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Discovery of a New Plant feeding Parasitic Mite species (Acari: Eriophyoidea) from a Medicinal plant from sub Himalayan Region of India.

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Abstract : During the routine survey of plant feeding microscopic creatures in vegetation belts of sub Himalayan Gangetic Plain of India, a tiny plant feeding mite species is found on ventral surface of leaves of *Streblus asper* Lour. *Streblus asper* is a rigid evergreen small tree distributed in tropical countries including India, Sri Lanka, Malaysia, Thailand and the Philippines. It is well known medicinal plant extensively used in Ayurveda and other Ethno Medicine without any side effects. Various parts of this plant are used for the treatment of menorrhoea, gum pain, piles, and dysentery. Due to infestation of this parasitic sap sucking mite, the leaves turn greyish brown and ultimately become dry and premature leaf fall occurs. Mites are collected from the plant and studied thoroughly under phase contrast microscope from taxonomic point of view. Camera Lucida line drawing of the different body parts and their measurements are done. Finally it is appeared as a new species of plan mite discovered from. This new record is registered in Zoo Bank Account to get New Species Account ID for the publication. In this article, taxonomic description of the mite, relation to the host plant, etymology of new name of the mite is given following the International Code of Zoological Nomenclature.
Key words **– new species, eriophyoiod mite, medicinal plant, taxonmy.**

I. INTRODUCTION

Eriophyoid mites are tiny arthropods belong to the sub class Acari of the super family Eriophyoidea. They are exclusively plant parasites throughout their life history. During their feeding they insert their oral stylets to the plant tissue to suck plant sap and transmit viruses to the plant body (Shukla, 2021, Vervaet, 2021, Jeppson *et al.* , 1975, Sarwar, 2020) causing severe damage to the infested parts. They are highly host specific and show intimate relationship with the host plant (Abdel-Khalek & Momen, 2022; Brown et al., 2021, Oldfield, 2010). Various damage symptoms are produced in plants such as discoloration of leaves, distortion, hairy out growth, gall formations are most common (Druciarek et al., 2019; Sarwar, 2020; Stephan et al., 2008). A routine survey of this plant feeding mites are done from different vegetation belts of two northern districts of West Bengal, India (Latitude: 24°50′40″ N and Longitude: 87°55′50″ E) for the months of July to December, 2024. During this survey mites are collected from the leaves of *Streblus asper* of family Moraceae. Detailed taxonomic study of these mite species demands that this species is new to the genus *Diptilomiopus* Nalepa 1916 (See Nalepa 1916). New name is given to the species following ICZN Rules of Nomenclature and a Zoo Bank Account ID has been generated for taxonomic establishment of new species.

Streblus asper is a small sized evergreen tree (Fig 2) grows in tropical countries having immense medicinal uses. Various plant parts such as leaf extracts, soft barks etc. are used for the treatment of menorrhoea, gum pain, piles, and dysentery (Sen and Behera, 2024; Ghuge *et al*., 2024; Gunasekaran and Balasubramanian , 2012). Due to heavy infestations of this mite, leaves of the plant shows discolouration and premature leaf fall occurs.

According to Working Catalogue of Eriophyoidea of the World, Verson- 10, 'The catalogue of the Eriophyodea' (J Hallan; Biocat@ccms.net), at present the genus *Diptilomiopus* includes 106 valid species within it (Sur *et al*., 2018, Craemer *et al*., 2017, Amrine and Stasney b1994, Amrine et al., 2003, Yan-mei yuan-Xiao-Feng Xue 2019, Chakrabarti *et al*., 2019). From India one new species is added to this genus *Diptilomiopus* from this taxonomic study. The Holotype specimen bearing slide has been kept in laboratory of entomology research Unit of Serampore College of Calcutta University. After publication of this new record, the Holotype specimen will be deposited to the zoological Survey of India, a National repository.

II. MATERIALS AND METHODS

Eriophyoid mites are examined with the help of hand-lens (30X) on infested plants parts. The infested shoots of plants are collected and placed in individual polythene bag. These bags are then brought to the laboratory. The collected plant parts are duly labeled and herbaria are also prepared for their identification. To prevent the damage caused by desiccation or fungal degradation mite-infested fresh plant samples are brought to the laboratory as soon as possible. They are not exposed to heat to avoid moisture accumulation within the bags and contained in plastic bags are stored in a cooler. In order to keep the material fresh, the sample are wrapped in damp (not wet) paper towel, then sealed in a plastic bag, preventing it from drying out, and stored in a refrigerator. Fine holes are punched in the plastic bag to reduce humidity whenever necessary. The plant samples are examined under stereomicroscope within a short time to confirm whether there is infestation of mites or not. With the aid of the stereomicroscope

