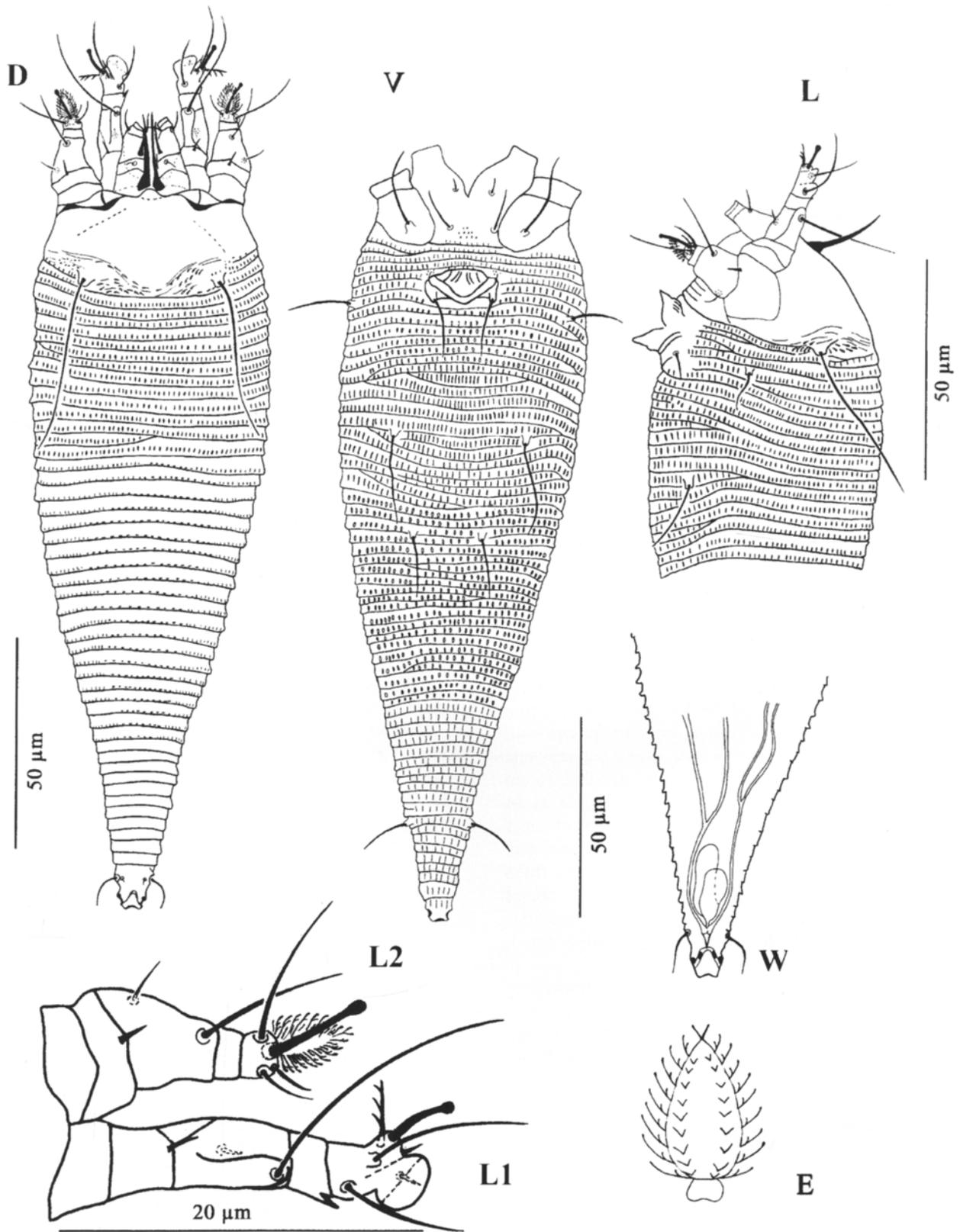


Fig. 2. *Aceria inusitata* n. sp. (deutogyne) - D. dorsal habitus; E. empodium (enlarged); L. anterior lateral habitus; L<sub>1</sub>. leg I; L<sub>2</sub>. leg II; V. ventral habitus; W. opisthosoma with internal wax-like substance with secreting paired structures.

