



Description of a new species in the Genus *Cosella* Newkirk and Keifer (Acari: Eriophyidae) From China

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Abstract

Eriophyoid mites are the most common groups of phytophagous mites found on various plants in Zhejiang Province of China. These mites are usually found on agricultural, horticultural, ornamental, and medicinal plants, including fruit and forest trees. Zhejiang Province is famous for its renowned mountains consist of Yandang, Putuo, Xuedou, Tianmu, Tiantai and Qingliang covered with green forest and wide range of vegetation due to which it is called as a treasure house of plants in China, which provide ecologically suitable living environment for eriophyoids species richness. Because of the diversity of host plants in Zhejiang Province, there is a dire need to investigate the presence of these minute creatures-especially those species that can be harmful to economic crops. Prior to this study genus *Cosella* Newkirk and Keifer held 43 species worldwide. Further one new leaf vagrant eriophyoid mite species in the genus *Cosella* was found from Zhejiang Province, China. A survey was carried out to determine the eriophyid mite fauna on natural vegetation of Linan City, Zhejiang Province China. One new species *Cosella linanensis* sp. nov. is described and illustrated from *Rhododendron ovatum* (Ericaceae). There was no apparent damage found on host plants where the new species was collected.

Key words: Acari, phytophagous, Prostigmata, taxonomy, Tianmu, Qingliang

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1. INTRODUCTION

Eriophyoid mites are very minute in comparison to other mites, almost invisible to the naked eye. These mites are soft bodied, cigar shaped or worm-like creatures with four legs. Most of the members of this unique group are considered major pests of many fruits, vegetables, ornamental plants and some other agricultural crops and forestry worldwide^{1, 2}. These mites are almost invisible, very hard to see with naked eye but causing heavy losses to cultivated crops. Due to plant feeding habits eriophyoid mites show remarkable host specificity^{3, 4}.

These mites not only cause direct damage to the crops, but they are also responsible for transmission of viral diseases to the plants that are potentially much more serious than direct losses to the agriculture⁵. Eriophyoid mites suck the cell sap from the leaves and transfer toxic saliva by injecting their stylets into plant cells⁶. Due to the transmission of saliva having disease causing pathogens, Cytological, biochemical and physiological changes occur in plants^{7, 8}. These mites are considered the most important vectors of several plant pathogens which cause a dozen of plant diseases⁹. Most of the recognized vector species belong to the family Eriophyidae. *Aceria tulipae* is the vector of wheat streak mosaic virus (WSMV) in wheat, *Aceria ficus* is known to be the vector of Fig mosaic in fig¹⁰.

The aim of the study was to investigate the presence of Eriophyoid mites which are very minute creatures but that can be harmful to economic crops. Because of the rich diversity of host plants in Zhejiang Province, there was a dire need to investigate the presence of these minute creatures. There is also a need to provide information to the farmers about these mites and efforts should be taken by researchers to discover eriophyoid mite fauna of different countries which are undiscovered yet but rich in biodiversity. Prior to this study genus *Cosella* Newkirk and Keifer held 43 species worldwide. Further one new leaf vagrant eriophyoid mite species in the genus *Cosella* was found from Zhejiang Province, China.

2. MATERIALS AND METHODS

2.1 Collection of specimens

To specimen collection, the Southeast part of China was surveyed. Collection of mites was done from hilly areas of Zhejiang Province of China. Different host plants were observed, and mites were collected using a 30X magnification hand lens.

2.1 Identification of specimens

After Collection, specimens were brought into the laboratory for identification and preserved in 75% ethanol in glass vials. Plant specimen folder was used to keep host plant parts for further identification. Specimen detail was labelled on each vial. Keifer's Booster¹¹ was used to clean the collected specimens and later modified Berlese medium was used for slides mounting¹². Semi-schematic diagrams were made after observing the specimens under Zeiss A2 research microscope with phase contrast. Micrographs were taken for hand drawing by using Microphoto camera AxioCam MRc connected to Zeiss A2 research microscope with x10 eyepieces at x100 oil magnification, connected to a computer equipped with Axiovision image analysis software. The terminology for the description of body parts of the mites used in this paper were followed by¹³. Measurements of specimens were followed by¹⁴ and generic classification was followed by¹⁵. For each species the measurements of holotype females are given following by the range of paratypes measured in brackets. The unit of measurement for body parts of the collected specimens was in micrometres (μm). Total specimens measured were shown by (n) in the description. Identified specimens were dropped to the Arthropod/Mite specimen's laboratory, department of entomology NJAU, Jiangsu, China.

