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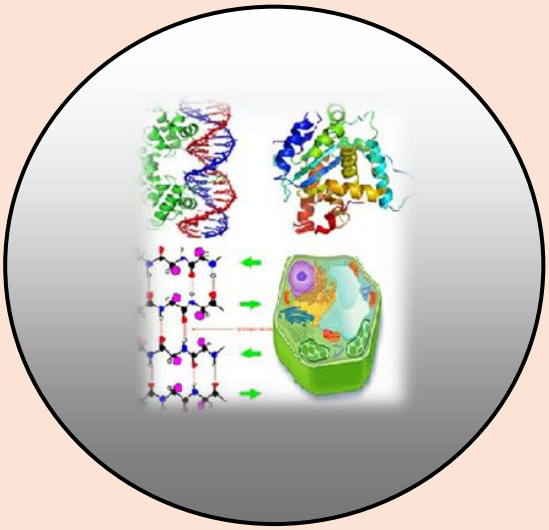

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RESEARCH PAPER

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New Distributional Record of *Lotus corniculatus* L. (Birds foot trefoil) from Kishanpur Wildlife Sanctuary, Uttar Pradesh, India

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ABSTRACT

***Lotus corniculatus* L. was earlier known from hilly areas of Western Himalaya, is being reported for the first time from Pakka Machan area of Kishanpur Wildlife Sanctuary (KWLS), as a new distributional record for Uttar Pradesh plains. The species is also provided with the updated correct nomenclature, detailed description, synonyms, phenology, distributional map and conservation status. A plate of photographs of different parts of the plant is also provided for better representation of characters.**

Keywords: ***Corniculatus, KWLS, Lotus, Uttar Pradesh and Wildlife.***

INTRODUCTION

Uttar Pradesh is one of the largest state of India spanning over an area of about 2,41,286 sq. km, however, its recorded forest area is about 21,291 sq. km which is only about 3% of total forest cover of the country because its maximum area is occupied by agricultural land and human population (Kumar etal., 2011). In order to ensure the protection of all major ecosystems, to minimize damages to the habitats and to safeguard biodiversity there is a network of protected areas in our country. On these lines of conservation programs, Wildlife Protection Act was promulgated in 1972 and resulted in the declaration of National Parks and Wildlife Sanctuaries. Dudhwa Tiger Reserve (DTR) is one of the such protected areas, which contains one National Park and two Wildlife Sanctuaries. This sanctuary harbours rich and unique flora of Terai region, situated at 28°24′01″N and 80°22′01″ E in Uttar Pradesh, came into existence in the year of 1972. This beautiful emerald sanctuary is a part of Dudhwa Tiger Reserve and spans over a vast area of 227 km^2 in Terairegion and also home for Tiger, Leopard, Swamp Deer, Hog Deer, Barking Deer, Bengal Floricon and other fauna. Family *Leguminosae Juss.* Is the third largest family of flowering plants followed by Asteraceae and Orchidaceae (Christenhusz & Byng, 2016). Themembers of this family are easily recognised by its peculiar fruit that is Pod (Legume) hence the name Leguminosae originated. These are mainly distributed across the globe in diverse habitats ranging from tropical forests wetlands, dry lands, cold deserts to alpine areas and comprises of approximately 720 genera and more than 18,000 species across the globe (Lewis et al., 2005; Escaray et al., 2012). The name *Lotus* was published by Linnaeus in 1753 in his Species Plantarum. *Lotus corniculatus* L. sensulato (Leguminosae Juss., Papilionoideae DC., Loteae DC.) is a widely distributed and most variable species of the genus *Lotus* (Kramina, 1999).

There are *ca.* 100 species of *Lotus* mainly distributed in Europe, temperate and tropical regions of Asia (Escaray et al., 2012). In India this genus consists of 3 species, namely, *L. corniculatus* L., *L. garcinii* DC., *L. arabicus* L. (Chaudhary, 1999). Sanjappain Legumes of India (1992), has given the distribution of *L. Corniculatus* L. from Western Himalaya. Therefore, this species is being reported for the first time from plains of Uttar Pradesh. This forms the new record from plains of Uttar Pradesh.

MATERIAL AND METHODS

The present study isan outcome of the survey and extensive explorations in Kishanpur Wildlife Sanctuary for documentation of floristic diversity from 2105-2018. During these explorations and surveys in the KWLS we came across this interesting species near grasslands of Pakka Machan area of the sanctuary. After microscopic examination of morphological characters, survey of previously published literature and consultation of LWG Herbarium it is identified as *L. corniculatus* L. The characters of the species have been presented through a plate (Figure 2) containing the photographs of different parts of the plant taken by stereo-zoom microscope (Leica, Germany) for proper and easy identification. The species is also provided with the keys, updated correct nomenclature, detailed description, synonyms, phenology, distribution and conservation status. The specimens are housed in the LWG herbarium, Lucknow.

