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A new species of the genus *Storchia* (Acari: Prostigmata: Stigmaeidae) from Pakistan

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ABSTRACT

The study was led to find the predators of family Stigmaeidae from Punjab, Pakistan. The holotype female (immatures & male unknown) of genus *Storchia* (*Storchia sheikhupuraensis*) was collected from the urban cultivated area of city Sheikhupura from millet plant (*Pennisetum americanum*) and described here. Fourteen (14) paratypes with, same collection data including holotype and seven from *Oryza sativa*. The description, figures, measurements and discussion is given. The collected samples were put in Mite Research Laboratory, Department of Entomology, University of Agriculture, Faisalabad, Pakistan.

Keywords: Storchia, new species, Raphignathoidea. predatory mite, Stigmaeidae.

INTRODUCTION

The family Stigmaeidae was established by Oudemans in 1931. The mites of this family are main predators within Raphignathoidea, include a diversity of almost 577 species that assembled into 34 valid genera (July 31, 2016). These guys are tiny, yellowish to reddish arachnids, that may present in many habitats and provide a vital portion of leaf litter, soil texture and aerial plant parts. The Stigmaeidae is among most studied families in Acarology and the rate of described species has increased by almost 45 percent in last twenty years. Earlier, Baker and Wharton (1952) had used this family as junior synonym of family Raphignathidae and included 18 genera. In 1952, Cunliffe recognized it as a distinct family under the superfamily Raphignathoidea together with four other families. A pioneer acarologist Francois Grandjean had developed and given a modern shape to Stigmaeid morphology during 1944-1946. Wood (1964-1981) synonymized *Apostigmaeus* Grandjean, 1944 with Storchia Oudemans, 1923 (Wood 1973). Actually, the *Apostigmaeus* Grandjean was created in 1944 based on *Apostigmaeus navicella* Grandjean, 1944. This notion was trailed by Summers (1964), (1966), Wood (1966), (1967), Meyer (1969), Cunliffe (1955), Wainstein & Kuznetsov (1978), Chaudhri, Akbar & Rasool (1979), Liang & Hu (1988). This synonymization with *Storchia* by Wood (1973) was done after the examination of mites of Berlese collections. Currently, this change has been followed by most of the acarologist researchers. This *Storchia* is one of the smallest genus among Stigmaeids that are often found in leaf and grass litter, aerial plant parts, tree bark, soil, sometime from husk and stored products (Fan *et al.,* 1997; Miranda *et al*. 2002; Khanjani, 2010). Likewise, these Stigmaeids also shown as efficient killers that feed on pollen, a variety of arthropod pest and ecto-parasite of flies (Meyer and Ueckerman 1987, Summers 1966; Walter *et al*. 2009). These organisms are proved to be effective feeders against mites of the families of Tetranychidae, Tenuipalpidae and Eriophyidae (Santos and Laing 1985). Khanjani *et al*., 2010, Akyol and Kocc 2007, Swift 1987 also elaborated such findings as good predator against plant mites, pollens and small bodied plant aerial bugs.

Diagnosis: Chelicerae moveable, idiosoma slender, palp tarusus bear a cluster of 3-4 minute sensory setae (eupathids) instead of terminal trident. Propodosamal shield narrow, reduced, elongate and bears only vi, ve; setae sci and sce placed a little away; hysterosomal plate sometime restricted to minute platelets, 1 platelet for each seta except suranal setae. Dorsal setae 13-14 pairs. No obvious eyes. Propodosoma bears 4 pairs setae excluding the humeral seta he. The shaft of empodium extends beyond the tip of the claw before branching to produce 3 pairs of capitate raylets. 3rd pair of

Author's Contribution: B. S.K., Principal and corresponding author; **M. A. Q.,** Development of key formation ; **A. G.,** Development of key characters ; **I. A.,** Revised study of genus Apostigmaeus to Storchia ; **M. F.,** Reviewed study of genus Apostigmaeus to Storchia.

agenetal setae (paragenetal) much longer than others.

