



## **DAEMONOROPS TERAIENSIS (ARECACEAE) A NEW SPECIES FROM TERAI OF DARJEELING, INDIA**

**Sujit Mondal and Monoranjan Chowdhury**

Taxonomy of Angiosperm and Biosystematics Lab, Department of Botany, University of North Bengal,  
Raja Rammohunpur, Darjeeling, West Bengal 734013, India.  
mondalsujit.bgc@gmail.com & mono\_malda@yahoo.co.in (corresponding author)

### **Abstract**

*Daemonorops teraiensis* (Arecaceae or Palmae), a new species of rattan from Dalkajhar forest of Darjeeling district of West Bengal, India, is described and illustrated. This species has close resembles with *Daemonorops jenkinsiana* (Griff.) Mart. distinguished by its completely different armatures on knee, petiole, rachis, leaflets number, sizes, female rachis size and flowers number.

**Key words:** *Daemonorops teraiensis*, new taxa, Dalkajhar forest, India

### **Introduction**

The genus *Daemonorops* Blume (Arecaceae) comprises about 114 species distributed in tropics and subtropics of southeastern Asia extending to southeast China, Malaysia to New Guinea (Dransfield et al. 2008). Terai and foothills of Darjeeling district is rich with dense vegetation and also houses various species of palms and canes (Mondal & Chowdhury 2018, Mondal et al., 2019). A good number of Canes were recorded from the Dalkajhar forest of Terai and few very large population of *Daemonorops* are growing in Terai and foothills of Mahananda wildlife sanctuary and Jore Pokhri Wild life sanctuary of Darjeeling district. Beccari (1832) first time estimated 27 species of *Daemonorops* from undivided British India. Presently 6 species of *Daemonorops* were reported from India, *Daemonorops jenkinsiana* (Griff.) Mart is only species that found in N and NE India whereas, rest 5 species were described from Western Ghats and the Andaman & Nicobar Islands (Basu, 1992; Renuka 2011). *Daemonorops jenkinsiana* (Griff.) Mart. is only species reported from China (Pei et al., 1991), Bangladesh (Alam 1990) and Bhutan (Noltie 1994). During exploration of palms and canes in the forest of Terai and foothills of Eastern Himalaya of Darjeeling District, one interesting specimen of *Daemonorops* was collected from the Dalkajhar forest near Bagdogra (Jore Pokhri Wildlife Sanctuary 26°41'42" N, 88° 17' 14" E, Alt. 145 m) in the month of January, 2017. Initially the plant was seems to be *Daemonorops jenkinsiana* (Griff.) Mart. but after extensive morphological comparisons (Table 1) with various herbarium specimens of key herbaria (CNH, ASSAM, BSIH, and NBU) and also matching with some digital herbarium of K, TAI, it is considered as a new species for its remarkable dense armatures on leaves, leaflets number, sizes, female rachis size and flowers number. To understand the population size and ecology, it was observed periodically since last two successive years (2017-2019). Finally the specimen was carefully described here along with necessary photographs and illustrations.

### **Taxonomy**

*Daemonorops teraiensis* S. Mondal & M. Chowdhury, *sp. nov.* [Fig.1, Image 1]

**Type:** INDIA. West Bengal: Darjeeling District, Dalkajhar forest at terai of Darjeeling (Jore Pokhri Wildlife Sanctuary)

26° 41'42"N, 88° 17' 14" E, Alt. 145 m, 01.05.2018, S. Mondal & M. Chowdhury 0070; (holotype CAL, isotype NBU)

**Diagnosis:** Distinguished by its extremely unique armatures on knee, petiole, rachis, leaflets number, sizes, female rachis size and flowers number.

