

A NEW VARIETY OF *ABRUS PRECATORIUS* L. (FABACEAE) FROM BANGLADESH

MD. ABUL HASSAN, M. OLIUR RAHMAN¹ AND SUMONA AFROZ²

Department of Botany, University of Dhaka, Dhaka 1000, Bangladesh

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Abstract

A new variety *Abrus precatorius* L. var. *albo-spermum* Hassan, Rahman *et* Afroz, var. nov. is described and illustrated from Bangladesh. The new variety is closest to *Abrus precatorius* L., but differs by its white coloured oval shaped seeds, short gynoecium which is half the length of longer filaments and with a short style.

Introduction

The genus *Abrus* (Fabaceae) was erected by Adanson in 1763 based on *Glycine abrus* L. (Bretele, 1960). *Abrus* Adans. is a small genus consisting of c. 17 species and widespread in tropical and subtropical regions predominantly in Asia, Africa and probably introduced in the New World (Munsuk *et al.*, 2016). In Bangladesh, *Abrus* is represented by two species, viz. *Abrus precatorius* L. and *A. pulchellus* Wall. ex Thw. (Ahmed *et al.*, 2009). Hooker (1876) in his Flora of British India reported *A. pulchellus* from Chittagong, whereas Prain (1903) documented *A. precatorius* and *A. pulchellus* from the present territory of Bangladesh. *Abrus precatorius* (red-black seeded form) is distributed almost throughout the country and occurs in diverse habitats including village thickets, natural forests and several protected areas of Bangladesh (Uddin *et al.*, 2013; Rahman, 2017; Rashid *et al.*, 2018). In contrary, *Abrus pulchellus* is rare and reported to be found in Chattogram, Cox's Bazar and Sylhet districts (Ahmed *et al.*, 2009).

In early 2018, a group of botanists from the Department of Botany, University of Dhaka visited the Medicinal Plants Garden of *Adhi Kabirj* (an Ayurvedic physician) at the village Tok under Kapsia upazila of Gazipur district and collected different plant samples along with some seeds of 'Sada Kunch' (white *Abrus*). The white seeds of *Abrus* were grown in Dhaka University Botanical Garden for further investigation. Since then red-black seeded *Abrus precatorius* and purely white-seeded forms have been maintained alongside in the garden for comparison. The white-seeded taxon of *Abrus* displays some distinguishing characters, viz. gynoecium and seed characters which do not match with other known species of *Abrus* (Hooker, 1876; Prain, 1903; Kanjilal *et al.*, 1938; Bretele, 1960; Deb, 1981; Ahmed *et al.*, 2009; Wu *et al.*, 2010; Munsuk *et al.*, 2016). The white-seeded *Abrus* taxon is closely allied to the red-seeded *Abrus precatorius* in terms of stem, leaf, inflorescence and some floral characters; however, it differs from *Abrus precatorius* by gynoecium and seed characters. After critical examination, the white-seeded form of *Abrus* for its distinct, heritable and discontinuous characters, is recognized as a new variety, *Abrus precatorius* L. var. *albo-spermum* Hassan, Rahman *et* Afroz, **var. nov.**

Results and Discussion

***Abrus precatorius* L. var. *albo-spermum* Hassan, Rahman *et* Afroz, **var. nov.** (Fig. 1, Plate 1).**

Diagnosis: *Abrus precatorius* L. var. *albo-spermum* Hassan, Rahman *et* Afroz, var. nov. is distinct by its entirely white seeds, gynoecium length which is half the length of the longer filaments and a short style.

¹Corresponding author. Email: oliur.bot@du.ac.bd; prof.oliurrahman@gmail.com

²Present Address: National Museum, Shahbag, Dhaka 1000, Bangladesh

Type: Bangladesh, Dhaka, Dhaka University Botanical Garden, M.A. Hassan 6001, 24 October 2021 (*Holotype:* DUSH!) (Originally seeds were collected from the village Tok of Kapasia upazila under Gazipur district and maintained in Dhaka University Botanical Garden since March 2018). The holotype is deposited at Dhaka University Salar Khan Herbarium (DUSH).

