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MISCELLANEOUS NOTES ON *BAUHINIA PHOENICEA* (FABACEAE: CAESALPINIOIDEAE)

Sujana K.A.¹, Avishek Bhattacharjee², Agrawala D.K.³ and *Subir Bandyopadhyay²

¹Botanical Survey of India, Central Botanical Laboratory, P.O. Botanic Garden, Howrah – 711103, West Bengal, India

²Botanical Survey of India, Central National Herbarium, P.O. Botanic Garden, Howrah – 711103, West Bengal, India

³Botanical Survey of India, Sikkim Himalayan Regional Centre, Gangtok – 737103, Sikkim, India

*Author for Correspondence

ABSTRACT

This paper deals with an Indian endemic species *Bauhinia phoenicea* B. Heyne ex Wight & Arn., with respect to the number of fertile stamens in its flowers, uses, seed germination in *ex situ* condition and re-assessment of threat status.

Keywords: *Bauhinia phoenicea*, Fertile Stamens, Uses, Seed Germination, Re-assessment of Threat Status

INTRODUCTION

A discussion has been made on *Bauhinia phoenicea* B. Heyne ex Wight & Arn., an Indian endemic species, with respect to the number of fertile stamens in its flowers, uses, seed germination in *ex situ* condition and re-assessment of threat status.

In the Indian *Bauhinia s.l.* the number of fertile stamens in a flower varies from 2–10. The fertile stamens have well-developed filaments and anthers. In some species of *Bauhinia* there may be reduced stamens or staminodes or both of them if the number of fertile stamens is less than 10. Reduced stamens have short filaments with diminutive anthers and staminodes are much smaller than the fertile stamens, often filament-like or in a modified form.

In the flowers of *B. phoenicea* B. Heyne ex Wight & Arn., a species endemic to Western Ghats in Karnataka, Kerala and Tamil Nadu, India, the number of fertile stamens was known to be 4 or 5. During the field studies Mr. Rajeev Kumar Singh (pers. comm., 2015) observed that in some of the flowers though 4 or 5 well developed filaments were present, anthers were not formed in all of them. So they reported (2–)3–5 fertile stamens in *B. phoenicea* (Singh *et al.*, 2015). Without the said field observation it would have not been possible to ascertain the actual range of variation in the number of fertile stamens in this species because in the herbarium specimens anthers can occasionally be seen, as they usually fall off from the fertile stamens. However, we could not agree with Singh *et al.*, (2015) in some other aspects.

Singh *et al.*, (2015) stated that none of the seeds germinated in *ex situ* condition in the Experimental Garden of Western Regional Centre of Botanical Survey of India at Pune. The first author (K.A. Sujana) studied seed germination of this species as a part of her project work on 80 plant species endemic to Western Ghats and found that growing *B. phoenicea* from seeds is possibly the simplest way to multiply this species (Figure 1). However, the voracious attention of primates and squirrels make the harvesting of viable seed virtually impossible. Pods attain maturity between December and April. In dry weather mature pods split open to release the seeds. Mature plants climb up to the top canopy making hard to collect seeds directly from the plant and it is better to collect seeds that have fallen to the ground. *B. phoenicea* flowers profusely but poor in fruit setting and seed production. An average pod contains 2 or 3 viable seeds. When pods split open, the area below the plants can be seen as scattered with the brown disc shaped seeds of c. 1 cm diameter. Seeds are sown in trays on a mixture of sieved vermin-compost and river sand, and are lightly covered with the same mixture and watered two times daily. No pretreatment for the seeds is required. They start germinating after 21 days of sowing and 90–96 % germination is observed in freshly collected seeds. Storage of seeds is not advised because they are probably recalcitrant.

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Figure 1: Saplings raised by germinating seeds in Nursery at M.S. Swaminathan Research Foundation, Wayanad

Singh *et al.*, (2015) stated that no use for this species is reported so far but they have overlooked the publication of Baby and Raphael (2014) where they have stated that the leaves and barks of *B. phoenicea* are used in traditional medicine against ‘diabetes, skin allergies, fungal infections and worm disturbances’. The first author (KAS) has found that the Paniya tribe in Kerala uses the paste of scarlet young leaves to treat fresh cuts and wounds and is very effective to stop bleeding. The mature green leaves are used for making plates, bowls and the fibre extracted from stem bark is used as rope for tying purposes or for rope making.

While assessing the threat status, Singh *et al.*, (2015) assessed the species as Vulnerable once as ‘[B1B2b(i,ii,iii,v) c(i,ii,iv); C2a(i); D1]’ (page 7680) and again as ‘[B2ab(i,ii,iii,iv,v); C2a(i); D1]’ (page 7681) in the same publication. Further, the EOO has been estimated as ‘less than 3,000 km²’ (page 7677) in their publication and also as ‘less than 40,000 km²’ (page 7681). However, the EOO will never be ‘less than 3,000 km²’ as per the distribution map of the species.