Climbing rattan, 6–8 m tall; stem erect, covered with sheath, 8–12cm in diameter, internodes 10–12cm; without sheath up to 10.4 cm in diameter; *sheath* tubular, 16–26 cm long dense, light brown with flat, papery spines, base conical, 0.8–4.2cm long, internodes 11.5–15cm long. Leaves cirrate; leaf excluding cirrus 1.85–2.43m long, cirrus 1–1.19 m long; knee conspicuous, covered with dense brown scurf, spines except both longitudinal side, spines flattened, deep brown to blackish spines in series or scattered; *petiole* 8.5–13 cm long, 2–2.8 cm broad at middle, scurfy outside, flat to slightly convex above, 5–6 rows of dense spines on abaxial and adaxial surface, margin without spines; rachis with strong digitate dense spines on adaxial surface and claw shaped on abaxial surface, spines at concave side 2–8 mm and convex side 2–18 mm long. Ocrea conspicuous, scarcely developed, tightly sheathing, mouth with fine short rusty bristles up to 3.4 cm long, rachis 1.90–2.14 m long; *leaflets* 72–80 on each side of rachis; equidistant, alternate to sub opposite, 18–24 × 48–52 cm long, apical leaflets 0.6–1 × 1.8–2.2 cm, 3 nerved, each with fine bristles, bristles 0.4–1.2cm long, on mid-veins bristles on both abaxial and adaxial surfaces sparsely spinous on lower edges, spine 4–6 hook shaped, joined at the base, 4–9 mm; Inflorescence subaxillary not very broadly fusiform or inserted above the mouth of their sheaths, not very broadly fusiform after opening; *male flowers* oblong in bud, 2×5 mm; calyx copular, with yellow powdery dust corolla with 3 oblanceolate petals; 3–4 mm × 1–2 mm; stamens 6; 2–3 mm long, subulate, connate and thickened at base; *female flowers* 2–3 in number on each side; 4–5 mm long; calyx copular, 2–3 mm long, truncate; corolla distinctly veined, with deeply divided lanceolate petals; each 3.5–4.5 × 1–2 mm; ovary ovoid to globose, stigmas 3, Fruit globose, 1.8 cm in diameter.