MATERIALS AND METHODS

Storchia mites (Prostigmata: Stigmaeidae: Acari) were collected from *Sorghum bicolor* by using sieve collection. Few specimens (paratypes) were also collected by placing field debris and litter through Berlese apparatus. The permanent mounts were equipped with the help of Hoyer's solution and drawn with assistance of eye pieces/ microscope. The prepared glass slides were dried at 46 C for 8-10 days. The specimen was recognized with accessible keys & literature by using the terminology and setal notations of Grandjean's vocabulary 1944 with alterations & accompaniments by (Summers, 1960, Gonzalez, 1965 and Kethley 1990). The dimensions and size of body parts and setae are given in µm. The ellipses followed as:

pre-ocular dorsal setae ……..…ve(be)
central suranal setae-I……..…h1(e)
post ocular dorsal setae-I……. ...sci(ce)
dorsolateral setae-I……...c2 (he)
post ocular dorsal setae-II……sce(de)
dorsocentral setae (I)…….……..c1(a)
dorsocentral setae (II)…….……d1(b)
dorso mediozonal setae-I……...e1(c)
intercalary dorsal setae……..f1(li)
central suranal setae-II……..h2(le)
dorsolateral setae-II…..….....d2 (la)
lateral mediozonal setae-II……..e2 (lm)
vertical dorsal setae ……..vi(ae)
agenital setae……ag1-ag5
genital setae (1 pair) ……g
anal setae (paraproctal setae) ……ps1- ps3
humeral seta (dorsally/ ventrally) …he
adoral setae……..…….or1, or2
subcapitular setae……..m, n

Note: Terminology and setal nomenclature used as agreed by Kethley (1990) and Grandjean system (1944) respectively. [Old setal abbreviations in brackets].

RESULTS AND DISCUSSION

Caligonus robustus Berlese, 1885
Storchia robustus, Oudemans, 1923
Apostigmaeus navicella Grandjean, 1944

Storchia previously known (*Apostigmaeus)* by Grandjean in 1944. Meyer and Ryke (1959 b) recorded *Storchia* (*Apostigmaeus navicella* Grandjean) from South Africa. Summers (1964) called mites of this genus rare because he was succeeded to collect only single species of *Storchia* (*Apostigmaeus)* over a period of 12 years from California and described this new species under *Apostigmaeus pacificus* Summers. Wood (1967) also recorded *Apostigmaeus navicella* Grandjean from Australia fauna. Chaudhry (1974) designated 2 new species from Pakistan and set a key of the said species. Qing–Hai Fan and Chen Yan (1997) described Storchia genus with report of a new species from China. Hassanzadeh and Khanjani (2013) described a new species of genus *Storchia* belongs to Iran. The author has collected four new species of this genus from Punjab, Pakistan and one species name *Storchia sheikhupuraensis* described here.

***Storchia sheikhupuraensis* n.sp.** (Fig. 1-3)**:** Description of female dorsum (n=4). The measurement of holotype followed by three paratypes in parentheses.

Long slender body 462 µm (without gnathosoma), 268 µm wide, chelicerae moveable 82 µm long, stylet 28 µm long. Pedipalp 104 µm, palpus 5 segmented, palptarsus longer than main tibial claw with 3 setae and a trifid sensillum. Palptip without eupathids, palptibia 2 setae, palpgenu 1 seta, whole idiosoma with longitudinal striated. Propodosomal shield area not such prominent and reduced. Eyes not obvious (Fig.1). Idiosoma provided with 13 pair of finely barbed dorsum setae. Propodosomal area given 2 pairs of setae including ve and vi. Seta h1 and h2 present on a large separate plate. Seta ve longer than all other dorsal setae.

The **respective distances** between vi-vi=32 (31-33), ve-ve=37 (36-39), sci-sci=100 (99-102), c1-c1=87 (87-90), d1-d1=50 (50-53), e1-e1=100 (101-103), f1-f1=110 (108-112), c1-d1=50 (49-53), d1-e1=45 (45-47), e1-f1=50 (48-50).

The **respective length** of dorsal setae: vi 18 (19-21), ve 40 (39-42), sci 20 (18-22), sce 23 (23-25), c1 20 (19-22), c2 27 (26-30), d1 20 (19-23), d2 23 (22-26), e1 18 (18-20), e2 23 (22-24), f1 17 (17-20), h1 23 (23-26) and h2 28 (26-29).

