

Pseudo-vivipary in *Globba pauciflora* Baker from the Andaman and Nicobar Islands, India

Gautam Anuj Ekka^{1,*}, Pragya Sourabh², Lal Ji Singh¹

¹Botanical Survey of India, Andaman and Nicobar Regional Centre, Sri Vijaya Puram, Andaman and Nicobar Islands (INDIA)

²Faculty of Science, Mansarovar Global University, Sehore, Madhya Pradesh (INDIA)

*Corresponding author: shalom_gautam281@rediffmail.com

Received September 10, 2025; Revised October 12, 2025; Accepted October 19, 2025

Abstract This paper deals with the pseudo-vivipary in *Globba pauciflora* Baker (Zingiberaceae) for the first time from Andaman & Nicobar Islands, India. It is described here as an adaptive reproductive strategy in Islands ecosystem along with morphological characters. Pseudo-vivipary in *Globba pauciflora* Baker is favoured by excessive atmospheric moisture or humid dark conditions. However, there is no report of pseudo-vivipary in this plant growing in other regions where the moisture level is not so high. It is probably induced by ecological factors, followed by physiological factors.

Keywords: Bulbils, ecology, Island ecosystem, Reproductive potentials, Zingiberaceae

Cite This Article: Ekka, G.A., Sourabh, P. & Singh, L.J. "Pseudo-vivipary in *Globba pauciflora* Baker from the Andaman and Nicobar Islands, India." *Applied Ecology and Environmental Sciences*, vol. 13, no. 3 (2025): 83-85. doi: 10.12691/aees-13-3-3.

1. Introduction

Pseudo-vivipary is an asexual reproductive process in which plantlets or vegetative buds develop in place of seeds, emerging from the plant's reproductive structures. In contrast, true vivipary is a form of sexual reproduction where seeds begin to germinate while still inside the fruit and attached to the parent plant, eventually pushing through the fruit wall before detachment. This phenomenon, observed in many mangrove and non-mangrove flowering plants, serves as an adaptive strategy for efficient population propagation [1]. Various investigators have emphasized that occurrence of vivipary in flowering plants with few exceptions like Zingiberaceae (pseudo-viviparous) as a potential reproduction strategy [1]. Less than 0.1% of all angiosperms exhibit vivipary [2]. Families such as Asparagaceae, Liliaceae, and Poaceae are the monocotyledonous families where vivipary has been observed. In Zingiberaceae, this phenomenon is recorded from other parts of the Country in *Hedychium elatum* and *Kaempferia parviflora* [3,4,5]. However, pseudo-vivipary is common in the form of bulbils and it has been recorded in at least in six genera of this family viz. *Alpinia* Roxb., *Boesenbergia* Kuntze, *Costus* L., *Globba* L., *Hedychium* J.Koenig, *Larsenianthus* W.J.Kress & Mood and *Zingiber* Mill [5,6,7,8,9].

The genus *Globba* L. represents more than 100 species worldwide distribution making it the fourth largest genus of the family Zingiberaceae of them 19 species recorded from India [10,11,12,13]. In Andaman and Nicobar Islands (ANI), the genus represented by three species i.e., *Globba marantina* L., *Globba pauciflora* Baker and

Globba pendula Roxb. [14,15]. ANI is one of the tropical hotspots of biodiversity and well recognized as a rich and unique phytogeographical region with high endemism in India [15,16,17,18]

The present study has been recorded pseudo-vivipary in *Globba pauciflora* for the first time during floristic exploration in the South Andaman Islands. Although, the occurrence of pseudo-vivipary has also been recorded in other species of the genus viz.: *G. marantina* and *G. pendula* [3]. *Globba pauciflora* is recognized as native to the Andaman Islands [19,20]. It was originally described by King ex Baker in 1890 based on the specimen 'King's Collector 379', from the Andaman Island. Thereafter, the species has also been reported from three locations in Malaysia i.e. Mandalay, Taninthayi, Yangon. [21].

2. Material and methods

Morphological observations on the viviparous germination were carried out based on living plants in the field. To verify the identity of the species, the authors undertook morphological comparisons on specimens collected during field excursion, herbarium housed in Indian herbaria as mentioned under subheading specimen examined and digital herbaria and consulted the relevant literature. Vouched herbarium specimen [22] deposited in PBL.

3. Observations

3.1. Viviparous Germination

The plants of *Globba pauciflora* were found growing in

the habitat with high humidity, nearby water-stream. A total of 20 individuals were found growing in the area out of which 06 individuals were observed with viviparous germinations. The viviparous germination was observed during the month of September. In the month of August and September the rainfall and days of rain were high in ANI. The fruit of *Globba pauciflora* is oblong and smooth with plenty of seeds.