the mites are picked up from the infested leaves with the help of a needle and placed onto a grooved slide containing Kono's fluid (Jepppson et al., 1975). The slide is then kept on a hot plate having temperature of 40ºC and cooked enough to clear the mites. Upon being cleared enough, the mites are mounted in Hoyer's medium after a bath in the same medium. The ingredients of Kono's mixture are chloral hydrate 100 g, Glycerin 10 g, water 50ml, concentrated HCI 1 ml. The mites are studied under a Leitz Dialux 20 microscope with provision for phase illumination. Camera lucida drawings were prepared using a built-in draw tube type prism Camera Lucida attached to the microscope. The morphological terminologies and abbreviations used here were given by Lindquist (1996), and the generic classification system followed is that of Amrine *et al*. (2003).

Measurements were taken at (10 x 100X) magnification and strictly under phase contrast using an ocular micrometer. Sixty nine specimens, including the holotype are measured. The following measurements are taken during this study: i) width of body of the mite : maximum width just behind rear prodorsal shield margin, ii) length of body: distance from the anterior tip of the prodorsal shield to the posterior end of the body, iii) length of shield: distance from the tip of anterior lobe to rear prodorsal shield margin, iv) width of prodorsal shield: maximum width along rear shield margin, v) length of gnathosoma: length from base of proximal segment to end point of terminal segment, vi) length of legs: distance from base of trochanter to the tip of tarsus, vii) length of epigynum: maximum width across mid transverse line, viii) length of seta: distance from the socket to its tip. All measurements are taken as de Lillo *et al.* (de Lillo *e.t al.* 2010) recommended and are given in micrometres (µm) referring to the length unless specified otherwise. In the text, measurements of holotype are followed by the range of measurements of the paratypes in parentheses. Slides after being properly labeled with all relevant data are stored suitably. The slide bearing the type specimen has been deposited in the Entomology Research Unit (A Biosystematics Research Unit Maintained by Zoological Survey of India, a national depository), Serampore College of University of Calcutta, Serampore, 9, William Carey Road, West Bengal, India. Registration of this new species in Zoobank account (see urn:lsid:zoobank.org:pub:03B5CBA8-652B-4DA6-B0A8-A190153635B2) is done properly and a Zoo Bank LSID has been generated.

III. Results and Discussion

Taxonomic studies and differential diagnosis with the preexisting species of this genus reveals this mite species new to Science. The etymology of the new name of the species is given after the ICZN Rules and the Registration of new species in Zoo-Bank is properly done.

3.1 Description of the Genus: *Diptilomiopus* Nalepa 1916

As described by Nalepa, the body is robust, spindle shaped. Gnathosoma and chelicerae large and set at perpendicular or strongly re-curved in between the leg I. Prodorsal shield wider than long, without frontal lobe, scapular tubercles and setae usually absent, in some species scapular tubercles without seta may be present. Legs with distinct genu or fused with femur, genual seta absent; only tarsal setae present on legs; tarsal empodium deeply divided. Coxae I may or may not be separated, with less prominent sternal line; *1b* tubercles absent; opisthosoma sub circular in cross section with 1 to 3 ridges just behind the prodorsal shield; seta *c2* missing, often tubercles present; epigynium may be smooth or provided with longitudinal ribs or lines and granules or tubercles; internal apodeme normal in length.

3.2 Taxonomic description of new species*: Diptilomiopus streblusis* sp. nov. (Fig. 1)

FEMALE(56 Female mites studied including holotype) : Reddish in colour, body 165.2 (165.2-182.0) long, 74.6 (74.6-75.6) wide, robust, fusiform with 4 ridges and 3 grooves running up to two-third of the body length, reddish in colour.