Venter

Gnathosoma ventrally with 2 pairs of adoral setae (or1-or2), three pairs barbed setae (1A, 3A, 4A), and seta 3A much longer than others. 5 pairs of agential smooth setae, provided ag3 much longer than others. Whole anognital plate area looked dotted and shown 4 pairs like g1, ps1, ps2, ps3. Genetal and anal area/ opening are contiguous. (Fig.2).

Legs

Chaetotaxy i.e., arrangement of setae on leg I-II-III-IV (Fig. 3): coxae 2-2-2-2__ trochanters 1-0-1-

1__ femora 4-3-2-2__ genua 2-1-1-2__ tibiae 3-4-3-3__ tarsi 8-7-6-3.

Etymology

The name of this new guy was given as per locality name, somewhere it collected.
Adult Male & immatures: Unknown

Type

The female as Holotype collected from Sheikhpura city from (*Pennesetum americanum*) by (Bilal Saeed Khan). Fourteen 14 specimen other than holotype were collected from identical place and seven 7 from *Oryza sativa*.

Remarks

This new species is similar with *Storchia* (*Apostigmaeus*) *hortus* Chaudhri, but can be separated due to certain remarks.

1. Only two pair of ventral gnathosomal setae in this new species, while 3 pairs in *hortus*.
2. Palptarsus, 2 setae in this n.sp. which differs with *hortus*.
3. Palp tibia, 02 setae in sheikhupuraensis. while 01 in case of *hortus* Chaudhri.
4. 5 pairs of agenital setae in n.sp. although 3 in *hortus*.
5. Chaetotaxy of setal arrangement of leg I-IV is different in said species.
6. Tarsi I-IV with 11-8-7-7 setae in *hortus*, which differ in this new species as 8-7-6-3.

KEY TO GENUS STORCHIA FORM PUNJAB, PAKISTAN (Adult Female)

1. 5 pairs of (agenetal) setae; 3 pairs of anogenital setae; single suranal shield; 14 pairs of dorsal setae; setae lr, h1 and h2 forming a straight line.……
……
……...*bellulus* Chaudhri

4 pairs of (agenetal) setae; 2-3 pairs anogenital setae; 2 suranal shield; 13-14 pair of dorsal setae; setae lr, h1 and h2 not forming a straight line…….....2

2. 14 Pairs smooth dorsal setae; femur IV 2 setae; tibiae I-IV each with 6 setae.……..……..…
…… *navicella* Grandjean

13-14 pairs dorsal setae with spinules; femur IV 3-4 setae; tibiae I-IV each not with 6 setae…….……
…….3

3. Length seta ve 33; h2 22; seta lr present.……*errabundus* Chaudhri

Length seta ve not 33, h2 not 22, seta lr absent…….……
……4

4. Dorsal body setae serrate; tarsi I-IV with 11-8-7-7 setae…….. *hortus* Chaudhri

Dorsal body setae simple; tarsi I-IV not with 11-8-7-7 setae…….……5

5. Propodosomal shield simple; coxa I-IV provided with 2-2-2-1 setae.……
……
……. *cirrus* Chaudhri

Propodosomal shield pretentious; coxa I-IV not provided with 2-2-2-1 setae…….…
…….6

6. Ventral idiosoma completely striated; agenetal/ paragenital setae barbed, smooth and vary in length; anogenital (paraproctal) setae 3 pairs with almost of equal length.……
……
…….....*pennisetumus* (n.sp)

Ventral idiosoma not completely striated; agenetal/ paragenital setae not restricted to barbed, smooth & serrate; anogenital setae not 3 pairs and not restricted to same in length.……
……..7

7. Palp genu with than 1 seta; palp tibia not restricted to 1 seta; palp tarsal peg 3 setae; venter provided with 3 pairs of setae; anogenital setae 4 pairs, agenetal setae 5 pairs.
……
…… *sheikhupuraensis* (n.sp)

Palp genu more than 1 seta; palp tibia restricted to 1 seta; palp tarsal peg not 3 setae; venter varies with 3-4 pairs of setae; anogenital setae not limited to 4 pairs, agenetal setae not with 5 pairs.……
……8

8. Trident eupathid absent; propodosomal shield with more than 2 setae; 13 pairs of dorsal setae; dorsal setae smooth; intercalary shield present; 2 pairs of paragenital setae; genu IV without seta……..……..…… ……..*sativaus* (n.sp)