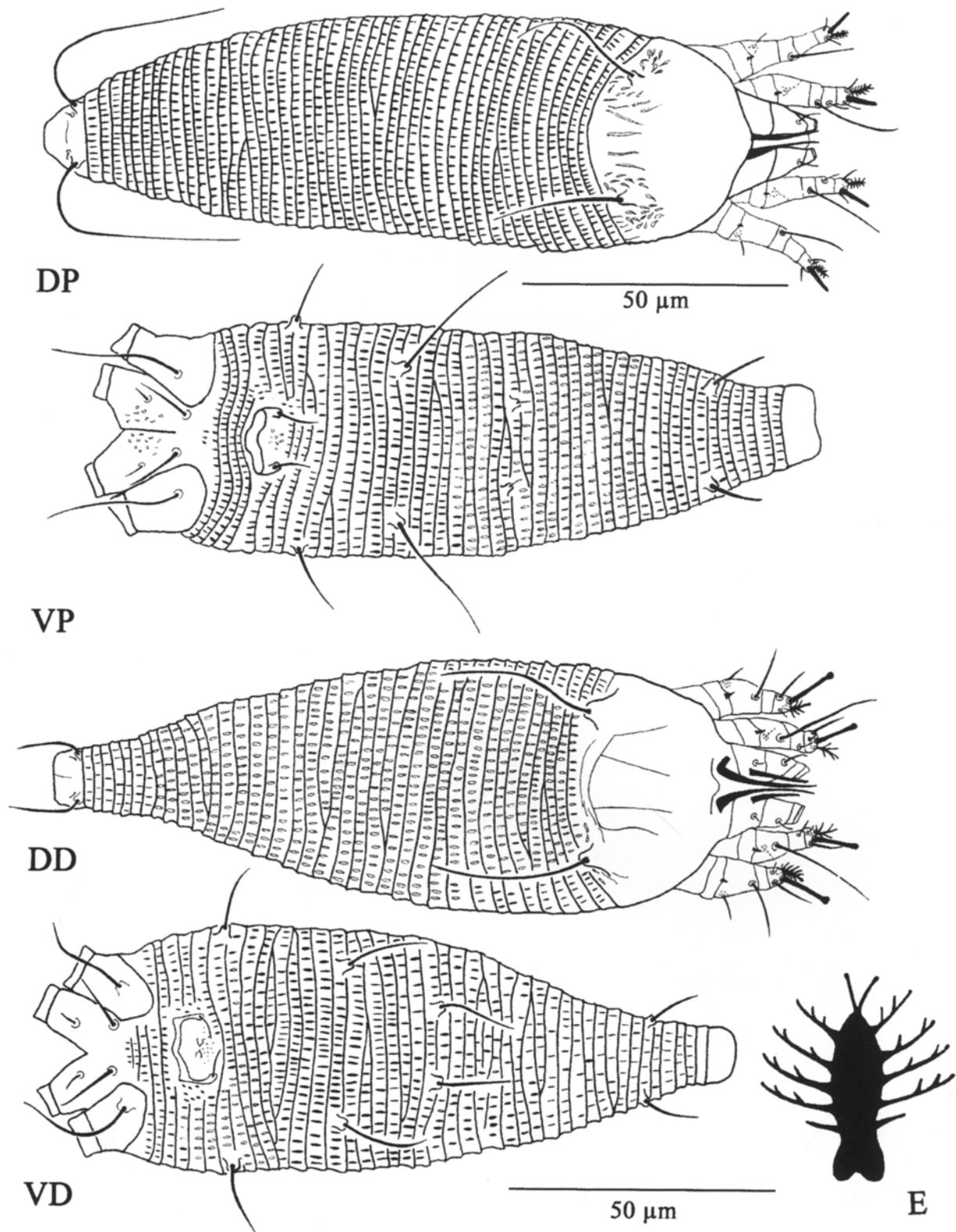


Fig. 3. *Aceria inusitata* n. sp. (males) - DD. dorsal habitus of deutogyne-like male; DP. dorsal habitus of protogyne-like male; E. empodium of deutogyne-like male (greatly enlarged); VD. ventral habitus of deutogyne-like male; VP. ventral habitus of protogyne-like male.

