

Rediscovery of *Hibiscus fragrans* Roxburgh (Malvaceae) from Jaldapara National Park in Duars of West Bengal, India

Chandra Ghosh², T. K. Paul¹ and A. P. Das³

Taxonomy and Environmental Biology Laboratory, Department of Botany, University of North Bengal, Siliguri, 734013, West Bengal, India

¹Central National Herbarium, Botanical Survey of India, Howrah 711103, West Bengal, India

²Present address: Department of Botany, Gour Mahavidyalaya, Mangalbari, Malda, West Bengal, India

³Corresponding author; E-mail: apdas.nbu@gmail.com

[Received 26.10.2013; accepted 21.12.2013]

Abstract

Hibiscus fragrans Roxburgh (Malvaceae), an endangered plant is recorded to grow Jaldapara National Park. The population of the species has increased from one in 2002 to seven in 2013. The species needs to be conserved both in *in-situ* and *ex-situ* modes and may be exploited for its sweetly fragrant flowers.

Key words: *Hibiscus fragrans*, Jaldapara National Park, Endangered, Conservation

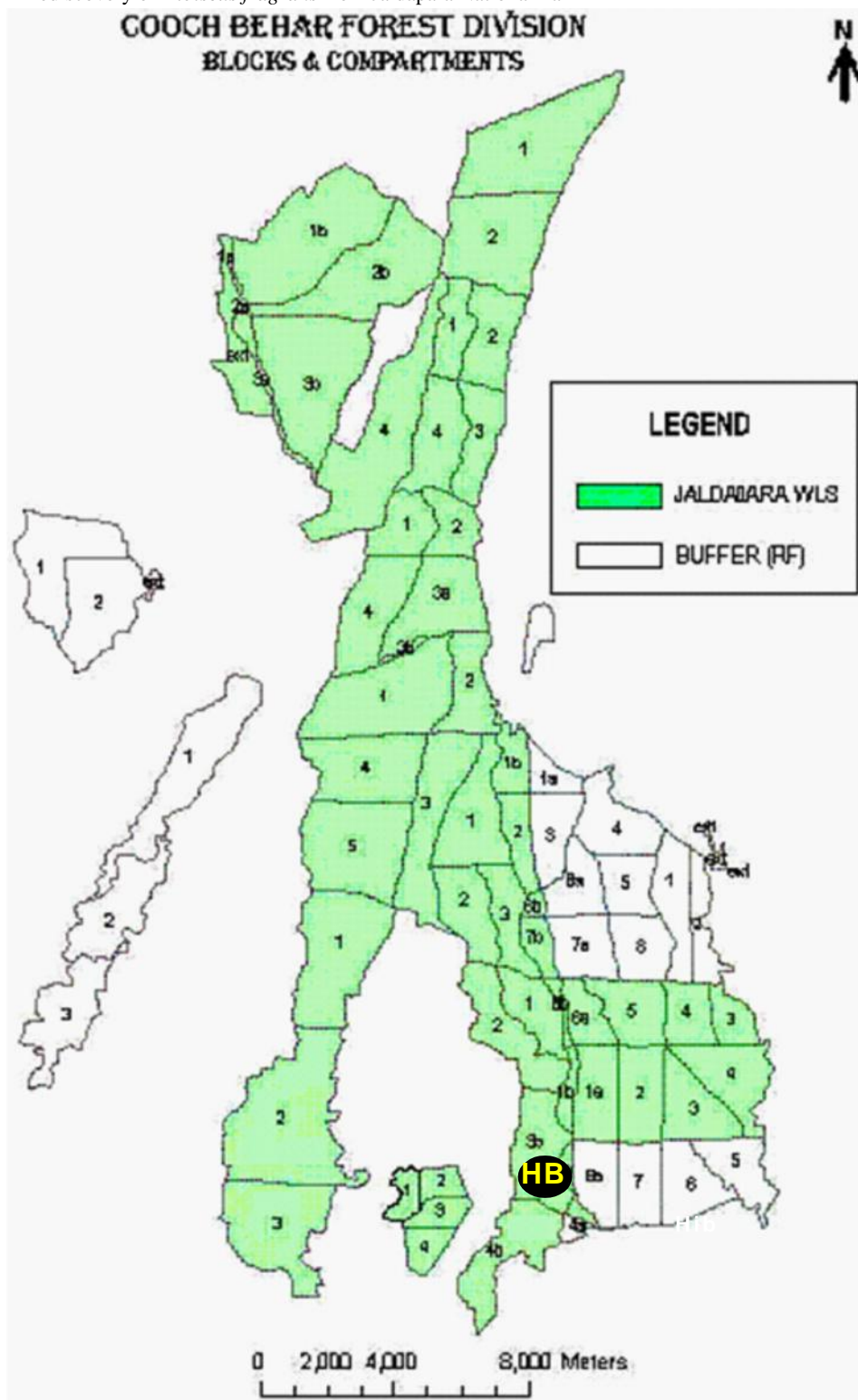
INTRODUCTION

Floristic richness of Eastern Himalaya is well known (Das 1995, 2004; Das & Chanda 1987). Darjeeling part of Eastern Himalaya and its contiguous Terai and Duars regions are equally rich and are supporting innumerable RET and endemic plants (Dutta *et al* 2002; Kadir *et al* 2002; Pandit *et al* 2004; Ghosh *et al* 2004; Rai & Das 2005; Das *et al* 2008, 2010 a,b; Das & Yadav 2011; Moktan & Das 2011; Shukla *et al* 2013; Saha *et al* 2013). Realizing the richness a good number of Protected Areas like National Parks, Wildlife Sanctuaries and Reserve Forests have been established in this region (Das 2004, 2013; Das *et al* 2008).

Jaldapara Wildlife Sanctuary (JWLS) was established in 1941 to conserve the Great Indian One-horned Rhino (*Rhinoceros unicornis* Linnaeus). Later on, in May 2012 it was upgraded to Jaldapara National Park (JNP) (ToI 2012). The National Park is situated along the coast of Torsa river in the Jalpaiguri district of the Indian state of West Bengal with an area of 216.5 sq km and is located in between 25° 58' N and 27° 45' N latitude and 89° 08' E and 89° 55' E longitude and is looked after by the Coochbehar Wildlife Forest Division. The average altitude of the Park area is 61 m amsl (Anonymous 1997; WII 2007; Das *et al* 2003).

Though this PA was basically maintained as a sanctuary to conserve the rhino and steps were taken to improve the fodder production for the increasing animal population in the park, even then, the flora of JWLS was recorded to be quite high and diverse (Banerjee 1993; Pandit 1996; Das *et al* 2003; Pandit *et al* 2004; Ghosh & Das 2005).

