Nature of fruits in *Calamus erectus* Roxb., from Assam of North-East India

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Abstract: The present study deals with the observation of small and large fruits in *Calamus erectus*, where the small fruits were found with abortive ovule hence abnormal and large fruit with a normal seed.

Keywords: Abnormal fruit, *Calamus*, Darjeeling, Dima Hasao

Introduction

The wild rattan species *Calamus erectus* Roxb., is an erect non climbing species of around 3 m tall and distributed mainly in hilly areas of Karbi Anglong, Cachar and Dima Hasao districts of Assam (Mehmud and Roy 2021). In India occurrences of this species were recorded from the states viz., Arunachal Pradesh, Assam, Meghalaya, Tripura, West Bengal and Sikkim (Renuka and Sreekumar, 2012). *Calamus pseudoerectus* S. Mondal, S.K. Basu & M. Chowdhury was described from Darjeeling district of West Bengal, the taxa prefers habitats along the hilly slopes and riverine forests (Mondal *et al*., 2019), which was later treated as synonym of *Calamus erectus* in a revision on *Calamus* L. (Henderson, 2020). The major differences mentioned between *C. erectus* and *C. pseudoerectus* was in the nature of fruit and seed size; the fruit of the former is 3–5 cm, seed 2.7 cm and scales vertically twelve rows whereas later one is 0.7–0.8 cm, seed 0.5 cm and scales vertically nine rows (Mondal *et al*., 2019). The shape of fruit and seeds can provide information on ecology, nutrition and development and in palm identification seed morphometry play an important taxonomic role (del Pozo *et al*., 2020).

During field exploration of Jatinga of Dima Hasao district, in November 2019 and February 2021,multiple individual of *C.erects* were examined and interestingly small and large fruits were observed in the same infrastucture. Report of occurrence of such fruits in the species was not found in previous works. The small fruits noted in the present study were found almost similar to the fruits of *C. pseudoerectus* mentioned by Mondal *et al*., (2019). A detailed comparative study is discussed here with suitable photographs (Fig. 1).

Materials and Methods

Field surveys were conducted in forests areas of Jatinga in Dima Hasao district; collections and vouchers were prepared following standard procedure as provided by Dransfield (1986) and submitted at herbarium of Department of Botany, Cotton University. Flowers and fruits were preserved in formalin. Identification was based on literature (Renuka and Sreekumar, 2012; Henderson, 2020) and consultations of herbaria of Botanical Survey of India (ASSAM and ARUN).

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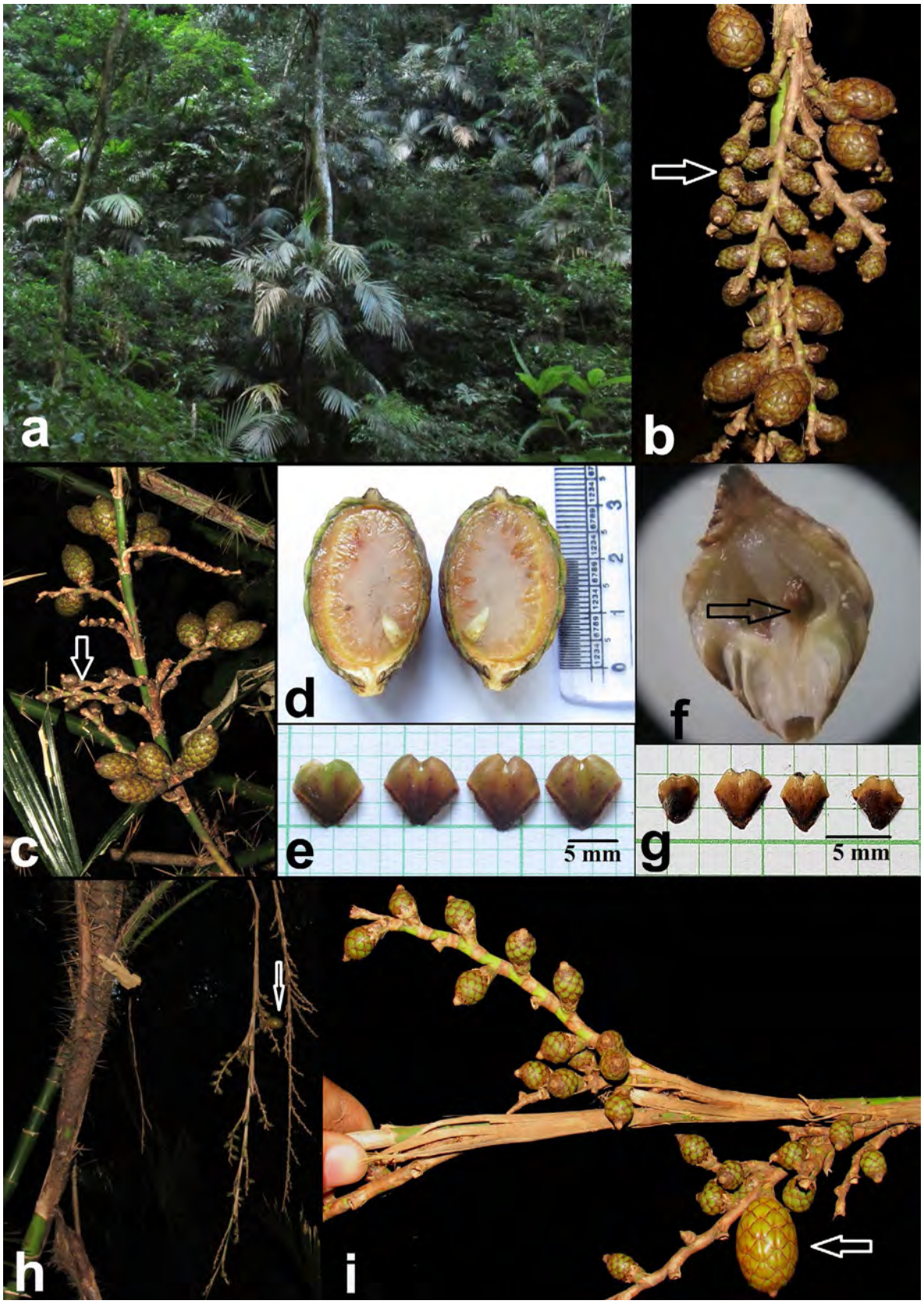