**Flowering:** March – May **Fruiting:** April – June

**Distribution:** Known only from few bushes at Dalkajhar forest near Bagdogra, Darjeeling, West Bengal.

**Habitat:** Sub-tropical forest in the Terai of Darjeeling, West Bengal, India (alt 140-150 meter)

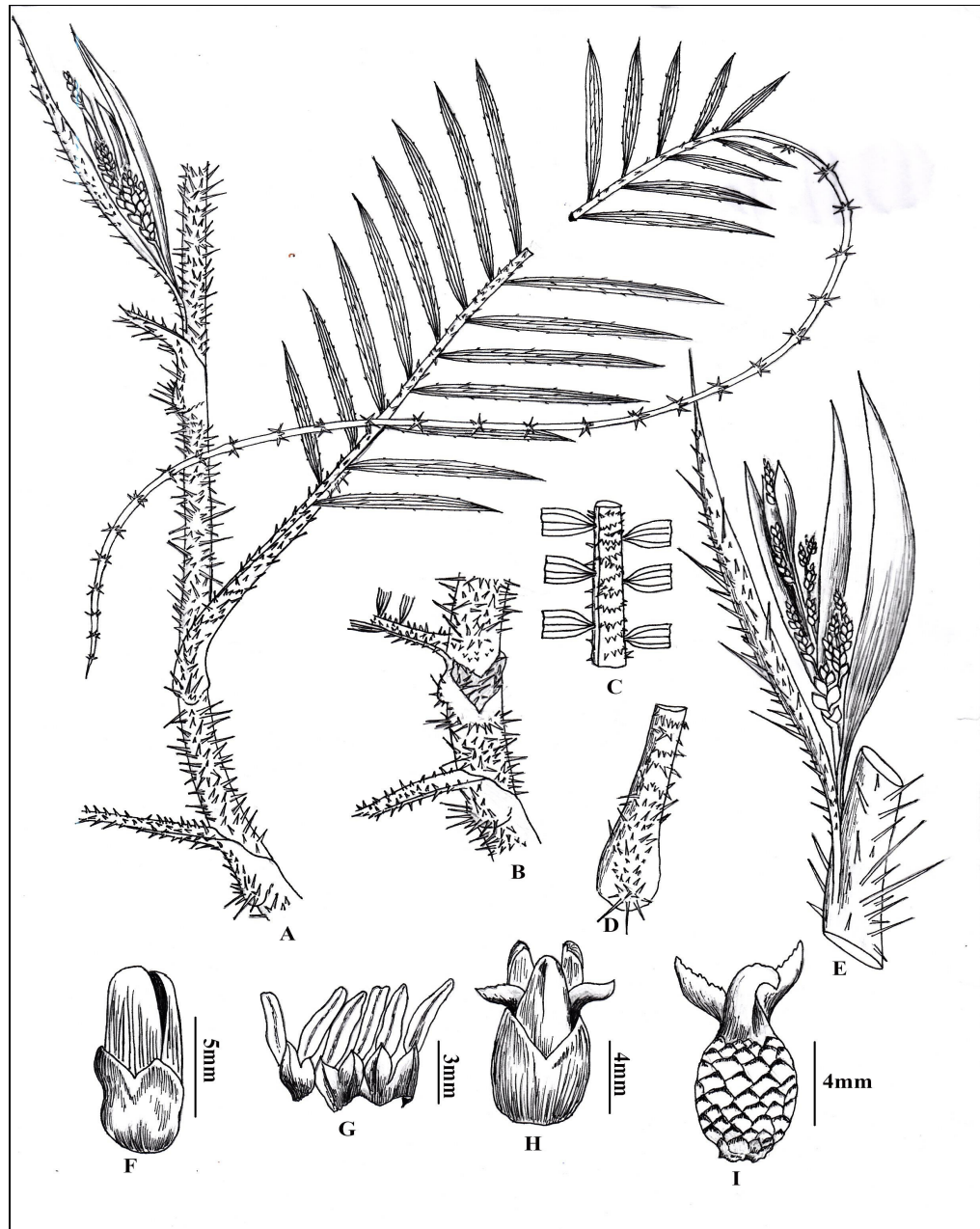
**Uses:** Local tribal people eat the tender shoots and use dried leaf as fuel. Fruits are favorite food of wild elephants.

**Vernacular name:** Kanra bet (Nepali).

**Etymology:** The specific epithet '*teraiensis*' is derived from the type habitat topography i.e., right bank of Teesta river with undulating land commonly known as *Terai* of Darjeeling district of West Bengal, India.

**Notes:** *Daemonorops teraiensis* was discovered from the Dalkajhar forest near Bagdogra of Darjeeling district is presently known from only two populations at study area where each population is with an average of 10–14 individuals. Altogether, 20–28 individuals were observed

and the given size of the area is about 40 km<sup>2</sup> (area of occupancy <500 km<sup>2</sup> and area of occurrence <5000 km<sup>2</sup>), number of locations two ( $\leq 5$ ), and threats to the habitat, we recommend this new species under the status of Endangered (EN; IUCN Standards & Petitions Subcommittee 2014) and also endemic. The type locality is a part of Himalayan hotspot (Myers *et al.*, 2000) and faces extreme adverse threats including extension of tea gardens, road, huge forest resource removal by forest dwellers and ecotourism. As *Daemonorops teraiensis* grows in the margin of open forest associated with Bengdubi tea garden of Dalkajhar forest of Jore Pokhri WLS where human infiltration is huge due to the presence of nearby tea gardens and ecotourism sites, the existing habitat needs to be protected by the forest department for the sake of in situ conservation of new species.



**Fig. 1 :** *Daemonorops teraiensis* S. Mondal & M. Chowdhury, *sp. nov.* **A, B**– Habit sketch; **C**– Armature on adaxial surface of petiole & rachis; **D**– Armature on abaxial surface of petiole & rachis; **E**– Inflorescence; **F**–Male flower; **G**–Anther; **H**–Female flower; **I**–Fruit. © Papiya Saha

**Table 1 :** Morphological comparison among *Daemonorops jenkinsiana* (Griff.) Mart. and *Daemonorops teraiensis* sp. nov.

