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***Striga todgarhica* (Orobanchaceae)- A new parasitic species from Todgarh-Raoli Wildlife Sanctuary, Rajasthan, India**

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ABSTRACT

A new species of *Striga* from Todgarh-Raoli Wildlife Sanctuary of Rajasthan, India is described and illustrated as *Striga todgarhica* sp. nov. The new species shows similarity with *S. asiatica* in having a densely hispid stem, linear leaves and one calyx-rib terminating the tip of each lobe and others rib in the sinus, but differ in the densely hairy leaves, 13-ribbed on calyx, densely hispid along ribs, calyx lobe narrow triangular, half the length of calyx tube, corolla tube up to 2 cm long, lower lip tri – tetra partite, white. A detailed description, with data on distribution with relevant taxonomic notes and colour photographs are provided here for their easy identification.

Key words: New species, Orobanchaceae, *Striga*, Todgarh-Raoli, Rajasthan.

INTRODUCTION

The genus *Striga* Loureiro (1790: 22) belonging to the family Orobanchaceae with the centre of origin in Tropical Africa. Based on morphological and molecular data, the genus *Striga* was transferred from Scrophulariaceae to Orobanchaceae (Olmstead *et al.* 2001). The genus comprises about 42 species with the highest diversity in Tropical Africa (Jayanthi *et al.* 2014) where 28 taxa have been recorded of which 22 are endemic (Mohamed *et al.* 2001, Fischer *et al.* 2011). Only few taxa extended to the Arabian Peninsula and Asia, e.g. *S. lutea* Loureiro (1790: 22) and *S. gesnerioides* (Willd.) Vatke (1875: 11) (Musselman & Parker 1981). Recently three new species were recorded from India viz. *Striga indica* Prabhu *et al.* (2013: 284), *Striga scottiana* Jeeva *et al.* (2012: 79) and *Striga kamalii* Omalsree *et al.* (2015: 163). Five taxa so far reported from Rajasthan (Shetty & Singh 1991).

All the species of *Striga* are obligate root hemiparasite and require some specific host plants for their survival (Botanga & Timko, 2005). Most of the

species are parasitic on various members of family Poaceae. Few species viz. *Striga indica* parasitic on *Euphorbia antiquorum* Linnaeus (1753: 450) and *Striga gesnerioides* parasitizes on a variety of host belonging to family Fabaceae, Convolvulaceae, Solanaceae, Vitaceae and Euphorbiaceae (Mohamed *et al.* 2001).

Wettstein's (1895) treatment of *Striga* in Engler and Prantl's "Die Natürlichen Pflanzenfamilien", divides the genus into two sections based on the number of ribs on the calyx tube, viz. *Striga* sect. *Pentapleurae* with 5-ribbed calyx and *Striga* sect. *Polypleurae* with 10-15 ribbed calyx.

Many researcher (Katewa *et al.*, 2003; Sharma *et al.*, 2005; Sharma & Katewa, 2007; Jain *et al.*, 2011; Kanther & Gena, 2012; Kanther, 2018; Purohit, 2019; Purohit *et al.*, 2019; Purohit 2020, 2020a, Purohit 2020b, 2020c, 2020d, 2020e; Purohit *et al.* 2020a, 2020b; Sharma, 2019; Sharma & Khandal, 2019; Tomar & Sharma, 2019; Purohit, 2021; Purohit & Sharma, 2021) have been reported few plants from

Todgarh-Raoli wildlife sanctuary and nearby area but some workers have done remarkable works i.e. Jain *et al.* (2007) have done work on ethno-medicinal plant of this sanctuary and reported 45 ethno-medicinal plant species belonging to 28 families. Galav *et al.* (2013) reported 54 species belonging to 34 families used by tribals as ethnoveterinary medicines in the sanctuary. Singh and Yadav (2018) extensive work on medicinal important cucurbits of this sanctuary and reported medicinal importance of 5 species belonging to 5 genera. Kanther (2019) have done extensive work extensive vegetation of Todgarh-Raoli wildlife sanctuary and reported 301 species belonging to 84 families including with 141 species belonging to 107 genera and 41 families under Class Polypetalae. But no one work on parasitic plants of this Todgarh-Raoli wildlife sanctuary, Rajasthan.