3. RESULTS AND DISCUSSIONS

3.1 Taxonomy

1. Family: Eriophyidae Nalepa, 1898
2. Subfamily: Nothopodinae Keifer, 1956
3. Tribe: Nothopodini Keifer, 1956
4. Genus: *Cosella* Newkirk & Keifer, 1975
5. *Cosella linanensis* sp. nov. (Fig. 1)

3.2 Description

Total no of female specimens observed ($n = 20$) Body shape fusiform; length of holotype female 207, ranges (202–233), width 76, ranges (67–80). Gnathosoma 22 ranges (20–22), positioned diagonally down; pedipalp coxal seta (*ep*) 3 ranges (2–3); dorsal pedipalp genual seta (*d*) 5 ranges (4–5); cheliceral stylets 20 ranges (18–20). Prodorsal shield length 40 ranges (37–39), width 62 ranges (60–65); complete median and admedian lines present on prodorsal shield, these lines connected each other through horizontal line at

middle of the shield, forming 2 cells at posterior margin, 4 cells at the center of the shield and 2 cells at anterior margin of prodorsal shield, submedian lines also present on shield but incomplete, forming 2 cells at both sides of admedian lines, all the cells are filled with many irregular longitudinal and transverse lines; frontal lobe broad. Scapular tubercles set ahead of rear shield margin; distance between scapular tubercles 27 ranges (26–30); length of scapular setae (*sc*) 15 ranges (13–15), projecting centrad. Many granules present on coxal plates; anterolateral setae *I* (*1b*) absent; length of proximal setae on coxisternum *I* (*1a*) 10 ranges (8–10); distance between proximal setae on coxisternum *I* (*1a*) 12 ranges (11–12); length of proximal setae on coxisternum *II* (*2a*) 23 ranges (23–26); distance between proximal setae on coxisternum *II* (*2a*) 29 ranges (26–29). Prosternal apodeme was absent in each specimen observed. 3 (3–4) smooth annuli present at coxigenital region. Legs with tibia completely fused with tarsi, size of Leg I 25 ranges (23–25); femur length 13 ranges (11–13), basiventral femoral seta (*bv*) 8 ranges (6–8); genu length 3 ranges (3–4), length of antaxial genual seta (*l'*) 28 ranges (25–28); legs without paraxial tibial seta (*l'*); length of tarsus 9 ranges (8–11); seta *ft'* 19 ranges (15–19), seta *ft''* 25 ranges (21–25); length of seta *u'* 5 ranges (4–5); length of tarsal empodium (*em*) 5 ranges (5–6), simple, 4-rayed, tarsal solenidion (ω) size 6 ranges (5–6), knobbed. Leg II 19 (19–21), femur length 10 ranges (9–11), basiventral femoral seta (*bv*) 14 ranges (13–14); genu length 3 ranges (3–4), length of antaxial genual seta (*l''*) 8 ranges (8–11); tarsus size 6 ranges (6–8), length of seta *ft'* 6 ranges (5–6), length of seta *ft''* 21 ranges (19–22), seta *u'* 4 (3–5); tarsal empodium (*em*) 5, simple, 4-rayed, tarsal solenidion (ω) 6 (6–7), knobbed. Opisthosomal annuli subequal dorsoventrally, dorsally with 55 ranges (53–55) smooth annuli, ventrally with 55 ranges (53–57) annuli with elongated microtubercles on rear annular margins. Length of setae *c2* 21 ranges (20–23) on ventral annulus 6 ranges (5–7); distance between setae *c2* 56 ranges (51–60); length of setae *d* 42 ranges (42–52) on ventral annulus 12 ranges (11–16), distance between these setae 33 ranges (31–36); setae *e* length 7 ranges (7–9) on ventral annulus 24 ranges (24–30), distance between these setae 16 ranges (16–17); length of setae *f* 18 ranges (16–18) on 8th ventral annulus from the posterior end of the ventral opisthosoma, distance between these setae 18 ranges (18–20). Setae *h1* less than a micron, *h2* length 53 ranges (51–59). Genitalia, 24 (23–24), 26 (25–26) wide, genitalia with an anterolateral prominent pointed projections on both sides, cover flap with granules, setae *3a* length 7 ranges (7–10) distance between setae *3a*, 18 ranges (16–18). Male: Not found.

3.2 Material examined

Holotype: 1 Female, Slide no. NJAUAcarEriZ153.1, collected from *Rhododendron ovatum* (Lindl.) Planch. ex Maxim, (Ericaceae), Tianmu mountain, Linan City, Zhejiang Province, P.R. China.

Paratypes: 14 females, slide no. NJAUAcarEriZ153.2-153.15, collected from *Rhododendron ovatum* (Lindl.) Planch. ex Maxim, (Ericaceae), Tianmu mountain, Linan City, Zhejiang Province, P.R. China.

Names of collectors: Hao-Sen Li & Jing-Feng Guo.

3.4 Etymology

This new species is collected from Linan city, Zhejiang, China, so the species name *linanensis* is taken from Linan and the suffix *ensis*.