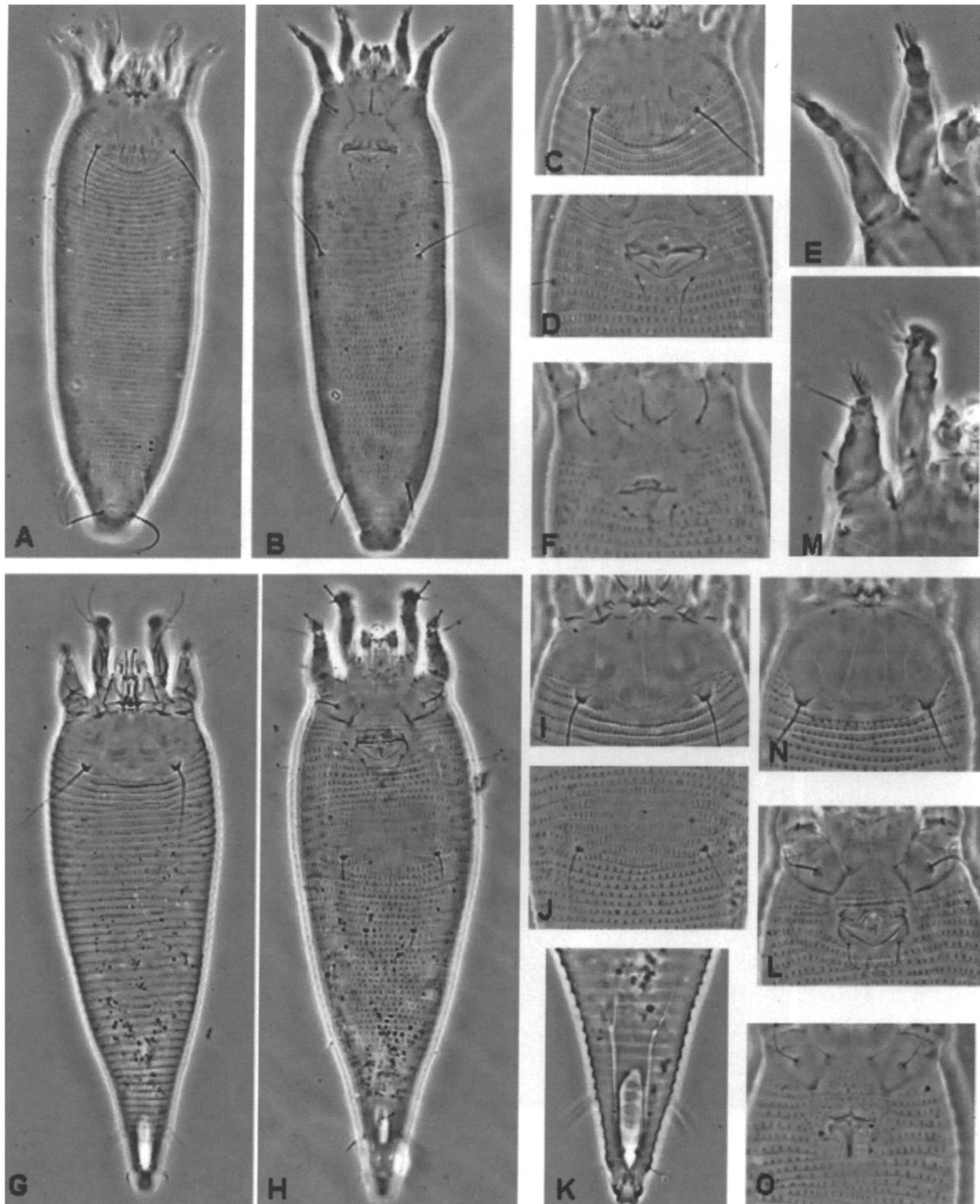


Fig. 4. *Aceria inusitata* n. sp. - A-E. protogyne; A. dorsal habitus; B. ventral habitus; C. prodorsal shield; D. genitalia; E. leg I and Leg II; F. protogyne-like male coxigenital area; G-M. deutogyne; G. dorsal habitus; H. ventral habitus; I. prodorsal shield; J. ventral microtubercles around 2nd ventral setae *d*; K. opisthosoma with internal waxlike substance with secreting paired structures; L. coxigenital area; M. legs I and II; N-O. deutogyne-like male; N. prodorsal shield; O. coxigenital area.

subtriangular, with rounded basal granules and 3 short longitudinal median lines near posterior margin; genital seta (*3a*) 13 (12-14). **Opisthosoma** - evenly arched in cross section, 60 (60-61) dorsal annuli with narrow, elongate microtubercles, 50 (49-53) ventral annuli with slightly elliptical microtubercles. Lateral seta (*c<sub>2</sub>*) 20 (16-22), on annulus 2 (2); ventral seta I (*d*) 55 (50-60), 42 (37-41) apart, 26 (24-28) microtubercles apart, on annulus 12 (11-14); ventral seta II (*e*) 7 (7), 23 (20-23) apart, 11 (10-12) microtubercles apart, on annulus 23-24 (23-27); ventral seta III (*f*) lateral, 13 (13-14), 14 apart, 12 (12-14) microtubercles apart, on annulus 43-44 (43-46). Caudal seta (*h<sub>2</sub>*) 62 (62-64); accessory seta (*h<sub>1</sub>*) 2 (2).