Gnathosoma 39.2 (37.3-39.2) long (Fig. 1A) , curved down, dorsal pedipalp genual seta d 3.7 (2.3-3.7) long, Prodorsal shield 28.0 (28.0-28.9) long , 49.4 (48.5-49.4) wide with a narrow shield lobe; prodorsal shield design present complete network of cells, median line incomplete, admedian and submedian lines forming complete cells; anterior tire with 12 cells, 6 cells on either side of median line, a large polygonal central cell makes the median line discontinuous, two asymmetrical lateral rectangular cells extend from the central polygonal cell, among them the left one is divided into two sub cells whereas the right one is not so divided, from the posterior margin of the shield median and ad median lines extend up to central cell forming two identical cells on either side of median line; scapular tubercle and seta *sc* absent

Legs: Leg I (Fig. 1C) from base of trochanter 28.9 (27.0-28.9) long; femur 13.0 (13.0-14.0) long, without basiventral femoral seta *bv*; genu fused with femur; tibia 5.6 (4.9-5.6) long, without paraxial tibial seta *1*'; tarsus 10.2 (9.6-10.2) long; two identical tarsal setae paraxial fastigial tarsal setae *ft*' and antaxial fastigial tarsal seta *ft*" 25.2 (24.7-25.2) long; paraxial unguinal tarsal seta *u*' 4.5 (3.9-4.5) long, tarsal solenidion *ω* almost straight, knobbed and 5.6 (5.1-5.6) long, 6 rayed divided tarsal empodium em 6.5 (5.9-6.5) long. Leg II (Fig. 1D) from base of trochanter 22.4 (22.4-23.3) long; genu fused with femur, femur long, without basiventral femoral seta *bv*; tibia 3.7 (3.7- 4.1) long, without paraxial tibial seta *1*'; tarsus 6.5 (6.1-6.5) long, paraxial fastigial tarsal setae *ft*' 23.3 (23.3- 23.9), antaxial fastigial tarsal seta *ft*" absent, paraxial unguinal tarsal seta *u*' 4.5 (4.5-4.9), tarsal solenidion *ω* almost straight, 5.6 (5.1-5.6) long, 6 rayed divided tarsal empodium em 4.5 (4.1-4.5) long.

Coxal-genital region: (Fig.1 F) Coxae I 14.9 (14.4-14.9) long and contiguous; coxal surface ornamented with granular transverse lines; 1b tubercles and seta absent; 1a tubercles with seta present a little ahead of line across the 2a tubercles with seta; seta 1a 17.7 (17.7-18.0) long; coxa II ornamented with smooth asymmetrical lines and 10.2 long, seta 2a 27.0 (27.0-27.5) long. Genitalia 18.6 (18.6-18.9) long, 24.2 (24.2-24.6) wide; epigynium smooth except one curve line at posterior margin of epigynium; seta *3a* 5.6 (5.1-5.6) long. Internal genitalia (Fig. 1G) shows two distinct round spermathecae.

Opisthosoma with 46 (46-48) smooth dorsal annuli and 58 microtuberculeted ventral annuli (Fig.1A); microtubercles rounded and located on anterior margin of ventral annuli; last 8 (7-9) ventral annuli have micro striations, seta *c2* absent, seta *d* 15.8 (15.8-19.6) long on annulus 19; seta *e* 11.2 (11.2-12.1) long on annulus 32; seta *f* 33.7 (33.7-34.4) long on ventral annulus; seta *h1* absent, seta *h2* 46.6 (45.8-46.6) long.

MALE: Not observed

3.3 Holotype and Paratype

Female (marked) on slide (no.1327/38/2024), India: West Bengal: Dakhindinajpur, Doulatpur (Latitude: 24°50′40″ N and Longitude: 87°55′50″ E)14.10.2024 from *Streblus asper* Lour. (Moraceae), Coll. S. Sarkar. **Paratypes:** 11 females on slide bearing holotype ,28 females on 3 slides (nos1328-1330/38/2024), 09.10.2024, 16 females on 2 slides (nos1331-1332/38/2024) 6.09.2024., area of collection same as in holotype.

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3.4 Relation to host

Mite occurs as vagrants on the mid ventral surface of leaves. Due to sap sucking mode of feeding the mite produces visible damages to the leaves. Leaves turn greyish color and Brown patchy areas are seen. Premature leaf fall occurs.

3.5 Taxonomic Diagnosis

This new species belongs to the group of *Diptilomiopus* with prodorsal shield having network of cells. Within this group, the new species shows similarities with *D. trewir* Chakrabarti and Mondal (1983) and *D. ficusis* Chakrabarti and Mondal (1983) by the absence of scapular tubercles and scapular setae, but differs from them by the presence of 6 rayed tarsal empodium. It differs from *Diptilomiopus daulatpurensis* sp. nov.by its 6 rayed tarsal empodium.