During our floristic survey in the then JWLS, we came across a liana in flowering condition in October 2002. Later on it was identified as *Hibiscus fragrans* Roxburgh of



Map 1. Location of *Hibiscus fragrans* (HB) Roxburgh in Jaldapara National Park



PLATE - I. *Hibiscus fragrans*: 1. A plant in full bloom; 2. A twig; 3. Flower in lateral view; 4. Flower in front view; 5 & 6. Stipule; 7. Young bud with epicalyx; 8. Flower bud partially open



PLATE II. The voucher specimen of *Hibiscus fragrans* Roxburgh collected from JWLS (now JNP) in 2002 and stored at NBU.

Malvaceae. But, our search in different herbaria including CAL, CUH, BSHC, NBU and Lloyd Botanic Garden (at Darjeeling) failed to trace even a single specimen from West Bengal. Paul (1993) recorded its occurrence from the nearby states. Miller & Long (1991) recorded the occurrence of the species from Darjiling Hills (300 – 1220 m). However, in all these cases the claimed records are based on very old specimens.

The last known collection of the species in India is from the Lohit district of Arunachal Pradesh in 1969. This expresses the rarity of the plant. In 2002 only one plant was recorded from JWLS. But, during our recent visits (2009 & 2013) to the habitat in JNP we recorded the slight increase in population. Though fruit and seed production was not recorded from JNP but it is propagating vegetatively as and when its slender branches remained in touch with moist forest floor, it gets rooted and leads to the establishment of a new individual. The forest of this area is completely undisturbed, mostly with evergreen species and favorable soil water condition.

In its vegetative condition with larger and more rounded leaves the plant might be mistaken with *Croton caudatus* Geiseler (Euphorbiaceae). For its easy recognition in the field and herbaria, the species is treated below with a brief description along with a map (Map 1), photographs from the habitat (Plate I) and of a herbarium specimen (Plate II).

Hibiscus fragrans Roxburgh (Hort. Beng. 97. 1814, *nom. nud.*) Fl. Ind. 3: 195. 1832; Masters in Hooker *f.*, Fl. Brit. India 1: 337. 1874; Kanjilal *et al*, Fl. Assam 1: 143. 1934; Hochreutiner in Ann. Cons. Jard. Bot. Geneve 4: 61. 1900; Deb in Bull. Bot. Surv. India 3: 287. 1961; Rakshit *et* Kundu in Bull. Bot. Surv. India 12: 158 (1970) 1972; T.K. Paul & Nayar, Fasc. Fl. India 19: 128, fig. 26. 1989; A.G. Miller & D.G. Long in Grierson & D.G. Long, Fl. Bhutan 2(1): 181. 1991; T.K. Paul in Sharma *et al* (eds.) 3: 318. 1993; P.K. Hajra *et al.* in Mat. Fl. Arunachal Pradesh 1: 211. 1996; Chauhan in N.P. Singh *et al.* (eds.), Fl. Manipur 1: 167. 2000.