Trident eupathid present; propodosomal shield with only 2 setae; 14 pairs of dorsal setae; dorsal setae barbed; intercalary shield absent; paragenital setae more than 3 pairs; genu IV with 2 seta……..…… ……*oryzaus* (n.sp)

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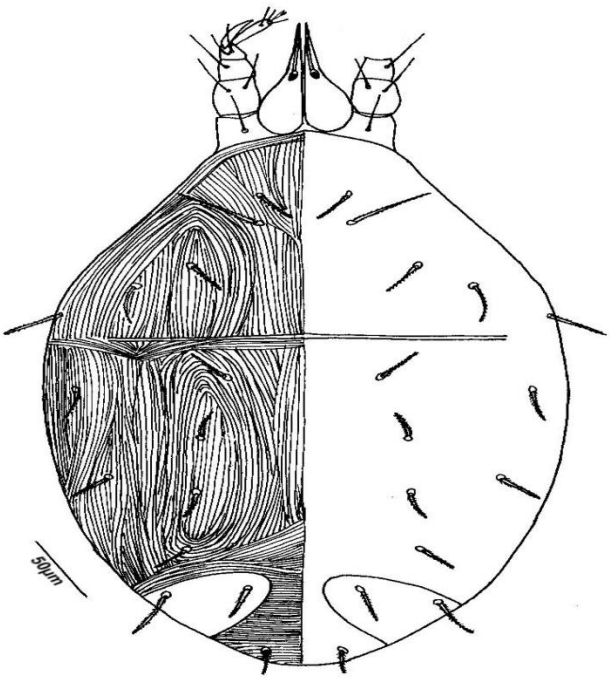

Fig. 1 : *Storchia sheikhupuraensis* n.sp. (Dorsum)

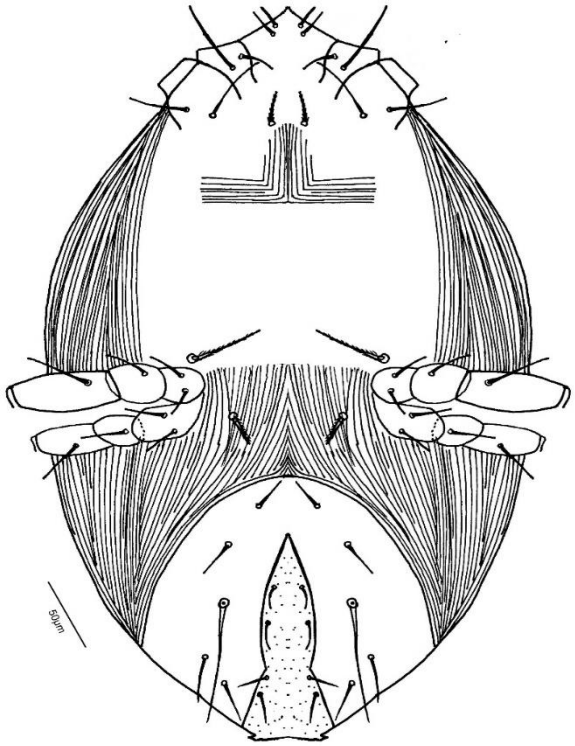

Fig. 2: *Storchia sheikhupuraensis* n.sp. (Venter)

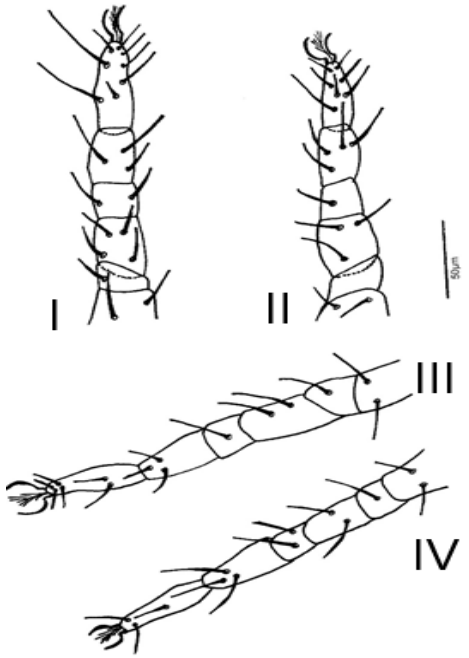

Fig. 3: *Storchia sheikhupuraensis* n.sp. Legs I-IV

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