**PROTOGYNE-LIKE MALE** (n = 5) (Figs. 3DP-3VP and 4F) - Smaller than protogyne, 121-134, 33-43 wide. **Gnathosoma** - 12-17; basal seta (*ep*) 1-2; antapical seta 3. Chelicerae 15-16; oral stylets 12-13. **Prodorsal shield** - as in protogyne, 30-40, 23-24 wide. Scapular seta (*sc*) 25-26, on tubercles 18-22 apart. Frontal lobe 3 (3), base 6 wide. **Legs** - as in protogyne. Leg I 15-17; femur 7, femoral seta (*bv*) 1-3; genu 3, genual seta (*l''*) 15-17; tibia 3-4, tibial seta (*l'*) 3-4; tarsus 2, lateral seta (*ft''*) 3-4, dorsal seta (*ft'*) 3, unguinal seta (*u'*) minute, solenidion 5-6; empodium 4-5, 5-rayed. Legs II 15-17; femur 7-8, *bv* 3-4; genu 3, *l''* 10-11; tibia 2-3; tarsus 3, *ft''* 2-3, *ft'* 1-2, *u'* 1-2, solenidion 6-7; empodium 4-5, 5-rayed. **Coxae** - I granulate, II smooth. Sternal line conspicuous 8-9. Coxal seta I (*Ib*) 2, 6 apart; coxal seta II (*Ia*) 10-13, 5-6 apart; coxal seta III (*2a*) 20-23, 20-21 apart; 4 coxigenital annuli, microtuberculate. **Genitalia** - 6-8, 10-11 wide, medially granulate, eugenital setae not seen; genital seta (*3a*) 7-8. **Opisthosoma** - as in protogyne, 48 dorsal annuli; 40-43 ventral annuli. Lateral seta (*c<sub>2</sub>*) 11-13, on annulus 2-3; ventral seta I (*d*) 23-35, 27-29 apart, 14-16 microtubercles apart, on annulus 9-11; ventral seta II (*e*) 3-5, 15 apart, 6-7 microtubercles apart, on annulus 18-21; ventral seta III (*f*) lateral, 9-10, 16-18 apart, 8-9 microtubercles apart, on annulus 34-37. Caudal seta (*h<sub>2</sub>*) 38-43; accessory seta (*h<sub>1</sub>*) minute.