Singh *et al.*, (2015) applied the following criteria in their assessment:

‘Vulnerable [B1B2b(i,ii,iii,v) c(i,ii,iv); C2a(i); D1]’ (page 7681)

I) Criterion B:

i) B1 (EOO) is <20,000 km² for Vulnerable as per IUCN (IUCN SPS, 2014).

In the assessment of Singh *et al.*, (2015) the EOO is < 40,000 km², i.e. it does not meet any Threatened category.

However, we estimated the EOO with ArcGIS (based on the map provided by the Singh *et al.*, 2015) and we found that it comes between 50,000 to 55,000 km².

ii) B2 (AOO) is <2,000 km² for Vulnerable as per IUCN (IUCN SPS, 2014).

1. b (i,ii,iii,v): Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (v) number of mature individuals.

2. c (i,ii,iv): Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iv) number of mature individuals.

Singh *et al.*, (2015) mentioned the AOO<750km², i.e. it meets Vulnerable.

Therefore, for Criterion B the highest category of threat is Vulnerable.

II) Criterion C: Number of mature individuals <10,000, and

C2 a(i): An observed, estimated, projected or inferred continuing decline AND number of mature individuals in each subpopulation is ≤ 1,000 for Vulnerable as per IUCN (IUCN SPS, 2014).

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Singh *et al.*, (2015) mentioned that the species is represented by a total population comprising less than 900 mature individuals and “the once expansive *B. phoenicea* had drastically collapsed to small populations of not more than 35–60 mature individuals in small fragmented patches in Dakshina Kannada, Hassan, Kodagu, Mysore, Shimoga and Udupi districts of Karnataka; Idukki, Kannur, Kollam, Kottayam, Palakkad, Pathanamthitta and Thiruvananthapuram of Kerala; Coimbatore and Nilgiris of Tamil Nadu.” which indicates it as Endangered (not Vulnerable).

Therefore, for Criterion C the highest category of threat is Endangered.

III) Criterion D:

D1: Number of mature individuals <1,000 (for Vulnerable D1).

Therefore, for Criterion D the highest category of threat is Vulnerable.

As per the Red List guidelines (IUCN SPS, 2014), to list a particular taxon in any of the categories of threat, only one of the criteria, A, B, C, D, or E needs to be met. However, a taxon should be assessed against as many criteria as available data permit, and the listing should be annotated by as many criteria as are applicable for a specific category of threat. Only the criteria for the highest category of threat that the taxon qualifies for should be listed. Singh *et al.*, (2015) applied criteria B, C and D1 and among these the highest category of threat is Endangered for criterion C (mature individuals 35–60 in each subpopulation). Therefore, as per the information provided by the author it should be assessed as ‘Endangered C2a(i)’.

Singh *et al.*, (2015) further assessed the threat as Vulnerable B2ab(i,ii,iii,iv,v); C2a(i); D1] in page 7681 of their publication. Here B1 is missing, B2a(iv) is added and B2c (i,ii,iv) has been omitted (from that given in page 7680). In this assessment also the highest category of threat is Endangered for criterion C and therefore should be assessed as ‘Endangered C2a(i)’ as per the data provided by Singh *et al.*, (2015).

Singh *et al.*, (2015) applied the criteria on the basis of perusal of the literature, herbaria information, and observations in the field the population of this species for 5 years from 2007–2012 and observed that it has dwindled by more than 75% in the last 100 years (page 7681) due to various threats but how they could conclude this based only on field observation only for 5 years with perusal of literature and herbarium specimens? It is also unclear how they know about the extreme fluctuations (under criterion B)?

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The way the data have been presented by Singh *et al.*, (2015) as an outcome of the field surveys by Rajeev Kr. Singh from 2007 to 2012 seems to immaculately precise but K.A. Sujana in course of her field surveys in Kerala from 2006 to 2012 have seen many mature plants and saplings of this species in many spots in the districts of Kozhikode (Thusharagiri RF, Kakkayam RF, Thamarassery Ghat) Malappuram (Nilambur forests), Thrissur (Athirapally RF, Vazhachal RF) and Wayanad (Periyar RF, Ambayathode RF, Kunjhome RF) which have not been taken into account by Singh *et al.*, (2015). Therefore, the Area of Occupancy (AOO) and number of mature individuals are much higher than stated by Singh *et al.*, (2015).

CONCLUSION

It makes us to believe that the said assessment on threat status of *B. phoenicea* needs serious revision.

ACKNOWLEDGMENT

The authors thank the Director, Botanical Survey of India, for the facilities and Dr. P. Lakshminarasimhan, Scientist ‘E’, BSI, Pune for informing us about the publication of Singh *et al.*, in the

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Journal of Threatened Taxa. The first author would also like to thank Dr. N. Anil Kumar, Director, M.S. Swaminathan Research Foundation, Wayanad for his valuable guidance and encouragement.

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