MATERIALS AND METHODS

While working on the floristic diversity of the Todgarh-Raoli Wildlife Sanctuary, Rajasthan, the author came across on interesting specimen which parasitizes on the roots of *Sorghum halepense* (L.) Pers. (1805: 101). The critical study has revealed that the species is allied to *Striga asiatica* but differs in many characters. Detailed taxonomic studies with the perusal of relevant literature (Hooker 1884, Wettstein 1895, Gamble 1923, Saldanha 1963, Mathew 1981, Olmstead *et al.* 2001, Kumar & Purohit 2015, Otaghvari *et al.* 2015) proved this to be a species hitherto unknown to science, which is described and illustrated here. A taxonomic key to *Striga* in Rajasthan is also provided to facilitate the identification of the species.

Taxonomy

Striga todgarhica C.S. Purohit *sp. nov.* (Fig.1)

Similar to *S. asiatica* but differs from it in having a densely hairy leaves, 13-ribbed calyx, densely hispid along ribs, calyx lobe narrow triangular, half the length of calyx tube, corolla tube longer up to 2 cm long, lower lip tri – tetra partite and corolla white.

Type: INDIA. Rajasthan, Todgarh-Raoli Wildlife Sanctuary, Jojawar Range, Uperli Babhan, 460 m, (25°46.306' N; 73°56.897' E), 12 November 2017, C.S.Purohit 33306A, (Holo BSJO!); C.S.Purohit 33306B (Iso BSJO!). [The IPNI LSID no. 77234927-1 for registration of new species allotted by K.N. Gandhi, Sr. Nomenclature Registrar, Harvard University Herbaria, Cambridge].

Description: Annual, erect chlorophyllous herb, 10 – 25 cm tall, entirely hirsute. Stem erect, branched ribbed, hispidly hairy. Leaves green, linear to narrowly lanceolate, with subacute apex, alternate, sessile, 2 – 4

x 0.2 – 0.4 cm, densely hairy on dorsal side, flowers in lax, leafy terminal spikes. Bracts similar to leaf in shape and size, densely hairy; Bracteole 2, equal, linear, densely hairy on both side, 6 – 8 mm long. Calyx 6 – 8 mm long; calyx lobes 5, narrow triangular, hispid, calyx lobe half the length of calyx tube [lobe 2 – 3 mm long; tube 5 – 6 mm long]; calyx 13-ribbed, densely hispid along ribs, one calyx rib terminating the tip of each lobe and others in the sinus,. Corolla white, salverform, tube 1.5 – 2 cm, apically strongly curved, lower lip tri – tetra partite; upper lip bilobed, 2.2 – 2.6 x 2.2 – 2.4 mm. Stamen 4, attached to distal end of the tube, just below the throat. Ovary 1.5 – 2 mm long, glabrous; style long upto 4 – 5 mm long, glabrous, brown colour at the tip. Capsule ovoid, 8 – 10 mm long, enveloped in persistent calyx. (Fig.1).

Flowering & Fruiting: October to December.

Etymology: The new species is named on the name of their type locality (Todargh-Raoli Wildlife Sanctuary, Rajasthan, India).

Habitat and Ecology: It grows on transition area of gravel and sandy habitat in associated with *Cordia sinensis* Lam., *Sorghum halepense* (L.) Pers., *Aerva javanica* (Burm.f.) Juss. ex Schult., *Calotropis procera* (Aiton) Dryand., *Prosopis juliflora* (Sw.) DC., *Butea monosperma* (Lam.) Taub., *Eragrostis amabilis* (L.) Wight & Arn., *Bergia ammannioides* Roxb. ex Roth., *Commelina difusa* Burm.f., *Lindenbergia indica* Vatke, *Senna siamea* (Lam.) H.S.Irwin & Barneby, *Ipomoea nil* (L.) Roth, *Trichosanthes tricuspidata* Lour., usually up to 500m {Fig. 2}.

Distribution: The type locality of the new taxon is the protected area of Todgarh-Raoli Wildlife Sanctuary, Rajasthan near Uparli Babhan village at Jojawar Range (Fig. 3).