**DEUTOGYNE** (n=10) (Figs. 2 and 4 G-M) - Body fusiform, 175-214, 56-72 wide; color in life orange-yellow. **Gnathosoma** - projecting downward, 20-26; basal seta (*ep*) 3; antapical seta 6-7. Chelicerae 18-22; oral stylets 11-12. **Prodorsal shield** - 30-32, 53-63 wide, widely rectangular, ornamentation restricted to posterior 1/3 and consisting of fine, elongate granules and faint lines which curve anteriorly around scapular tubercle bases and medially concave; anterior margin presenting conspicuous curved expansions, resembling anterolateral lobes, covering base of legs. Shield design as in Fig. 2. Scapular seta (*sc*) 40-47, on prominent tubercles on posterior shield margin, 25-27 apart. Frontal lobe small, rounded, 3 long, 6 wide. **Legs** - highly modified. Legs I 24-26; femur and genu apparently fused to some extent, femoral seta (*bv*) 3; genual seta (*l''*) 28-31; tibia 3, tibial seta (*l'*) absent; tarsus

expanded basally forming a shovel-shaped structure, lateral seta (*ft''*) 16-18, dorsal seta (*ft'*) 11-15, unguinal seta (*u'*) minute, solenidion 6, apically expanded; empodium 6-7, 3-4 - rayed; solenidion and empodium laterally displaced. Legs II with short segments, 20-22; femora and genua fused to some extent, 12-13, *bv* 5-6; *l''* 13-16; tibia 3; tarsus 4-5, *ft''* 17-18, *ft'* 7-8, *u'* 5, solenidion 9-10; empodium a large compound structure, with 6 rows of papillae on a 10-rayed pattern. **Coxae** smooth. Coxal seta I (*Ib*) 4, 11 apart; coxal seta II (*Ia*) 13-15, 12-14 apart; coxal seta III (*2a*) 26-28, 32-39 apart; 5 coxigenital annuli, microtuberculate. **Genitalia** 9-10, 18-20 wide; coverflap subtriangular, with six longitudinal lines, slightly divergent, on anterior half of epigynum; genital seta (*3a*) 13-14. **Opisthosoma** - dorsally with elongate microtubercles on anterior 1/3 (on annuli 1-15); next annuli (ca. 20) with small and rounded microtubercles medially and slightly elongate microtubercles laterally; last annuli (about last 10) smooth. Ventral microtubercles slightly elongate except for an area anterior to ventral setae I (*d*), from annulus 8-13, with microtubercles distinctively more elongate. Total dorsal annuli 47-49, ventrally with 60-61 annuli. Lateral seta (*c<sub>2</sub>*) 12-16, on annulus 2; ventral seta I (*d*) 26-28, 32-37 apart, 26 microtubercles apart, on annulus 13-14; ventral seta II (*e*) 18-23, 17-19 apart, 6-8 microtubercles apart, on annulus 23-26; ventral seta III (*f*) lateral, 10-11, 16-20 apart, 8 microtubercles apart, on annulus 54. Caudal seta (*h<sub>2</sub>*) 8; accessory seta (*h<sub>1</sub>*) 2.

In region caudal to annulus 27-28 an internal paired "wax" secreting structure could be seen in some specimens (Figs. 2W and 4G, H, K).