3.6 Etymology

The specific epithet of the new name '*Sreblusis*' derived from '*Streblus*' genus of the host plant. Here International Code of zoological nomenclature is followed by the author. See Zoo Bank Account Id Generated for this newly discovered species: - urn:lsid:zoobank.org:pub:03B5CBA8-652B-4DA6-B0A8-A190153635B2

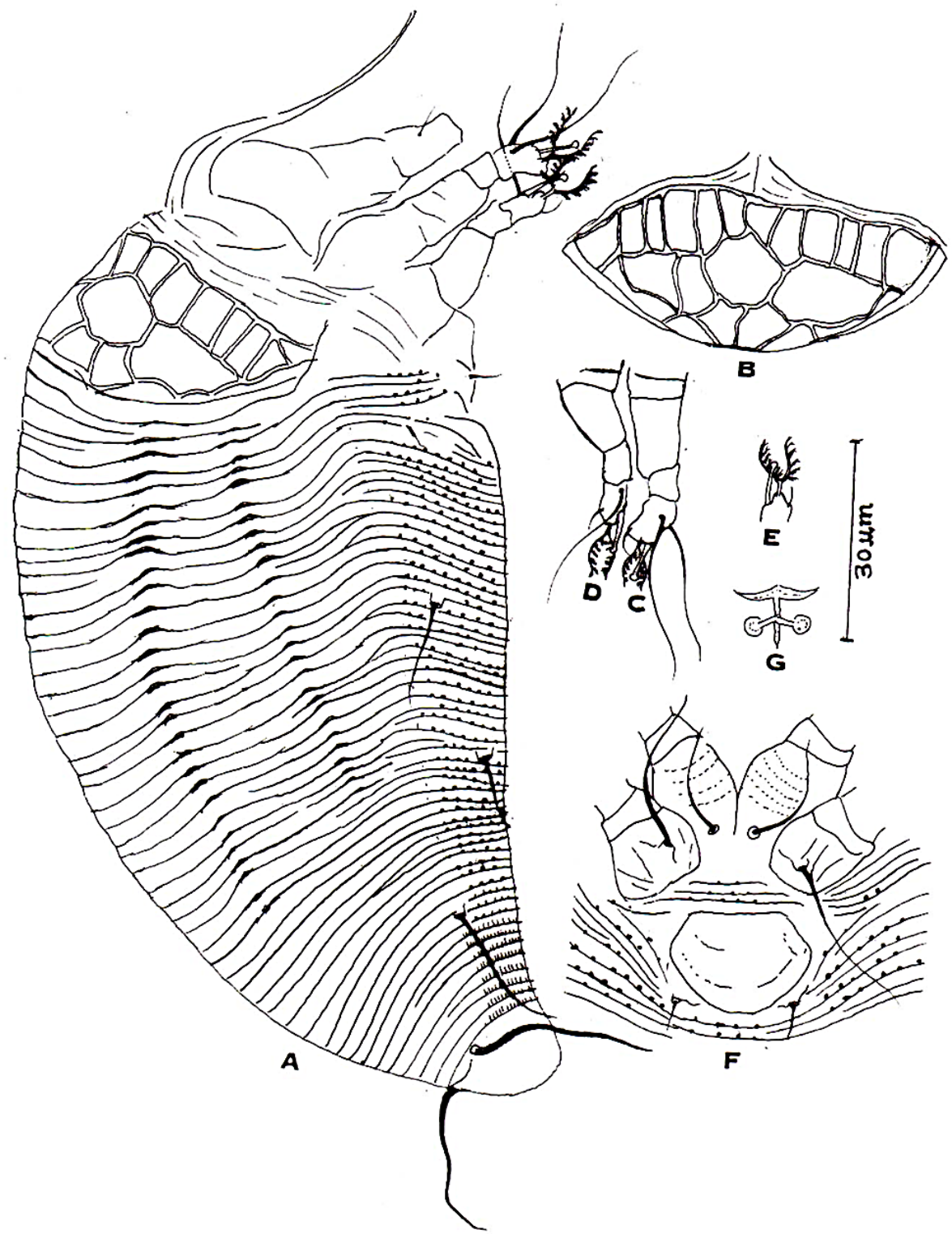

Figure 1. Camera Lucida line drawing of Diptilomiopus streblusis sp.nov, holotype, no. 1418/76/2024 (from Phase Contrast microscope) : A-Antero-dorsal mite (AD); B- Antero-Dorsal mite (AD); C- Leg I (L1); D- Leg II (L2); E- Tarsal empodium of LI (em); F- Coxal-genital region (CG); G- genitalia of female.

A B C

Figure 2. A : Photograph of fresh leaves of *Streblus asper*; B: photomicrograph of mite from Phase Contrast microscope ; C: Mite infested leaves of *Streblus asper* showing discolorations.

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