Parasitism: The new species is strictly parasitic on the grass roots of *Sorghum halepense* (L.) Pers. belonging to family Poaceae.

Taxonomic affinity: *Striga todgarhica* sp. nov. shows similarity with *Striga asiatica* (L.) Ktze. in having a densely hispid stem, linear leaves and one calyx-rib terminating the tip of each lobe and others rib in the sinus, but differ in the densely hairy leaves, 13-ribbed on calyx, densely hispid along ribs, calyx lobe narrow triangular, half the length of calyx tube, corolla tube up to 2 cm long, lower lip tri – tetra partite and corolla white.

Conservation Status: The new species is rare at the locality. Collected only from near Uparli Babhan village at Jojawar Range, the extent of occurrence is estimated to be less than 40 Km². So far, in this habitat, I could locate only a few populations with ca. 128 individuals, that too prone to destruction in the near future due to various human interference and grazing pressure. Due to the rarity and very restricted

distribution of this taxon, it needs to conserve and further field studies needed to confirm the status.

Key to the genus *Striga* for Rajasthan state

1a. Calyx 5-ribbed

2a. Leaves normal, linear, green

S. densiflora

2b. Leaves reduced to scales, purple

S. gesnerioides

1b. Calyx 10-15 ribbed

3a. Three calyx-ribs terminating the tip of each lobe, Calyx 15-ribbed

S. angustifolia

3b. One calyx-rib terminating the tip of each lobe and others in sinus, Calyx 10-13 ribs.

4a. Leaves smooth or villous; Calyx 10-ribbed, hispidulous along ribs, calyx lobe linear, as long as calyx tube; petals lower lip tripartite, yellow, white or red;

S. asiatica

4b. Leaves densely hairy on dorsal side; Calyx 13-ribbed, densely hispid along ribs, calyx lobe narrow triangular, half the length of calyx tube; petals lower lip tri – tetra partite, white;