3.2. Morphological Characters

Perennial herbs, leafy shoot 30–40 cm high. Rhizomes cylindrical, pale yellow. Leaf sheaths green, glabrous; ligules 0.2 mm long, green, membranous, glabrous, leaf blades 5 x 1 to 7 x 1.5 cm elliptic, base rounded, margins entire, undulate, tips aristate, both surfaces glabrous. Inflorescence raceme, terminal on leafy shoot; peduncle 2.5–3.0 cm, green, glabrous. Bracts 0.2 mm long, ovate-lanceolate, green, glabrous. Bracteoles 0.1 mm long, lanceolate, green, glabrous. Pedicels, green. Bulbils present, white. Flowers bright yellow. Calyx 3, 0.1 mm long, infundibular, pale green, glabrous. Corolla tubes 1 cm long, orange-yellow, pubescent; corolla lobes 3, ovate, concave, yellow, glabrous. Lateral staminodes 0.1 cm long, lanceolate, curved, yellow. Labellum 0.9 cm deeply bifid, yellow, connate to the filament in a slender tube above the staminodes, auriculate at base. Fertile stamen 1; filament curved; anthers 0.2 x 0.5 mm, bear two wing-like appendages on each side. Ovary ovate, unilocular, parietal placentation, many ovules in the locule, pubescent; styles filiform, inserted within the grooved filament of the fertile stamen, stigmas funnel-shaped. Fruits 1 cm, oblong, green, smooth, Seeds, ovoid, 25 nos.

Flowering and fruiting: June to November.

Distribution: World: Myanmar; **India:** Andaman & Nicobar Islands.

Specimens examined: Andaman and Nicobar Islands: South Andaman: Kenchi Road, Baratang Island, 14.07.1977, *N. Bhargava* 5885 (PBL); Nilambur, Baratang Island, 20.08.1975, *N. Bhargava* 2459 (PBL); Wright Myo, 12.08.1979, *M. K. Vasudeva Rao* 7545 (PBL); Collinpur, 23.09.2022, *Gautam Anuj Ekka* 35407 (PBL); Middle Andaman: Betapur, 23.07.1974, *N. Bhargava* 1847 (PBL); Camp No. 15, 24 km from Rangat, S-W, 02.11.1977, *N. Bhargava* 6329 (PBL); Bakultala, 17.07.1974, *N. Bhargava* 1754 (PBL); Betapur, 23.07.1974, *N. Bhargava* 1848 (PBL); Long Island, 7-8 km from Forest Nursery to Lalaji, 22.10.1990, *G. S. Lakra* 15559 (PBL); Rangat, 18.07.1974, *N. Bhargava* 1769 (PBL); Way to Lalaji, Long Island, 30.07.1975, *N. Bhargava* 2861 (PBL). North Andaman: Bamboo Nalla (Rest Camp), 26.06.2012, *M. Venkat Ramana & Johny Kurmar Tagore* 918 (PBL); Interview Island, West Coast, 23.09.2010, *G. S. Lakra & V. M. Radhakrishnan* 28742 (PBL); Kishori Nagar, 28.06.2011, *M. Venkat Ramana & Johny Kurmar Tagore* 371 (PBL); On the way to Dam, 06.09.2002, *R. Sumathi* 18570 (PBL); Saddle Peak, Dumbur Nallah, 23.07.2001, *R. Sumathi* 17391 (PBL); Saddle Peak, Kevra Nallah, 24.07.2001, *R. Sumathi* 17988 (PBL), Saddle Peak, 24.12.2013, *Lal Ji Singh*, 33715 (PBL!).



Figure 1. *Globba pauciflora* Baker- a: Habit; b: Flower; c-d: Various stages of vivipary.

4. Conclusion

The present study observed pseudo-vivipary in *Globba pauciflora* from ANI for the first time, however, further investigation is required to determine whether these seedlings can detach, establish, and grow successfully. Based on preliminary observations we revealed that like other viviparous plants, this species has been attributed to the environmental factors like temperature, humidity, light, rainfall etc. The plantlets involved in this study were collected during a period of heavy rainfall due to which the authors presume the wetting of inflorescence and high humidity might have triggered the seed germination. It is expected that the pseudo-vivipary is due to influence on potential reproduction strategy.

ACKNOWLEDGMENT

Authors are grateful to the Director, Botanical Survey of India, Kolkata for constant support and facilities. We are thankful to the Department of Environment and Forests, Andaman and Nicobar Islands, for necessary permission and logistic support in conducting field studies and to scientists and staff of Botanical Survey of India, teaching faculties of Department of Botany, Mansarovar Global University, who have always shown readiness for help.