RESULT AND DISCUSSION

The perusal of literature from different sources, consultation of herbarium (LWG) and study of morphological characters of the specimens collected from the field led to the identification of this species. This species is mainly distributed in the hilly areas of Indian subcontinent and other parts of the world. The major diagnostic characters of the genus *Lotus* L. are pinnately 5-foliolate leaves, claw with a thickened infolded margin, diadelphous stamens, and a style hardened from the base. The character that differentiates *L. corniculatus* L. from other species are yellow flowers on long peduncle, fruiting calyx lobes less than twice the length of calyx tube, pods with vertical septa and apex with a hook like appendage similar to bird's foot and seeds are not mottled. This species is being reported for the first time from KWLS that is situated at the foothills of the Nepal Himalaya in Terai region of Uttar Pradesh. Although many studies have been made from time to time on the floristic diversity from different parts of Uttar Pradesh (Duthie, 1903; Kanjilal, 1933; Srivastava, 1976; Mishra & Verma, 1992; Sharma & Dhakre, 1995; Singh, 1997; Singh & Khanuja, 2006; Maliya & Datt, 2010; Maliya, 2012a-2012b) but no record is available for this species. This species was previously known from the hilly regions of Western Himalaya. Our study extends its geographic distribution to Kishanpur Wildlife Sanctuary, Uttar Pradesh.

Key to the Indian species of genus *Lotus*

1a. Flowers without peduncle; corolla white coloured ……..……..….***L. garcinii***

1b. Flowers with peduncle; corolla yellow or rose coloured……..….2

2a. Annual herbs; peduncle twice as long as the subtending leaf; fruiting calyx lobes at least twice as long as the tube; corolla rose coloured…….……..…….***L. arabicus***

2b. Perennial herbs; peduncle more than twice as long as the subtending leaf; fruiting calyx lobes less than twice as long as the tube; corolla yellow occasionally with red tinge……..……...***L. corniculatus***

***Lotus corniculatus* L.** Sp. Pl.774. 1753; DC., Prodr. 2: 214. 1825; Baker in Oliver, Fl. Trop. Africa2: 63. 1871; Boiss., Fl. Orient. 2: 165. 1872; Baker in Hook. f., Fl. Brit. India 2: 91. 1876; Collet, Fl. Siml. 120. 1902; Burkill in Rec. Bot. Surv. India 4: 104.1910; Blatter, Beautiful Flowers of Kashmir 79. 1927; Chowdhery and Wadhwa, Fl. Himachal Pradesh 1: 215. 1984; Sanjappa, Legum. India 205. 1992; S. Kumar and P.V. Sane, Legum. S. Asia Checklist 291. 2003; Pushalkar and Singh, Fl. Gangotri Nat. Park 226. 2012.

=*Lotus corniculatus* L. var. *major* (Scop.) Brand, Bot. Jahrb. Syst. 25(1-2): 212. 1898.
=*Lotus major* Scop., Fl. Carniol. (ed. 2) 2: 86. 1772.
Type: Described from Europe, Herb. Linn. 931.23 (Linn, Scan!).

Perennial, prostrate, ascending herbs up to 7-12 cm high, branching from the base. Stem glabrous except hairy at the point of attachment of leaves and flowers; hairs long, transparent. Leaves 8-10 mm long, sessile, alternate, pinnately 5-foliolate, 2 basal, 3 terminal; rachis 1.75-2.25 mm long, villous; petiolule 0.4-0.8 mm long; leaflets green slightly fleshy, ovate-oblanceolate or obovate, cuneate at base, entire along margin, obtuse-rounded, acute to almost rounded or slightly shallow notched at apex, villous at lower surface; lower pair leaflets 3.5-4 × 1.8-2.2 mm; upper leaflets 3.5-4.4 × 1.9-2. 4 mm; upper lateral leaflets slightly oblique. Umbels axillary 1-2 flowered. Peduncles 1.6-2.2 cm long, glabrous, more than twice as long as the subtending leaf; bracts 3, foliaceous, 2.6-3.0 × 1.0-1.2 mm, ovate, elliptic-oblong, slightly rhomboid; midvein on abaxial side hairy. Hairs at the base of peduncle and leaves 0.4-0.6 mm long. Pedicel 1.3-1.6 mm long.

