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 - Short communication

SLEEPING BEHAVIOUR OF *SENNA ALATA* (L.) ROXB.

MD. ABUL HASSAN

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

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Many plants under diverse families show Circadian rhythms and circadian refers only to daily rhythms. One such behaviour deals with time. *Senna alata* (L.) Roxb. belonging to the family Caesalpiniaceae shows a very easily recognizable circadian rhythm regarding the closing and opening of their leaflets, which here is referred to as 'sleeping behaviour'.

The genus *Cassia* L. (*s.l.*) consists of 500 species (de Padua *et al.*, 1999), now segregated into three genera, *viz: Cassia* L. (*s.l.*), *Chamaecrista* Moench and *Senna* Mill. consisting of 30, 270 and 260 species, respectively (de Padua *et al.*, 1999). The correct name of former *Cassia alata* L., now belongs to the genus *Senna* Mill, appears as *Senna alata* (L.) Roxb. *Senna alata* (L.) Roxb. is originated in South America, but now it is Pantropical and naturalized in India, Bangladesh, Pakistan and South-East Asia (de Padua, 1999). In Bangla, the plant is known as *Dadmordan*, *Dadmari*, meaning which controls or kills ringworm. The plant is popularly known as Ringworm Bush or Ringworm Shrub.

Senna alata is found all over Bangladesh (Uddin *et al.* 2008) and is very much important as an ornamental as well as a medicinal plant. Its leaves contain anthraquinone, glycosides, rhein, emodin, aloe-emodin, chrysophanol and chrysophanic acid (Ghani, 1998). The leaves are specific for ringworm and other skin diseases.

Senna alata is a soft wooded shrubby plant. Leaves are paripinnately compound with 8-20 (or more) pairs of leaflets per leaf in a mature plant. Leaflets are stipulate, almost sessile, oblong, base oblique, apex with a mucro, entire, glabrous, and the terminal leaflets are obovate. Inflorescence is usually terminal raceme, up to 30 cm long, stout, and upwardly directed. Flowers are bright yellow, medium-sized, bisexual and complete. Sepals 5, free. Petals 5, free, ovate-orbicular. Stamens 10 (9), two large, four smaller and 3-4 staminodes. Ovary is unilocular, placentation marginal. Fruit is tetragonal, winged, and up to 50 seeded. Seeds are black, triangular, shiny and beaked.

Seed germination and leafing behaviour

Out of five seeds sown on 8.3.2022 (just after collection from fruit), three germinated on 15.3.2022 taking only seven days indicating no dormancy period. The type of germination is found to be epigeal. After two cotyledonary leaves first foliage leaf came out on 21.3.22 and the second foliage leaf on 26.3.22. The number of leaflets per foliage leaf increases in number in the following order: 4, 6, 8, 10, 12 and so on reaching up to 20 or more pairs in full-grown plants.

The sleeping behaviour of *Senna alata* is shown in Plate 1. The salient features of sleeping behaviour of *S. alata* include: i) Approximately at 5 pm two leaflets of each pair started to come closer and the process is continued with time; ii) Around 6 pm all leaflets of a leaf (and of all leaves) came very close to each other by their ventral (upper) surfaces; iii) Lower pair of leaflets, if remotely present towards the base, usually became directed upwards and forwards along the rachis; iv) The closed leaflets of the other pairs usually directed towards the rachis terminal; v) The last but the terminal pair usually directed partially downwards and partially

forward; vi) The terminal pair as there is no rachis part forward, directed downward; vii) When all leaflets of a leaf are completely closed, the whole leaf looks-like a rainbow or a sword; viii) The leaflets of the lower pair enclose the basal parts of the leaflets of the next upper pair; ix) Sleeping process starts first in the upper younger leaves and ends in the older lower leaves; x) Re-opening of the leaflets starts at the lower older leaves and ends at the upper younger leaves; xi) Re-opening starts approximately at 5 am and completely open at about 6 am.

