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An unusual seed germination response to unexpected weather event in *Butea monosperma* (Lam.) Taub. (Fabaceae)

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ABSTRACT

Butea monosperma (Lam.) Taub. (The flame of the forest), belongs to Fabaceae (subfamily Fabaoideae) produces single-seeded wind dispersed pods with flat, obovate, reniform, seed having a small hilum and thin papery reddish-brown testa (Lohot et al., 2016). It was reported that pod weight is important in determining the seed size and mass as their appropriate dimensions arise from the tradeoff between the seedling fitness and dispersal efficiency (Ganeshaiah and UmaShaanker, 1991). The seeds mature during April to May in the hot dry season and are dispersed before the onset of monsoon rains in June-July. The seeds of *B. monosperma* show physical dormancy; further the leathery tomentose pod, optimum seed size and tough seed coat (Lohot et al., 2016) enables the seed to germinate during a sustained long spell of rains that occur in the rainy season but not during the periods of isolated and brief drizzles that occur in the dry season (Khurana and Singh, 2001). Thus, microsites that provide high soil moisture content becomes key factor for successful seed germination as they enhance the ability of seed to imbibe enough water that forms a cue for germination.

Keywords: Butea monosperma, Fabaceae, germination, microsites, phenological patterns

1. INTRODUCTION

An unusual long spell of rains from July 4th to August 4th 2022 occurred in Jadcherla town (N 16.763526° and E 78.146459°) of Telangana state. A total of 339.3 mm rainfall against a normal rainfall (130 mm) was received in 25 rainy days (81%) with an average of 11.25 mm and a range of 0.3 to 79.3 mm. This abnormal rainfall event has led to unusual increase in relative humidity in the air and this condition has led to the seed germination in the pre-dispersed pods hanging on the trees. This feature was recorded among three trees in Telangana Botanical Garden, Dr Burgula Ramakrishna Rao Government Degree College, Jadcherla. Later, these pods endowed with germinated seeds were carefully handpicked and are sowed on the sand bed to check their germination success rate and all the 250 seeds have produced radical and a leaf along with two

cotyledons; while only 80% germination rate was recorded when only matured pods with non-germinated seeds were sown on the sand bed.

2. REPORT

Figure 1 A: Branch with germinated seeds in pods hanging on the tree. B: A closer view of pod with emergence of radicle. C: Open pod showing imbibed swollen seed with emerging radicle

This type of precocious germination of seeds in the pods prior to dispersal (somewhat similar to vivipary in mangroves) would have arisen due to the high relative humidity in the air, soaking of pods because of continuous rains and coincidence of the natural time of pod drying by which seeds have imbibed enough water very similar to ideal natural soil substratum (Baskin and Baskin 2014). The observed germination condition was in line with the report by Hyde, that in certain leguminous plants that, under rare events of slow and steady increase in relative humidity that occurs seldom in nature, seeds could absorb sufficient water vapour from air as hilum will not be closed and in turn seed moisture content will increase (Hyde, 1954). This feature was recorded only in *B. monopserma* trees and not in other leguminous plants in the garden. Once the seed coats become permeable under natural condition depending on the surrounding moisture content (water vapour) may make the imbibed seeds to germinate at low temperature range of 10-15^{O}C also where evaporation is low[5]. Such unusual plant behavior events have to be investigated further as the erratic weather events are affecting the phenological patterns and their implications.

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Informed consent
Not applicable.

Ethical approval

Butea monosperma trees were observed in the study from Telangana, India. The ethical guidelines for plants & plant materials are followed in the study for sample collection & identification.

Conflicts of interests

The authors declare that there are no conflicts of interests.

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Data and materials availability

All data associated with this study are present in the paper.

REFERENCES AND NOTES

1. Baskin CC, Baskin JM. Seeds, Second Edition. Elsevier, Amsterdam 2014; 1056. doi: 10.1016/B978-0-12-416677-6.00002-0
2. Ganeshaiah KN, Uma Shaanker R. Seed Size Optimization in a Wind Dispersed Tree *Butea Monosperma*: A Trade-Off between Seedling Establishment and Pod Dispersal Efficiency. Oikos 1991; 60(1):3-6.
3. Hyde EOC. The function of the hilum in some Papilionaceae in relation to the ripening of the seed and the permeability of the testa. Ann Bot 1954; 18:241-256.
4. Khurana E, Singh JS. Ecology of seed and seedling growth for conservation and restoration of tropical dry forest: A review. Environ Conserv 2001; 28(1):39–52.
5. Lohot VD, Thamilarasi K, Ghosh J, Mohansundaram A, Sharma KK. Monograph on Palas, *Butea monosperma* (Lam.) Taubert, ICAR - Indian Instutute of Natural Resins and Gums, Ranchi (Jharkhand), India 2016; 111.