Characters		<i>Daemonorops jenkinsiana</i> (Griff.) Mart.	<i>Daemonorops teraiensis</i> sp. nov.
<b>Stem</b>	<i>Without sheath</i>	2 – 3 cm diameter	9 – 10.4 cm diameter
	<i>Internodes</i>	15 – 20 cm long	10 – 12cm long
<b>Leaf</b>	<i>With cirrus</i>	Upto 5 meter long	Upto 3 meter long
	<i>Sheath</i>	28-40 cm long cm long, 2-3 cm in diameter	16 – 26 cm long cm long, 8 – 12 cm in diameter
	<i>Armature on sheath</i>	Green to brown, flattened, conical, deflexed spines, upto 3cm long	light brown with flat, papery spines, conical, upto 4.2 cm long
	<i>Armature on knee</i>	Dense packed throughout knee, spines needle like	Dense except both side glabrous, flattened spines
	<i>Petiole</i>	15 – 20 cm long, 5 cm broad at widest part	8.5 – 13 cm long, 2 – 2.8 cm broad at widest part
	<i>Armature on petiole</i>	Strong digitate claws, straight at petiole margin	5-6 rows of dense spines on abaxial and adaxial side, margin without spines
	<i>Armature on Rachis</i>	Sparsely, spines on adaxial side and one or two jointed on abaxial side	dense spines on adaxial side and claw shaped on abaxial side
	<i>Armature of cirrus</i>	Uniform, claw shaped,	Variable, clustered, upward and downward mixed type
	<i>Leaflets number</i>	60 – 70 on each side	72– 80 on each side
<b>Female partial inflorescence</b>	<i>Female rachillae</i>	6-7 in number on each side, 1.5-1.6cm long	2-3 in number on each side, 4 – 5 mm long
	<i>Female flowers</i>	5 – 5.5 mm long	4 – 5 mm long



**Image 1:** *Daemonorops teraiensis* S. Mondal & M. Chowdhury, sp. nov. **A, B**– Habit, **C**– Armature of abaxial surface of petiole & rachis **D**– Armature of abaxial surface of petiole & rachis; **E**–Shapes of male spadix; **F**–Shapes of female spadix; **G**–Male flower; **H** Female flower; **I**– Fruit. © Sujit Mondal

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### References

- Alam, M.K. (1990). Rattans of Bangladesh. Bangladesh Forest Research Institute. Chittagong.
- Basu, S.K. (1992). Rattans (Canes) in India. A monographic revision. Rattan Information Centre, Kepong, Kuala Lumpur, Malaysia.
- Beccari, O. (1832) Palmae, In: Hooker, J.D.(ed.). The Flora of British India, 6: 402-483.
- Dransfield, J.J.; Uhl, N.W.; Asmussen, C.B.; Baker, W.J.; Harley, M.M. and Lewis, C.E. (2008). Genera Palmarum: The evolution and classification of palms. Royal Botanic Gardens, 732.
- IUCN Standards & Petitions Subcommittee (2014). Guidelines for using the IUCN Red List Categories and Criteria, Ver. 11. IUCN Species Survival Committee.
- Myers, N.; Mittermeier, R.A.; Mittermeier, C.G.; da Fonseca, G.A. and Kent, J. (2000). Biodiversity hotspots for conservation priorities. Nature, 403: 853-858.
- Noltie, H.J. (1994). Areaceae (Palmae) In: Flora of Bhutan, Vol. 3, Part 1. Royal Botanic Garden, Edinburgh, 456.
- Pei, S.; Chen, S. and Tong, S. (1991). Palmae. In: Pei Shengji & Chen Sanyang, eds., Fl. Reipubl. Popularis Sin. 13(1): 1-172.
- Mondal, S.; Basu, S. and Chowdhury, M. (2019). *Calamus pseudoerectus* (Arecaceae), a new species from the eastern Himalaya, India. Journal of Threatened Taxa, 11(5): 13605-13610.
- Mondal, S. and Chowdhury, M. (2018). Rattans diversity in West Bengal, India. Advances in Plant Sciences, 31(2): 159-165.
- Renuka, C. (1987). A new species of *Calamus* (Palmae) from India. Kew Bulletin, 42: 433-435.