S. todgarhica

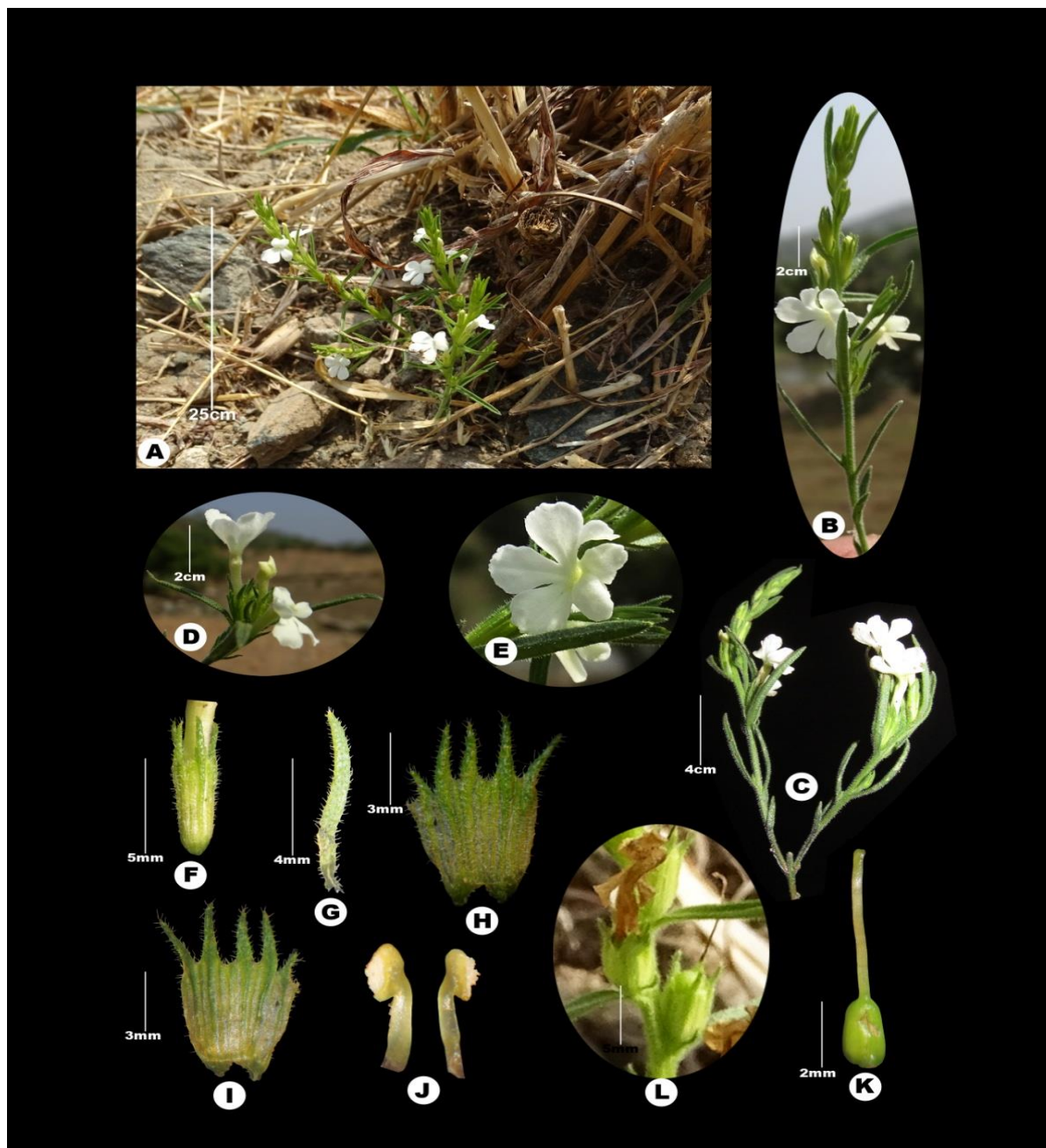


Fig. 1. *Striga todgarhica* C.S. Purohit sp. nov. A – Natural location at Uperli Bhabhan, Todgarh-Raoli wildlife sanctuary; B & C – Inflorescence; D & E – Close-up of flowers; F – Calyx; G – Bracteole; H & I – Dorsal & ventral view of calyx; J – Stamens; K – Ovary & L – Fruit.



Fig. 2. Natural location of *Striga todgarhica* at Uperli Bhabhan, Todgarh-Raoli wildlife sanctuary, Rajasthan.