A handsome undershrub with twining stem, and on support grows as a dextrose climber. Leaves paripinnately compound, alternate; leaflets linear or linear-oblong, usually 10-20 in number, occasionally more, opposite, very sweet in taste. Flowers in pedunculate racemes, shortly pedicellate, bisexual, complete; sepals 5, c. 2-4 mm long; petals 5, standard petal 10-11 × 7-8 mm, pinkish-white, wing petal 6-8 × c. 2 mm, keel petal 7-8 × 3-4 mm, elliptic; stamens 9 (alternately long and short, the vexillary filament absent). Gynoecium short, c. 2.5-3.5 mm, half the length of longer filaments; style short, c. 0.5-0.8 mm long; carpel 1, placentation marginal. Fruits oblong pods, turgid, usually 4-6 seeded. Seeds purely white, oval, smooth.

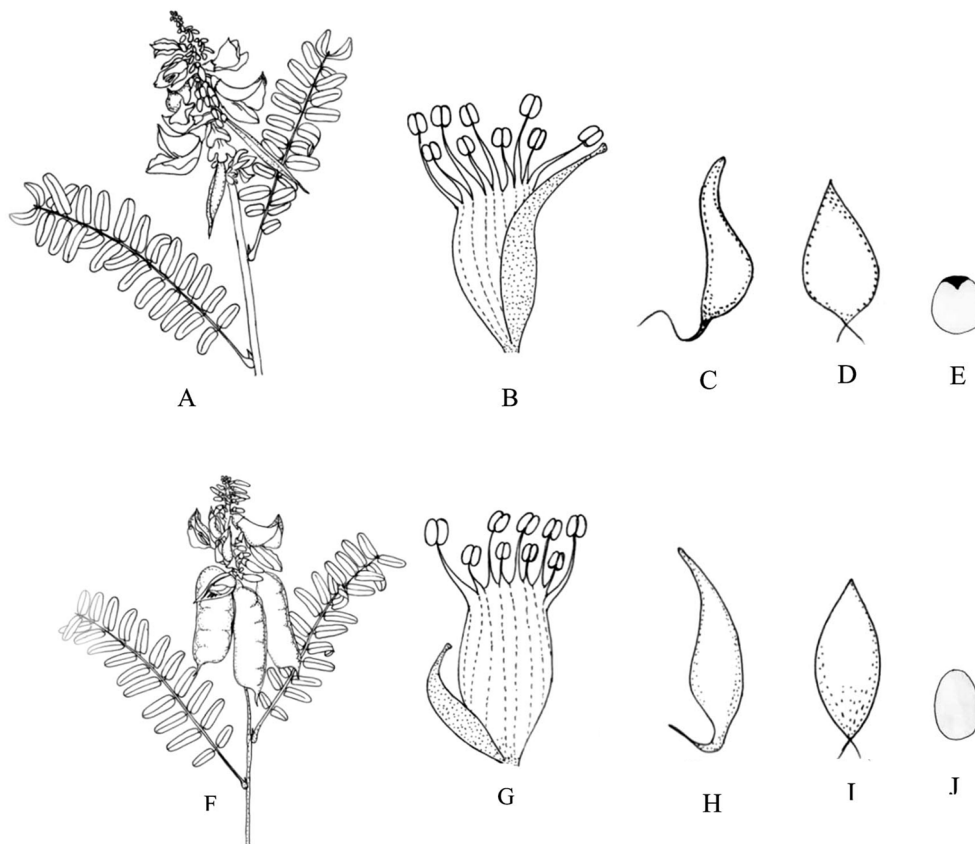


Fig. 1. A-E: *Abrus precatorius*; F-J: *Abrus precatorius* var. *albo-spermum* var. nov.; A,F=Habit sketch (x1); B,G=Androecium vs. gynoecium (x5); C,H= Wing petal (x3); D,I= Keel petal (x3); E,J=Seed (x1).