**DEUTOGYNE-LIKE MALE** (n = 5) (Figs. 3 DD-VD and 4 N-O) - Smaller than deutogyne. Differs from deutogyne mainly in absence of shovel-shaped structures on legs I. Idiosoma 107-118, 43-45 wide. **Gnathosoma** - 15-19; basal seta (*ep*) minute; antapical seta 2-3. Chelicerae 17-19; oral stylets 9. **Prodorsal shield** - 24-26, 40-43 wide, rectangular, with four longitudinal lines extending on 2/3 posterior shield; a concave curved transverse line joining these longitudinal lines near posterior shield margin. Scapular tubercles as in deutogyne. Scapular seta (*sc*) 22-25, on tubercles 20-24 apart. Frontal lobe 2, base 5-6 wide. **Legs** - with all normal setae present. Leg I 14-15; femur and genu apparently fused to some extent, 10, femoral seta (*bv*) 2-3; genual seta (*l''*) 15-17; tibia 2-3, tibial seta (*l'*) 4-5; tarsus 2, lateral seta (*ft''*) 7-8, dorsal seta (*ft'*) 4, unguinal seta (*u'*), minute, solenidion 7-8, empodium 4, 6-rayed. Legs II 13-14; femur and genu apparently fused to some extent 9, *bv* 3-4; *l''* 7; tibia 2; tarsus 2, *ft''* 7-8, *ft'* 4-5, *u'* minute, solenidion 9-10, empodium 4-5, 6-rayed. **Coxae** - as in deutogyne. Coxal seta I (*Ib*) 2, 9-10 apart; coxal seta II (*Ia*) 9-10, 8 apart; coxal seta III (*2a*) 12-17, 21-23 apart; 5 coxigenital annuli microtuberculate. **Genitalia** - 6-7, 10

