Gregarious flowering of a geriatric semelparous bamboo – *Bambusa tulda* Roxb. in Mizoram, India

Bambusa tulda Roxb. is a semi-deciduous large caespitose bamboo. It is endemic to the Indo-Burma biodiversity hotspots, and is widely distributed in India, Bangladesh, Myanmar and Thailand[1,2]. The northeastern states of India – Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura are the major niche of *B. tulda* Roxb., it is also found abundantly in Bihar and West Bengal.

Owing to its versatility, throughout the northeast India, it is chiefly used for prickles, toys, mats, food grain containers, baskets and other traditional items[3]. Due to its robust strength and its efficiency as scaffolding, *B. tulda* is preferred in the construction of reinforced concrete cement (RCC) buildings. The young shoots are widely consumed and shared a high market value. It is also one of the ten preferred species for commercial plantation under the National Bamboo Mission[4].

The long vegetative state and the semelparity of bamboo is a unique phenomenon. Several species of bamboo are known to be in the vegetative state for more than 100 years after which they flowered and died[5]. *B. tulda* Roxb. is one of the species which is known to be in the vegetative state for ~48 years.

Flowering of *B. tulda* Roxb. in Mizoram was first documented in the years 1880–1884 and 1928–1929; sporadic flowering since 1976, followed by mass flowering until 1979 were again reported from Mizoram[6]. Sporadic flowering, followed by gregarious flowering in 1997 and 2003 respectively was reported from Dhemaji and Lakhimpur, Assam[6]. In 2003, sporadic flowering was reported from Dighra, West Bengal[7]. Sporadic flowering was also observed in few locations in the north-western belt of Mizoram, during 2015–2017 (ref. 8).

Following the verbal reports on the flowering of *B. tulda* Roxb. in few locations in 2019, extensive survey was conducted by means of ground survey where it grows naturally in Mizoram (Figure 1). It was observed that the normal wave of flowering initiated from the western part, in a north to south direction, drifting towards the eastern part of the state. Till date, flowering was observed in 16 locations between 22°43′58″–23°46′53″N and 92°34′38″–92°50′20″E (Table 1), where the flowering was gregarious (Figure 2). Maximum basal area covered was observed in the Muallungthu area, Aizawl district (Figure 3).

The flowering is suspected to continue until flowered *en masse*. From the past experience, it can also be predicted that there is a high chance of ecosystem disturbances, natural calamities and famine after the gregarious flowering and death of whole population[9–11]. It is therefore suggested that mitigation measures be developed by the competent authorities to reduce the risk of natural calamities and famines. Further, the seeds of *B. tulda* Roxb. should be collected from the flowering sites for the generation of seedlings to ensure its future regeneration.

Table 1. Observed localities of flowering of *Bambusa tulda* Roxb.

Locality	Year of initiation	District	Geo-coordinates
Lengte	2019	Mamit	23°46′16″N and 92°37′32″E
Nghalchawm	2020	Mamit	23°46′55″N and 92°38′01″E
Sihhmui	2020	Aizawl	23°47′34″N and 92°39′07″E
Tlungvel	2020	Aizawl	23°37′06″N and 92°47′26″E
Muallungthu	2020	Aizawl	23°37′20″N and 92°47′14″E
Kulikawn	2019	Aizawl	23°42′39″N and 92°43′07″E
Khatla South	2020	Aizawl	23°42′58″N and 92°42′37″E
Zemabawk	2020	Aizawl	23°43′35″N and 92°45′11″E
Republic Veng	2020	Aizawl	23°43′02″N and 92°43′12″E
Ralvawng	2020	Lunglei	22°56′05″N and 92°49′59″E
Hmuntlang	2019	Lunglei	23°02′53″N and 92°48′41″E
Mausen	2020	Lunglei	23°01′04″N and 92°44′17″E
Zawlpui	2020	Lunglei	23°02′17″N and 92°34′38″E
Tawipui North 1	2020	Lunglei	22°43′58″N and 92°50′20″E
Sunhlukawn	2020	Lunglei	22°52′53″N and 92°45′36″E
Farm Veng	2020	Lunglei	22°53′06″N and 92°45′03″E

Figure 1. Inflorescence of clumps of *Bambusa tulda* Roxb. at Nghalchawm, Mizoram.

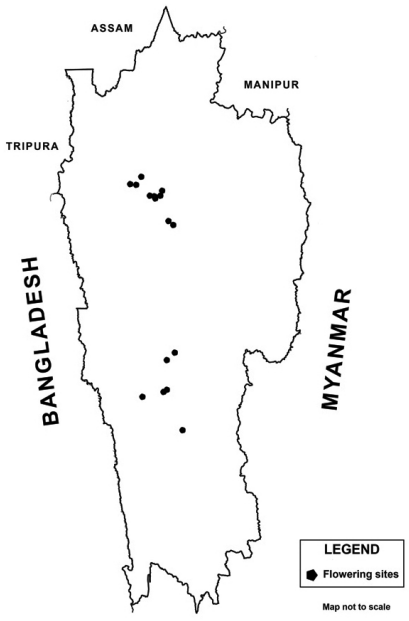

Figure 2. Map of Mizoram showing the flowering sites of *Bambusa tulda*.

Figure 3. Flowering of *B. tulda* Roxb. at Muallungthu area, Aizawl district.

This rare phenomenon opens the door for further research in the flowering ecology of a semelparous bamboo.

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