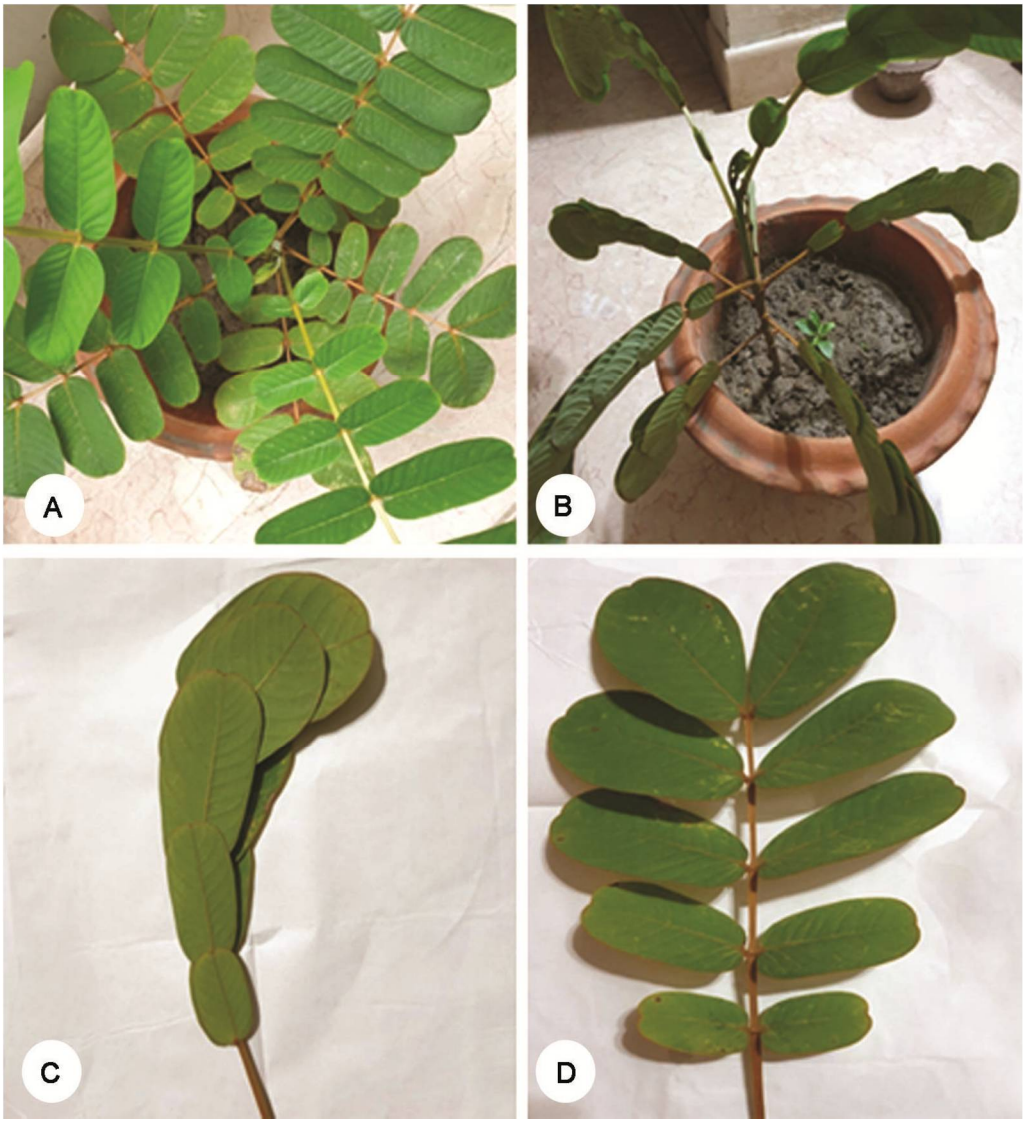

Plate 1. Sleeping behaviour of *Senna alata* (L.) Roxb. A. Open leaves; B. Sleeping leaves; C. Leaflets sleeping after leaf was detached from the plant; D. Leaflets (detached leaf) re-opened after sleeping on the next morning.

Comments

The plant remains at sleep for about 12 hours from evening to the next morning. The closing and opening of leaflets are not dependent on the sunset and sunrise. The detached closed leaf reopened the next morning at about 6 am. At 6 pm on the same day, the leaflets of the detached leaf again became 50-60% close and on the next morning reopened again. At 6 pm of the next day, only the terminal leaflets became about 60% close.

More or less similar phenomena are observed in *Mimosa pudica* L. (Mimosaceae), *Senna tora* (L.) Roxb. (Caesalpiniaceae), *Samanea saman* (Jacq.) Merr. (Fabaceae), *Phyllanthus niruri* L. (Euphorbiaceae), *Tamarindus indica* L. (Caesalpiniaceae), *Oxalis corniculata* L. (Oxalidaceae) and *Albizia niopoides* var. *niopoides* (syn. *A. richardiana* King & Prain) (Mimosaceae).

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