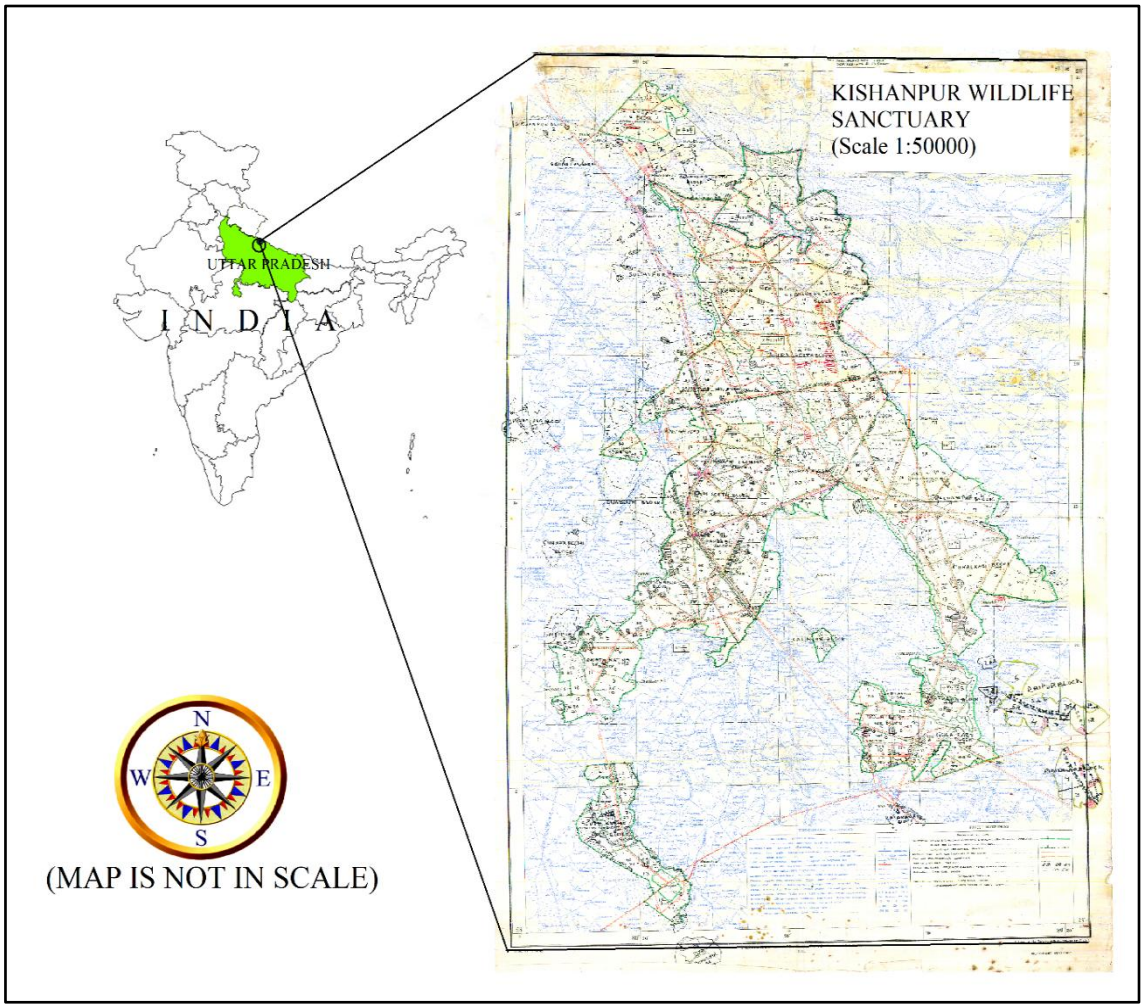

Figure 1. Location of study site (Kishanpur Wildlife Sanctuary) in map of India.

Flowers 4.6-6.5 mm long; calyx 5-lobed, 3.5-4 mm long, persistent, campanulate, lobes 1.7-2.0 mm long, less than twice as long as the tube, subequal, linear or narrowly lanceolate, acuminate, margin long hairy, usually longer than, rarely equalling to the tube; corolla yellow; standard limb orbicular 6.5-7.2 × 3.5-4.3 mm; claw 2.5-3.0 mm long, flattened; wings 5.5-6.5 × 2.0-2.5 mm, ovate-oblong; apex obtuse-round, curved; claw1.8-2.0 mm long; keel 6.7-7.2 x 2.8-3.2 mm, incurved, ovate, slightly curved on upper portion; claw 2.0-2.5 mm long.

Figure 2. ***Lotus corniculatus*** **L.(A) Flower in habit (B) Habit (C) Leaves (D) Foliaceous bracts (E) Dried flower (F) Sepals with flower (G) Joint filaments of androecium (H) Gynoecium (I) Nodes with hairs (J) Pod (K) Pod opened showing vertical septa and birds claw like apex (L) Seeds. (From** ***P. Katiyar*** **311628, LWG).**

Stamens diadelphous, 5.5 mm long. Ovary 3 × 0.5 mm; style 2.5 mm long; stigma capitate. Fruits 20 × 2 mm with a distinct claw at apex, 1 mm length, curved inwardly; seeds partitioned in fruits through vertical septa, black, shiny, suborbicular, glabrous, smooth, 1.0-1.2 mm long.

Specimens cited: India, Uttar Pradesh, Kishanpur Wildlife Sanctuary, Pakka Machan area Grassland, N-28.395321, E-80.439864, Alt-175 m, 27.04.2017, *P. Katiyar* 311628 (LWG).

Flowering and Fruiting: April-June
Distribution: India (Western Himalaya: Jammu & Kashmir to Uttarakhand), Bhutan China, Nepal, Myanmar, Pakistan, Africa, Europe, Middle Asia, West Asia. Occasionally found in open grounds, shady slopes and in open grasslands to Meadows.
Conservation status: The species is mainly found in grasslands and on slopes. This species is listed under Least Concern (LC) category in IUCN Red List.

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