3.5 Differential Diagnosis

The closest species to the new species described here is *Cosella ceratopudenda*¹⁶ from *Piptadenia gonoacantha* (Leguminosae), but different to some extent with *C. ceratopudenda*. Cells on prodorsal shield filled with many irregular lines (cells are smooth in *C. ceratopudenda*), cells on posterior margin formed by straight lines (cells formed by diagonal lines in *C. ceratopudenda*) and dorsal annuli smooth (rear dorsal annuli with some microtubercles in *C. ceratopudenda*).

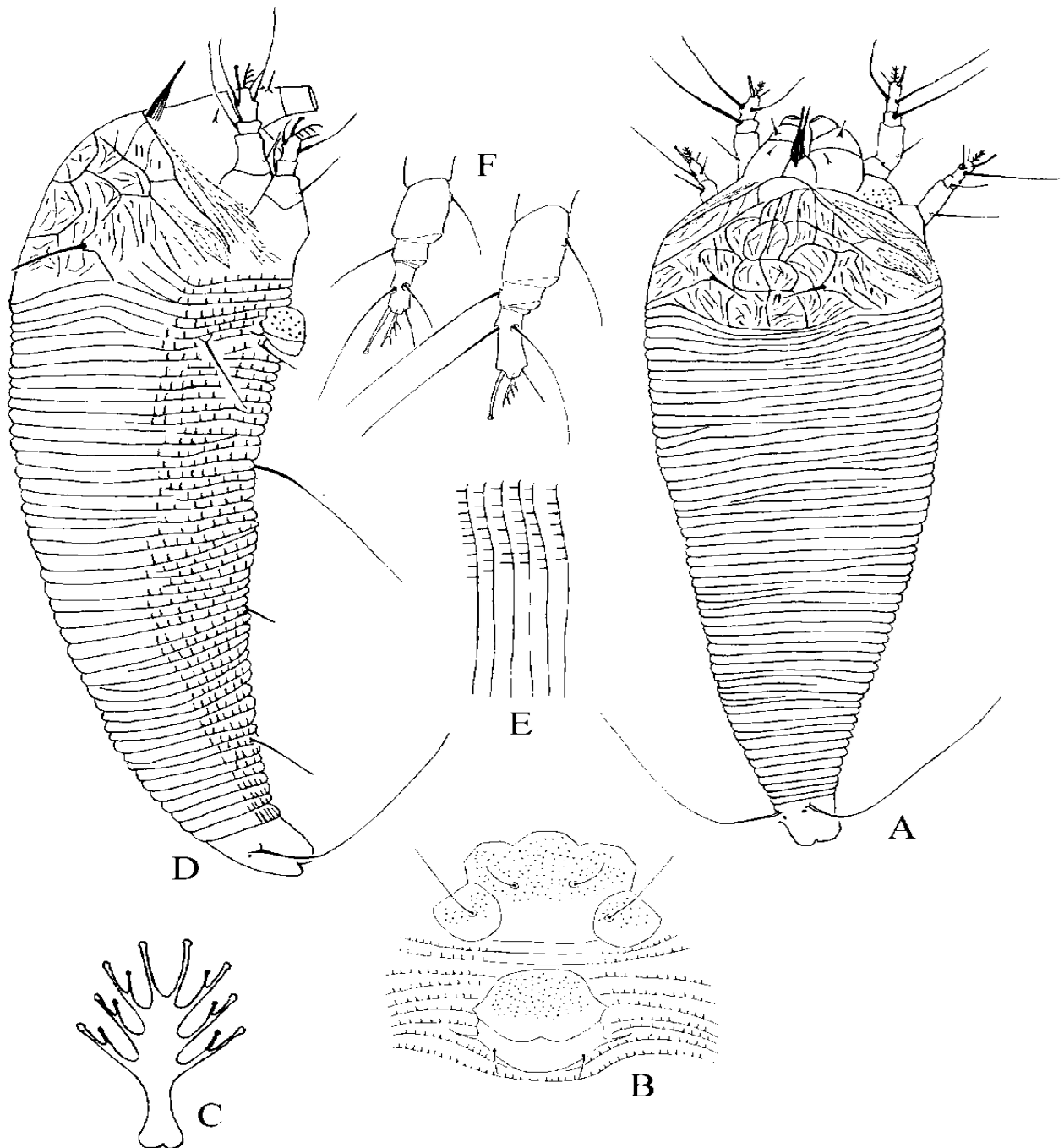


Fig. 1 *Cosella linanensis* sp. nov. **A.** dorsal view of female; **B.** coxae and female genitalia; **C.** empodium; **D.** lateral view of female; **E.** lateral microtubercles **F.** legs I and II.

4. CONCLUSIONS

It is concluded that the present survey explored one new species described as *Cosella linanensis* sp. nov. and illustrated from *Rhododendron ovatum* (Ericaceae) at natural vegetation of Linan City, Zhejiang Province China. Furthermore, this species of eriophyid mite showed no apparent damage found on host plants from it was collected.

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6. CONFLICT OF INTEREST

The authors declare no conflict of interest.

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