Type: Bangladesh, Sylhet, Wall. Cat. 1911 A (CAL)

A liana, ±18 cm in diameter near base; spreading over the forest canopy. Young stem, petiole and pedicel stellate-pubescent. Leaves simple; lamina ovate to broadly ovate or rounded ovate, 5 – 15 x 4 – 12 cm, unlobed, dentato-serrate, acute, base deeply cordate, basal lobes rounded, 5 – 7 nerved at base, both surfaces stellate hairy, densely on lower surface, glabrescent, chartaceous; petiole 5 – 7 cm long, terete; stipule early deciduous, subulate, 0.9 – 1.1 x 0.3 – 0.5 cm, entire, acuminate, finely hairy. 1 – 3 peduncles produced from a leaf axile bearing solitary flower on each. The flowering branches become leafless terminally and look like a raceme; peduncles 3 – 7 cm long, green; pedicels 0.4 – 0.6 cm long, grayish, finely hairy. Flowers ± 4 cm across, highly fragrant; epicalyx segments 5, equal, basally connate, lobes broadly subulate to ovate-subulate, ± 1.2 x 1.0 cm (in flower), entire, acuminate, finely stellate-hairy, grayish green towards the base, gradually turning purple towards the tip; calyx cup-shaped, sepals 5, connate to the middle, lobes ovate-subulate, ± 1.8 x 0.9 cm, entire, acute, greenish, stellate-tomentose inside, finely stellate-hairy out-side; corolla with 5 spreading petals, reflexed after 1/3rd from base, light purple, yellow at the base, petals ± 4 x 3 cm, entire, rounded at tip, glabrous inside, sparsely stellate-hairy inside, with many (±10) parallel veins, cross-veins obscure; stamina column ± 1 cm long, purplish, anthers numerous, yellow, reniform. Fruit set never recorded at JNP.

Exsiccatae: JP – 3, East Jaldapara, Jaldapara Wildlife Sanctuary (now, Jaldapara National Park), Chandra & A.P. Das/ Jld-317, dated 20.10.2002 (NBU, CAL).

Flowers: October - January; **Fruits:** Not seen at JNP

536 Rediscovery of *Hibiscus fragrans* from Jaldapara National Park

Local distribution: Only seven plants recorded from the JP-3 Compartment of Jaldapara Beet of East Jaldapara Range of JNP.

Distribution: INDIA: North-east India: Arunachal Pradesh, Assam, Meghalaya, Nagaland, Mizoram, Manipur, Sikkim, West Bengal; BANGLADESH, CHINA, MYANMAR.

Hibiscus fragrans Roxburgh is to be treated as an endangered plant. The plant may be explored for the production of perfume that can be used in cosmetics. The population of the species can be easily increased through vegetative propagation and can be re-introduced in its natural habitat. Also, the plant is also to be introduced into the *ex situ* conservatories for fast multiplication and exploitation.

Acknowledgements

The authors are thankful to the authorities of the Forest Department, Government of West Bengal for financial assistance and permission to work in JNP and to the Director, Botanical Survey of India for permitting us to work at CAL and BSHC. They are also thankful to two senior research scholars, Dibakar Choudhury and Anurag Chowdhury for different types of assistance in laboratory and in the field.