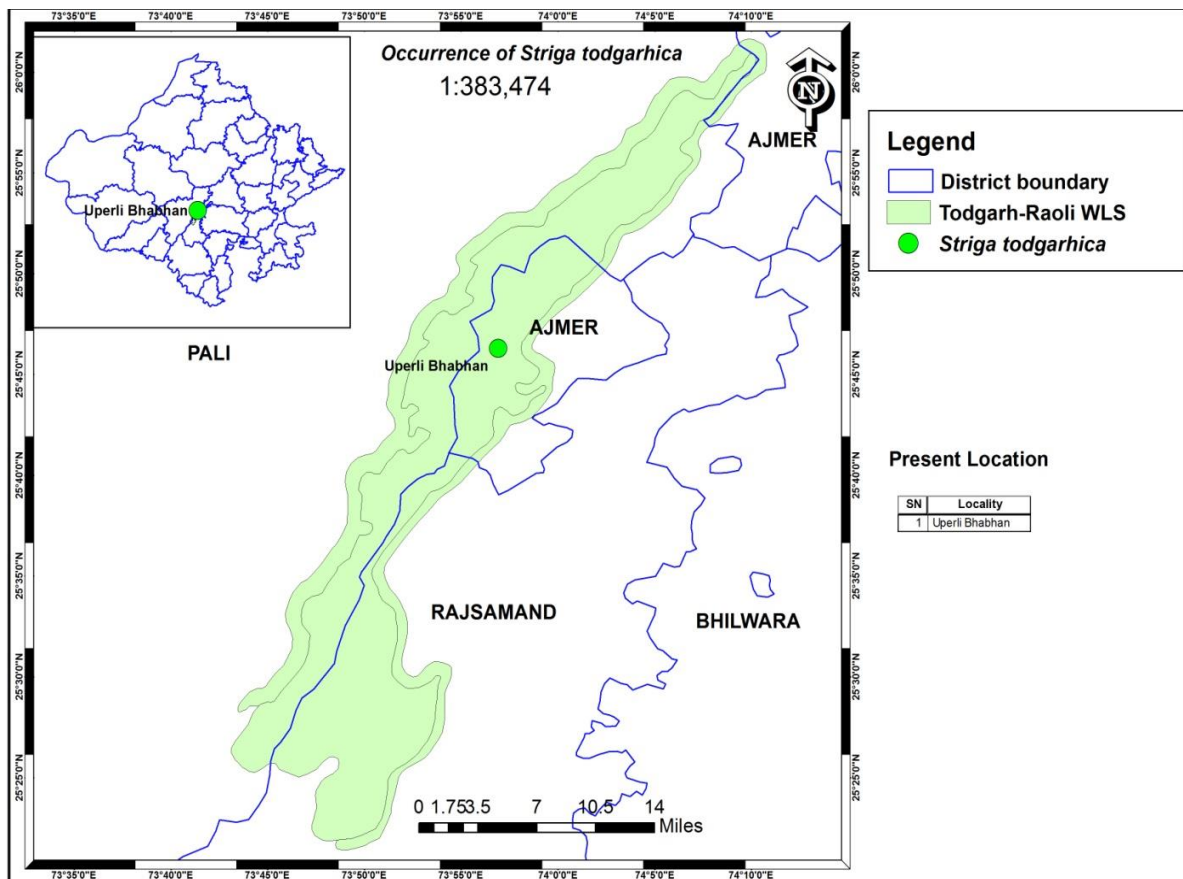


Fig. 3. Map showing occurrence of *Striga todgarhic* in Todgarh-Raoli wildlife sanctuary, Rajasthan

Table 1. Diagnostic morphological comparison of *Striga todgarhica* with *S. asiatica* and *S. densiflora*

Characters	<i>S. asiatica</i>	<i>S. angustifolia</i>	<i>S. todgarhica</i>
Leaves	Linear, smooth or slightly villous	Linear, smooth or slightly villous.	Linear, densely hairy on dorsal side
Stem	Erect, one rarely branched, ribbed, hispidly hairy;	Erect, subquadrangular, simple, rarely apically branched, hispidulous;	Erect, subquadrangular, simple, branched from base, hispidulous;
Bracts	Similar to leaf in shape and size, slightly hairy;	Similar to leaf in shape and size, slightly hairy;	Similar to leaf in shape and size, densely hairy;
Bracteoles	Less than 1 mm long, linear, slightly hairy;	Less than 1 mm long, linear, slightly hairy;	Less than 1 mm long, linear, densely hairy;
Flower	Flower axillary solitary or in a spike upwards, 3 – numerous flowers.	Flowers sub-sessile, axillary, passing into terminal spike, 3 to numerous flowers,	Flowers sub-sessile, in lax, leafy, terminal spike, 8 – 16 flowers;
Calyx	Calyx 4-8 mm long, 10-ribbed, one calyx rib	Calyx 9-10mm, 15-ribbed; lobes 5, each with 3-ribs	Calyx 6-8mm, 13-ribbed, one calyx rib terminating the tip

	terminating the tip of each lobe and others in the sinus. calyx lobe one third as long as tube;	terminating the tip of each lobe, hispidulous along ribs; calyx lobe as long as tube, subulate;	of each lobe and others in the sinus, densely hispid along ribs; calyx lobe half the length of tube;
Corolla	Calyx lobe: linear; Corolla bright yellow, white or red; Corolla tube 0.8-1.5 cm long, apically strongly curved; upper lip 2-partite, lower lip tri-partite;	Calyx lobe: linear; Corolla white; Corolla tube 0.8-1.5 cm long, tube abruptly incurved at or above the middle; upper lip 2-partite, lower lip outside in bud, tri-partite;	Calyx lobe: narrow triangular, hispid. Corolla white; Corolla tube longer up to 2 cm, apically strongly curved. upper lip 2-partite, lower lip tri to tetra-partite.

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