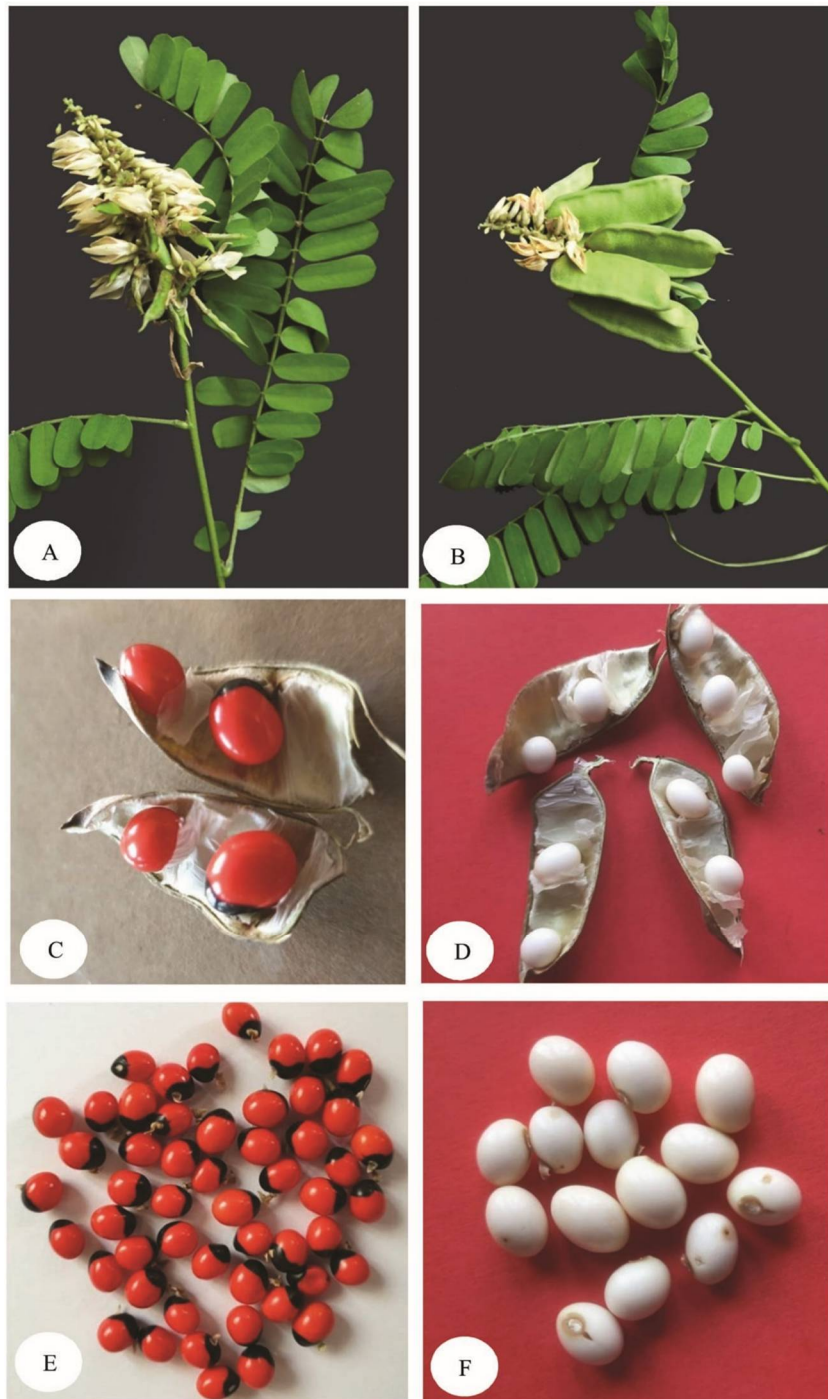


Plate 1. A,C,E= *Abrus precatorius*; B,D,F= *Abrus precatorius* var. *albo-spermum* var. nov. A,B=Habit; C,D= Fruits with seeds; E,F= Seeds.

Flowering and fruiting: August to October.

Etymology: The new variety is named after the white colour of the seeds of the new taxon.

A comparative account of *Abrus precatorius* L. and the new variety *Abrus precatorius* var. *albo-spermum* Hassan, Rahman *et Afroz*, var. nov. are depicted in Table 1.