LITERATURE CITED

- Anonymous 1997. *Management plan of Jaldapara Wildlife Sanctuary, West Bengal*. Wildlife Circle, Department of Forest, Government of West Bengal.
- Banerjee, L.K. 1993. *Plant Resources of Jaldapara Rhino Sanctuary*. Botanical Survey of India, Calcutta.
- Das, A.P. 1995. Diversity of the angiospermic flora of Darjeeling Hills. In *Taxonomy and Biodiversity*, ed. A.K. Pandey. 118 - 127. CBS, New Delhi.
- Das, A.P. 2004. Floristic studies in Darjiling hills. *Bull. Bot. Surv. India* 43(1-4): 1 – 18.
- Das, A.P. & Chanda, S. 1987. Flowering calendar of the angiospermic flora of Darjeeling Hills, West Bengal (India). *Trans. Bose Res. Inst.* 51(4): 99 – 133.
- Das, A.P.; Ghosh, C. & Bhowmick, D. 2003. *Project Report on Estimation of Palatable Biomass in Jaldapara Wildlife Sanctuary with special reference to Rhinoceros unicornis L.* Department of Botany, University of North Bengal, Siliguri.
- Das, A.P.; Bhujel, R.B. & Lama, D. 2008. Plant Resources in the Protected Areas and Proposed Corridors of Darjeeling, India. In *Biodiversity Conservation in the Kangchanjunga Landscape*. Eds. N. Chettri, B. Shakya & E. Sharma. Pp 57 – 79.
- Das, A.P.; Ghosh, C.; Sarkar, A.; Biswas, R.; Biswas, K.; Chowdhury, D.; Lama, A.; Moktan, S. & Chowdhury, A. 2010a. Preliminary report on the Medicinal Plants from three MPCAs in Terai and Duars of West Bengal, India. *Pleione* 4(1): 90 – 101.
- Das, A.P.; Samanta, A.K. & Ghosh, C. 2010b. A checklist of Angiospermic Climbers of Darjiling and Sikkim parts of Eastern Himalaya including Terai and Duars. *Pleione* 4(2): 185 – 206.
- Das, A.P. & Yadav, S.R. 2011. Distribution of *Gnetum montanum* Markgraf (Gnetaceae) in Terai and Duars of West Bengal, India. *Pleione* 5(1): 205 – 207.
- Dutta, S.; Naik-Desai, A.; Almeida, S.M. & Das, A.P. 2002. Aquatic macrophytes of Apalchand Reserve in the Jalpaiguri District of West Bengal. In *Perspectives of*

- Plant Biodiversity*. Ed. A.P. Das. 53 – 65. Bishen Singh Mahendrapal Singh, Dehradun.
- Ghosh, C. & Das, A.P. 2005. Effects of expansion of grassland on the herbland flora of Jaldapara Wildlife Sanctuary. In U. Chakraborty & B.N. Chakraborty (Eds.), *Stress Biology*. Narosa Publishing House, New Delhi.
- Ghosh, C.; Sharma, B.D. & Das, A.P. 2004. Weed flora of tea gardens of Darjiling Terai. *Bull. Bot. Surv. India* 43(1-4): 151 – 161.
- Kadir, A.F.M. Manzur & Das, A.P. 2002. Species diversity in the habitat of *Streptocaulon sylvestre* Wight – an endemic and critically endangered asclepiad. In *Perspectives of Plant Biodiversity*. Ed. A.P. Das. Bishen Singh Mahendrapal Singh, Dehradun. Pp. 579 – 592.
- Miller, A.G. & Long, D.G. 1991. Malvaceae. In Grierson, A.J.C. & Long, D.G. (Eds.). *Flora of Bhutan*. 2(1): 181. Royal Botanic Garden, Edinburgh
- Moktan, S. & Das, A.P. 2011. Dominance-diversity and Species richness of herb species in the foothill forests of Kurseong. In C. Ghosh & A.P. Das, *Recent Studies in Biodiversity and Traditional Knowledge in India*. Sarat Book House, Kolkata. Pp. 145 – 151.
- Pandit 1996. *Management plan of Jaldapara Wildlife Sanctuary, West Bengal* (Vols. I – III). Wildlife Circle, Department of Forest, Government of West Bengal.
- Pandit, P.K.; Ghosh, C. & Das, A.P. 2004. Non-timber Forest Produces from Jaldapara Wildlife Sanctuary: an Assessment. *Indian For.* 130: 1169 – 1185.
- Paul, T.K. 1993. Malvaceae. In Sharma *et al* (Eds.). *Flora of India*. Botanical Survey of India, Calcutta.
- Rai, U. & Das, A.P. 2005. Inventory of tree species in the lower hill of Darjiling district. In *Plant Taxonomy: Advances and Relevance*, eds. A.K. Pandey, Jun Wen & J.V.V. Dogra. CBS Publishers & Distributors, New Delhi. Pp. 101 – 118.
- Saha, G.; Biswas, R. & Das, A.P. 2013. Survey of medicinal plants in the Gorumara National Park, Jalpaiguri, West Bengal, India. *Pleione* 7(1): 127 – 133.
- Shukla, Gopal; Biswas, Rajib; Das, A.P. & Chakravarty, Sumit 2013. Visual qualitative description of a humid tropical foothill forest in Indian eastern Himalayas. *Biodiversity* <http://dx.doi.org/10.1080/14888386.2013.819786>
- TOI 2012. National Park status for Jaldapara Sanctuary. *Times of India*, May 11, 2012.
- WII 2007. *West Bengal Aids World Bank Forestry Project: Study on the Management of Rhinoceros*. (Final Report). Wildlife Institute of India, Dehradun.