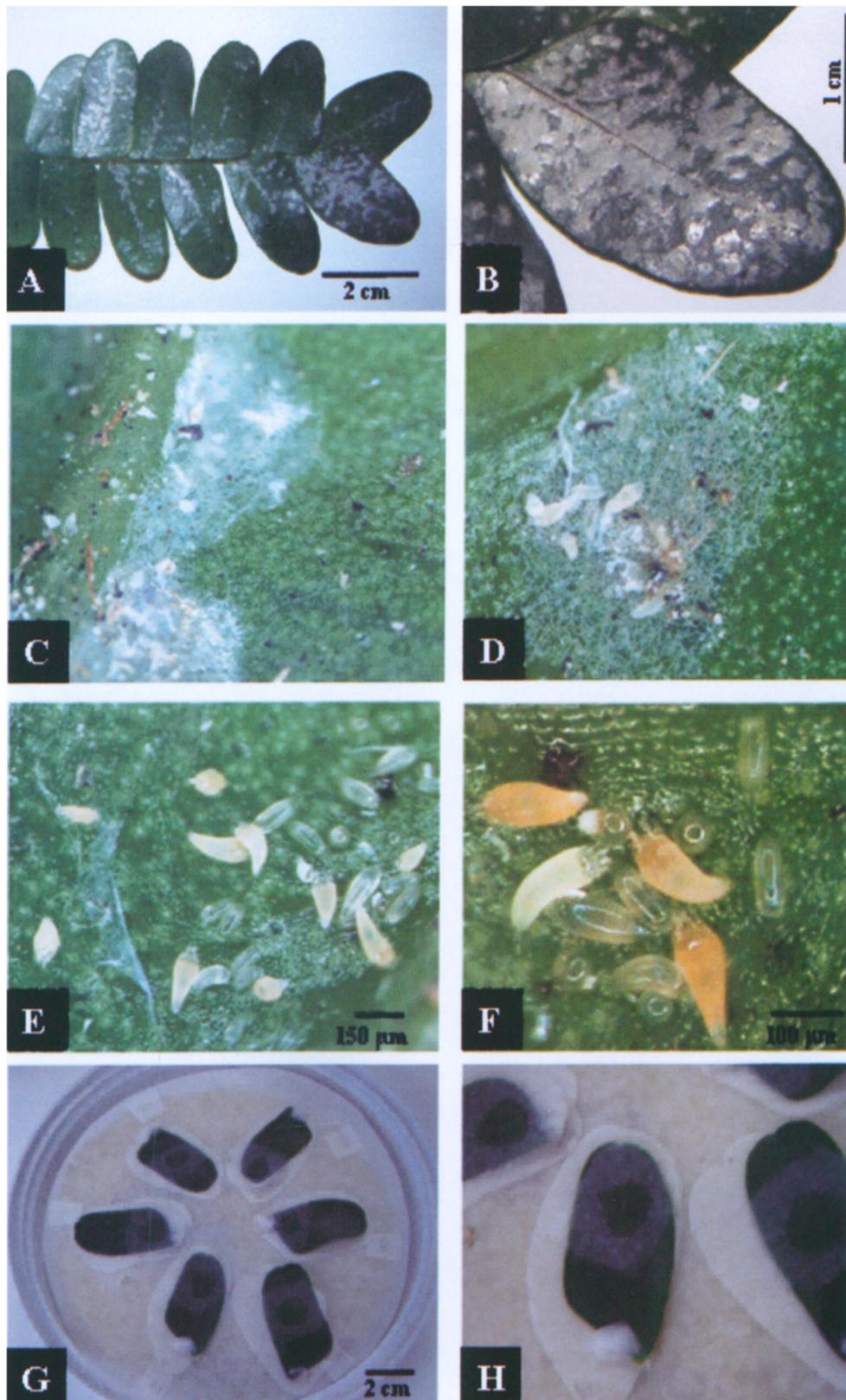


Fig. 5. *Caesalpinia echinata* ("pau-brasil") - A. upper leaf surface with symptoms of *Aceria inusitata* n. sp. infestation; B. detail of leaflet covered by *A. inusitata* "webbing patches"; C and D. *A. inusitata* "webbing patches" around midrib; E and F. *A. inusitata* n. sp. colony after removal of "webbing patches," G. arena; H. detail of leaflet in the arena.

Table 1. Relative numbers of adults of *Aceria inusitata* n. sp. in "webbing patches" of different sizes on *Caesalpinia echinata* leaflets.

Nest size	Area in mm <sup>2</sup>	No. and % of adult mites							
		Protogynes	%	Protogyne like males	%	Deutogynes	%	Deutogyne like males	%
Small	(0.07 – 0.38)	7	25.0	0	0.0	15	53.6	6	21.4
Medium	(0.43 – 0.98)	18	15.9	9	8.0	55	48.7	31	27.4
Large	(1.22 – 3.20)	26	16.6	13	8.3	69	43.9	49	31.2

wide, posterior region granulate, eugenital setae as figured; genital seta (*3a*) 3-4. **Opisthosoma** - with slightly elongate, fine, microtubercles dorsally, with 40 dorsal annuli; 41-43 ventral annuli. Lateral seta (*c*<sub>2</sub>) 9-10, on annulus 2. Ventral seta I (*d*) 10-14, on annulus 10-12, 26-28 apart and 18-25 microtubercles apart, ventral seta II (*e*) 9-12, 13-14 apart, 4-6 microtubercles apart, on annulus 17-19; ventral seta III (*f*) lateral, 8, 14-15 apart, 5 microtubercles apart, on annulus 35-37. Caudal seta (*h*<sub>2</sub>) 10-11; accessory seta (*h*<sub>1</sub>) minute.

**Relation to host** - Living under a "patch of webbing" on the upper surface of leaves.

**Etymology** - The specific designation *inusitata* is derived from the Latin *inusitatus*, meaning rare, unusual, referring to the dimorphic males of the species.

**Type material** - Protogyne holotype, 20 protogynes, 5 protogyne-like males, 46 deutogyne, and 5 deutogyne-like male paratypes, from *Caesalpinia echinata* Lam. (Caesalpinaceae). Recife, Pernambuco, Brazil 8° 01' 10" S, 34° 56' 53" W, April 25, 2007, coll. E.P.J. Britto, on 25 microscopic preparations. Holotype deposited in the collection of Departamento de Agronomia, Entomologia Agrícola, Universidade Federal Rural de Pernambuco- UFRPE, Recife, PE, Brazil. Paratypes deposited in the collections of Departamento de Entomologia, Fitopatologia e Zoologia Agrícola, Universidade de São Paulo, ESALQ, Piracicaba, São Paulo, Brazil; Laboratório de Quarentena Vegetal, Embrapa Recursos Genéticos e Biotecnologia, Brasília, DF, Brazil; and in the collection of Dr. James W. Amrine, Jr., Morgantown, West Virginia, USA.