Fig 1. Habit (a); Infructescence with abnormal (arrow) and normal fruits (b-c); Longitudinal cut of normal fruit (d); Fruit scales of normal fruit (e); Longitudinal cut of abnormal fruit with abortive ovule (arrow) (f); Fruit scales of abnormal fruits (g); Infructescence with single normal fruit (arrow) (h-i)

Results and Discussion

The small fruits were 0.7–1.0 cm long with abortive ovule hence the fruits were abnormal. Large fruits were 3.0–3.7 cm long with one normal seed, ruminate endosperms and embryo at the base and position slightly lateral. Both fruits were found with 12 rows of vertical scales. The number of abnormal fruits varied in different infructescence (Fig. 1 b-c) and sometimes even exceeded the normal fruits (Fig. 1 h-i). There is high chance that the entire infructescence bears only abnormal fruits. The habitat of the population with abnormal fruits occurred along the banks of streams in hilly areas of Dima Hasao district. However, normal fruits were observed in different populations of *Calamus erectus* in hilly and dry areas of Cachar and Karbi Anglong districts in our previous study (Mehmud and Roy, 2021). The observed abnormality may link with variation in ecological parameters, probably habitat differences in the present study. There are reports on various environmental factors which are responsible for fruit development (Goldel *et al*., 2015; Fischer *et al*., 2016).

Mondal *et al*., (2019) described *Calamus pseudoerectus* based on collections from Darjeeling, during February 2018 to April 2018. In our study we observed abnormal fruits of *C. erectus* in November 2019 and February 2021. Interestingly *C. pseudoerectus* and our collection exhibits similar habitat and period of fruiting. When Henderson (2020) merged *C. pseudoerectus* under *C. erectus* no note was provided regarding the nature of fruits, and earlier studies by Mondal *et al*., (2019) also doesn't provide the details of seed viability, endosperms and position of embryo. If the nature of fruit of *C. pseudoerectus* is consistent, and seeds viable then it would be better to consider *C. pseudoerectus* as a distinct taxa, otherwise this would be a condition of abnormal fruits wherein placement of *C. pseudoerectus* under *C. erectus* by Henderson (2020) would be justified.

Conclusion

In *Calamus*, the nature of fruits perianth, shape and numbers of scales were good diagnostic characters, however sometimes the numbers of vertical scales rows were variable within the same species (Beccari, 1908). The number of fruits scales in vertical rows was nine in *C. pseudoerectus* (Mondal *et al*., 2019), whereas twelve in *C. erectus* (Beccari ,1908; Renuka and Sreekumar, 2012; Mondal *et al*., 2019; Mehmud and Roy, 2021), and in this study we found 12 rows in the abnormal fruits of *C. erectus*. The presence of such abnormal fruits in *C. erectus* is probably due to environmental factors in different habitats as observed in our study. However further studies on molecular biology and seed viability test is required for taxonomic conclusion in favor of *C. pseudoerectus*.

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