Table 1. Comparison of *Abrus precatorius* L. and *Abrus precatorius* var. *albo-spermum* Hassan, Rahman *et Afroz*, var. nov.

<i>Abrus precatorius</i> L.	<i>Abrus precatorius</i> L. var. <i>albo-spermum</i> Hassan, Rahman <i>et Afroz</i> var. nov.
1. Seeds two-third scarlet and the rest jet-black, almost round.	1. Seeds entirely pure white, oval.
2. Gynoecium long, c. 6-7 mm.	2. Gynoecium short, c. 2.5-3.5 mm.
3. Gynoecium more or less equal to length of longer filaments.	3. Gynoecium half the length of longer filaments.
4. Style long, c. 2.5-3.0 mm long.	4. Style very short, c. 0.5-0.8 mm long.
5. Lower part of the wing petal narrower.	5. Lower part of the wing petal broader.
6. Keel petal ovate.	6. Keel petal elliptic.

Variation in seed colour: The new variety *Abrus precatorius* var. *albo-spermum* presents entirely pure white seeds, while the closely related *Abrus precatorius* displays variations in seed colour. In *A. precatorius*, seeds are usually two-third scarlet or white and the rest jet-black, sometimes whitish, rarely wholly black (Kanjilal *et al.*, 1938); seeds scarlet with area around the hilum black, rarely entirely black, whitish or yellowish (de Padua *et al.*, 1999); seeds bright scarlet and black or whitish black or mixed black and white (Bakshi *et al.*, 1999); seeds red or white with a black cap (Panigrahi and Murti, 1989); seeds bright scarlet and black, or white, or mixed black and white (Hooker, 1876).

Seed germination: Ten seeds of *Abrus precatorius* var. *albo-spermum* var. nov. were sown on 20 March 2018 and out of 10 seeds sown only 3 seeds germinated on 25 March 2018, and the germination was found to be epigeal. A detailed study on seed germination of *Abrus precatorius* var. *albo-spermum* var. nov. and *Abrus precatorius* reveals that the process of seed development in both taxa is perhaps the same. However, in the last two weeks of seed maturation in the red-seeded *Abrus precatorius*, colour development and colour changes occur. A black spot appears first at the hilum from where a reddish or pinkish colouration gradually coming down as observed on 26 September 2018. On 14 October 2018, it was observed that the black hilum portion became fully black (jet-black) and the lower part was yellowish-pink. After a few days the lower two-third yellowish-pink portion became scarlet when the seeds were fully mature. Therefore, the occasional whitish, yellowish, pinkish or fully black seeds found in the pods of *Abrus precatorius* might be due to incomplete final maturation process. A few fully black seeds were also noticed in the pods of this species; however, these black seeds did not germinate when sown.

Traditional uses and biological activities: The red-seeded *Abrus precatorius* and white-seeded *Abrus precatorius* var. *albo-spermum* var. nov. both the taxa are traditionally used in treating different ailments. Seeds are purgative, emetic and aphrodisiac, and administered in the treatment of diarrhoea and dysentery. In Ayurvedic medicine, especially the white-seeded form is used as they are thought to be less toxic (Panigrahi and Murti, 1989; Pal and Jain, 1998). *Abrus precatorius* leaf is used as laxative, expectorant and aphrodisiac in Ayurvedic medicine (Bhakta and Das, 2020). Leaves are applied to cure fever, cough and cold, while the roots are used to treat jaundice and haemoglobinuric bile (Garaniya and Bapodra, 2014). Seed extract is CNS depressant

and reported to have antibacterial and analgesic properties (Yusuf *et al.*, 2009). Various pharmacological study reveals that *Abrus precatorius* possesses anti-oxidative (Arora, 2011), neuroprotective (Premanand and Ganesh, 2010), anti-depression (Attal *et al.*, 2010), anti-inflammatory (Kuo *et al.*, 1995) and anticancer (Anbu *et al.* 2011) activities. Very recently, anti-ulcerative efficacy of ethyl acetate extract of *Abrus precatorius* seed in hydrochloric acid/Ethanol (HCl/EtOH)-induced ulcerative rats via regulation of inflammatory genes has been determined (Omoboyowa *et al.*, 2021).

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