**Remarks** - The deutogyne of *A. inusitata* shares a few characteristics with the stage described as protogyne by Flechtmann (2001) for *Aberoptus cerostructor*, mainly in the shovel-like expansion on tarsus I, the wax-like substance secreting glandular paired structure in the opisthosoma, as well as the "nest" building habit. Consequently, we are giving this species a new status:

#### *Aceria cerostructor* (Flechtmann, 2001) n. comb.

The stage described as the deutogyne (Flechtmann, 2001) is, in fact, the protogyne and vice-versa.

**Biological observations** - The eggs of *Aceria inusitata* n. sp. are rounded, measuring ca. 45 µm in diameter. Periods of egg incubation, larval and nymphal stages were 5-6, 6-7, and 5-6 days, respectively. The complete period of *A. inusitata* n. sp. deutogyne immature stages was 16-17 days. Larva and nymph differ from adult deutogyne in the absence of the spatula on tarsus I. Viability of immature stages was 100%. *Caesalpinia echinata* leaflets remain suitable for a maximum period of 30 days. This limitation did not allow determination of deutogyne total oviposition and longevity. Deutogynes layed on average 3-4 eggs during the 20-day observation period. Only deutogynes build the "nests" and afterwards the protogynes appeared in the colony. When the "nests" were removed, a 100% mortality of protogynes and 25% of deutogynes were observed, and the surviving deutogynes rebuilt the "nest." This suggests that the deutogyne is the dispersion form of the species. The inability of *A. inusitata* n. sp. protogynes to survive without the "nest" cover did not allow their further study.

Information on the life cycle of *Aceria* Keifer are scarce in the literature. Studies are restricted to *Aceria salsolae* de Lillo and Sobhian on *Salsola kali* L. (Chaenopodiaceae) (Sobhian *et al.*, 1999) and *Aceria guerreronis* Keifer, on *Syagrus romanzoffiana* (Cham.) (Arecaceae) (Ansaloni and Perring, 2004), which are not deutergynous. Distinctively, *A. inusitata* n. sp. presents a complex life cycle, a rare case of deutergyny, with two forms of females and two forms of males and all forms develop in colonies under the same "nest." A similar case was reported by Shevchenko and De-Millo (1968) in *Trisetacus kirghisorum* (Phytoptidae). In this species, a female "Summer form" (protogyne) occurs during the first year with a similar male. A female "Winter form" (deuto-

gyne) occurs during the second year along with a similar male. Second year forms are dispersive, entering the pollen tubes of new developing fruits of *Juniperus semiglobosa* in the Kyrgyzstan Republic. Although *A. inusitata* n. sp. also presents two female forms and their respective males, these two forms can be found concomitantly year-round.

Isolated "nests" were selected and grouped into 3 types according to their size: small (0.07-0.38 mm<sup>2</sup>), medium (0.43-0.98 mm<sup>2</sup>), and large (1.22-3.20 mm<sup>2</sup>). Numbers of adult life stages in "nests" of different sizes are presented in Table 1.

Relative numbers of protogynes and deutogynes are independent of "nest" size and "nests" with only protogynes or only males were never found, suggesting that the deutogynes are the dispersal stages. Manson (1984) described the protogyne of *Aceria gersoni* found under small areas of white webbing on the undersurface of pinnae of the tree fern, *Dicksonia squarrosa* (Forst. f.) Swartz, in New Zealand. Manson and Gerson (1996) presented a SEM micrograph of a few mites under the partially lifted webbing on a pinna and found that the mites left their patches after any disturbance. The photo suggests a structure similar to that observed for *A. inusitata* n. sp. Since Manson (1984) had only four females on basis of which he described his species, and one male which he mentioned only as being present, it is likely that a more detailed study of *A. gersoni* may disclose the presence of deutogynes.

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