References

- [1] Singh L. J. & Murugan C. Vivipary in *Hibiscus cannabinus* L. (Kenaf): a potential reproductive strategy in island' s ecosystem. *Geophytology* 43 (2): 171-175. 2013.
- [2] Cota-Sánchez, J.H. & Abreu, D.D. Vivipary and offspring survival in the epiphytic cactus *Epiphyllum phyllanthus* (Cactaceae). *Journal of Experimental Botany* 58: 3865 – 3873.
- [3] Ashokan, A. and Gowda V. Describing terminologies and discussing records: More discoveries of facultative vivipary in the genus *Hedychium* J.Koenig (Zingiberaceae) from Northeast India. *PhytoKeys*. 96: 21 – 34.
- [4] Bhadra, S., Ghosh, M., Mukherjee A. and Bandyopadhyay, M. 2013. Vivipary in *Hedychium elatum* (Zingiberaceae). *Phytotaxa* 130 (1): 55 – 59. 2013.
- [5] Devi, A. R., Raj, N. M., & Minimol, J. Vivipary in *Kaempferia parviflora* Wall. Ex-Baker: discovery and utilization. *Journal of Tropical Agriculture*, 60(2): 187-194. 2023.
- [6] Rao, A.S. and Verma, D.M. Material towards a monocot Flora of Assam-II (Zingiberaceae and Marantaceae). *Bull. Bot. Surv. India* 14(1 – 4): 114 – 143. 1972.
- [7] Karthikeyan, S., Jain S.K., Nayar M.P. and Sanjappa M. Zingiberaceae. In: Flora of India Series 4: Florae Indicae Enumeratio: Monocotyledone. Botanical Survey of India 289-299. 1989.
- [8] Braun, J. & Schumann, K.M. Mitteilungen aus den Deutschen Schutzgebieten. *Deutsches Kolonialblatt* 2: 151. 1889.
- [9] Aswani, K. & Sabu, M. Reproductive biology of *Alpinia mutica* (Zingiberaceae) with a note on flexistylous pollination mechanism. In: Proceedings of the 6th International Symposium on the family Zingiberaceae, University of Calicut, Kerala, pp. 40 – 41. 2012.
- [10] Willams, K.J., Kress, W.J. and Manos, P.S. The phylogeny, evolution, and classification of the genus *Globba* and tribe Globbeae (Zingiberaceae): appendages do matter. *Amer. J. Bot.* 91: 100–114. 2004.
- [11] Larsen, K. A preliminary checklist of the Zingiberaceae of Thailand. *Thai Forest Bull. Bot.* 24: 35 – 49. 1996.
- [12] Kress, W.J., Defilipps, R.A., Farr, E. and Yin Yin Kyi. A checklist of the trees, shrubs, herbs, and climbers of Myanmar. Contributions from the United States National Herbarium 45: 1 – 590. 2003.
- [13] Kress, W.J., Prince, L.M. and Williams, K.J. The phylogeny and a new classification of the gingers (Zingiberaceae): Evidence from molecular data. *Amer. J. Bot.* 89: 1682 – 1696. 2002.
- [14] Karthigeyan, K. In: Singh, P. and Dash, S. S. (Eds.), Angiosperm Diversity of Mahatma Gandhi Marine National Park, South Andaman, India. 356. 2017.
- [15] Singh, L.J. and Ranjan V. New vistas in Indian Flora.1 & 2. Bishen Singh, Mahendra Pal Singh, Dehra Dun, Uttarakhand, India, pp. 417, 819. 2021.
- [16] Singh, L. J., Murugan, C. and Singh, P. Plant genetic diversity of endemic species in the Andaman and Nicobar Islands. – In: Nat. Conf. On Islands biodiversity. U.P. State Biodiversity Board, pp. 49 – 57. 2014.
- [17] Singh, L.J., Ekka, G.A., Vivek, C.P. & Misra, D.R. Gymnosperms of the Andaman and Nicobar Islands: An Overview – In: eds. L.J. Singh and V. Ranjan – New Vistas in Indian Flora, Bishen Singh Mahendra Pal Singh, Dehra Dun, India, 1: 265 – 278. 2021a
- [18] Singh L.J., Ranjan V., Sinha B.K., Mishra, S., Purohit, C.S., Vivek, C.P., Naik, M.C. & Ekka, G.A. An overview of Phytodiversity of the Andaman and Nicobar Islands, India. – In: L.J. Singh & V. Ranjan (eds.), New Vistas in Indian Flora, Bishen Singh Mahendra Pal Singh. 2: 381 – 399. 2021b.
- [19] Hooker, J. D. The Flora of British India. Vol. VI. L. REEVE Co. Ltd., London. 1849.
- [20] Singh, S.K. and Srivastava, S.C. Zingiberaceae. In: Ashiho Mao, A. & Das, S.S. (Eds.), Flowering Plants of India: An annotated checklist (Monocotyledons) 2:116-134. 2020.
- [21] Soe, N., Ohnmar S., Han, S. T., Mar, A. A. & Thu, Y. Y. Comparative studies of different *Globba* species in Bago Yoma and Rakhine State. *2nd Myanmar Korea Conference Research Journal*, Vol. 1. 272-282. 2019.
- [22] Bridson, D. & Forman, L. (eds.). The Herbarium Handbook. Royal Botanic Garden, Kew. 1992.



© The Author(s) 2025. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).