

A taxonomic review of *Trachycarpus martianus* (Wall.) H. Wendl.

Trachycarpus is an Indo-Asian genus. Native to India are *T. martianus* H. Wendl., *T. takil* Becc. and *T. ukhrulensis* Lorek & Pradhan. In addition, *T. fortunei* Hook. f. is found in cultivation. The genus is usually divided into an 'oval group' with oblong fruits, and a 'reniform group' with globular-subreniform, umbilicate fruits.

The 'reniform group' comprises *T. takil* and *T. ukhrulensis*. *T. takil* is endemic to the Kumaon region, Uttarakhand, and has recently proved to be a frequently occurring species¹. In 2003, *T. ukhrulensis* was described as a new species^{2,3}. It occurs in eastern Manipur, Ukhrul District, along the Burmese border. Previously, specimens of this species were mentioned by different authors either as *T. martianus*^{4,5} or *T. fortunei*⁶.

The 'oval group' consists of a single species, *T. martianus*, which is native to the Khasi hills, Meghalaya, but is cultivated in other regions across the lower Himalayas of India^{3,4,7,8}. There has been some confusion about the occurrence of *T. martianus* in the lower Himalayan region, especially regarding cultivated plants in Darjeeling and Kalimpong. Also, the population at the Rissoom mountain, Dumsong range, Darjeeling, close to the Bhutan border has not been unequivocally classified yet.

Gamble⁸ regarded the population at Rissoom as *T. martianus* (earlier described as *Chamaerops martiana* Wall.) and stated that he '...had once found small plants of what is probably this palm on Rissoom, near Dumsong, beyond Darjeeling, at 6500 feet elevation'. Beccari⁵ mentioned that a collection from this population was similar to *T. martianus* (earlier described as *C. khasyana* Griff.): 'The leaves of young plants collected by Clarke at Rungbong and on the Dumsong Hills, are of a rather herbaceous texture, have few segments and these with the midcosta underneath, together with the margins of the petiole, furnished with soft ashy palae; this appearance is, however, assumed also by the leaves of young plants from the Khasia hills'.

This confusion may be due to the fact that Beccari had not examined the population himself, and also the lack of mature plants found by Gamble. One should also be aware that *T. martianus* is a variable species with two major populations

in Meghalaya (ssp. *khasianus*) and Nepal (ssp. *martianus*). They differ from the lamina in the 'Nepal-form' (ssp. *martianus*) in being almost orbicular and divided into up to 75 segments, in lacking teeth on the petioles, and in fruits with greenish-yellow pulp, turning brown-black with age. The seeds are 10 mm long. Whereas in the 'Khasia-form' (ssp. *khasianus*) the lamina is flabelliform to reniform, divided into up to 65 segments, the petioles have irregular denticulate margins and the fruits show a yellow-pulp, turning bluish-black with age. The seeds are up to 13 mm long. It should be emphasized that both forms were classified by Beccari⁵ as one species, although they differ in a few aspects.

Noltie⁹ mentioned that he was sceptical about this classification: 'the commonly planted species [in Sikkim] appears to be *T. fortunei*; however, *T. martianus* [...] has been recorded as being planted [...] and there are old records from Darjeeling: Rissoom; Rungbong' and 'a pair of very distinctive trees apparently belonging to this genus are planted at the Windamere Hotel, Darjeeling. They have elongate fruits and very wide (over 3 cm) segments, but clearly belong to a different species'. Further work led to the description of a species called *T. latisectus* Spanner, Noltie & Gibbons¹⁰. It differs in having broader segments than those of *T. martianus*, as described by Beccari⁵.

My own observations on the cultivated plants in Kalimpong, Darjeeling town (including the above-mentioned Windamere Hotel locality) and Rissoom showed that the leaf-segments of the 'Rissoom-form' are in fact, broader. Some segments are adherent to one another. Thus the lamina is more or less orbicular and forms a '...slightly convoluted leaf profile'¹⁰. The petioles have no denticulate margins similar to *T. martianus* 'Nepal-form', but seeds are similar to *T. martianus* 'Khasia-form'.

The flowers do not differ distinctly from other forms of *T. martianus*, neither in staminate nor in pistillate inflorescences. The staminate inflorescence in the 'Rissoom-form' is similar to *T. martianus* 'Nepal-form'. However, the flowers are arranged in groups of 1–2 in the 'Nepal-form', 1–3 in the 'Khasia-form' and 2–4 in the 'Rissoom-form'. The

flower size does not differ. Three petals and three sepals are similar, with some variation in size of the sepals, which are half to one-third as long as the petals. This also is not evidently different between the three forms. Stamens and anthers are similar as well. Also, the pistillate inflorescences are similar in the three forms, except that the flowers in *T. martianus* 'Nepal-form' are '... usually solitary, but accompanied by the traces of another (abortive?) flower...' as described by Beccari⁵. In the 'Rissoom-form'^{5,10}, the flowers are arranged in groups of 1–2. The 'Khasia-form' has flowers arranged in groups^{11–13} of 1–3. Petals and sepals are equal in length in the 'Khasia-form' and the 'Rissoom-form'. According to Beccari⁵, in the 'Nepal-form' petals are one-third longer than the sepals.

A study of the literature and my own examination reveals that the 'Rissoom-form' is not distinct from other forms of *T. martianus*, and should therefore be included in this species. All three forms differ only in a few aspects, so that *T. martianus* is best treated as one species with three subspecies:

Trachycarpus martianus (Wallich) H. Wendl., *Bull. Soc. Bot. Fr.*, 1861, **8**, 429.

Basionym: *Chamaerops martiana* Wallich, *Plantae asiaticae rariores*, 1832, **3**, 5.

(1) *Trachycarpus martianus* ssp. *Martianus* = 'Nepal-form'.

Diagnostic characters: Leaves up to 100 cm long, lamina orbicular or almost orbicular, ca. 70 cm long, ca. 120 cm broad, glaucous underneath; segments about 75 in number, up to 3.5 cm wide. Petioles unarmed. Fruits oval with greenish-yellow pulp, turning brown-black with age. Seeds (length, width, height): 10 × 6–7 × 5–6 mm.

Distribution area: Widespread in Nepal.

(2) *Trachycarpus martianus* ssp. *latisectus* (Spanner *et al.*) Lorek stat. nov. hoc loco.

Basionym: *Trachycarpus latisectus* Spanner *et al.*, *Edinburgh J. Bot.*, 1997, **54**, 257.

– *Chamaerops martiana sensu* Gamble, *Man. Indian Timbers*, 1881, p. 418 non Wallich. = 'Rissoom-form'.

Diagnostic characters: Leaves up to 125 cm long, lamina orbicular or almost

orbicular, ca. 80 cm long, ca. 125 cm broad, glaucous beneath; segments about 70 in number, 3.5 cm wide or more, sometimes adherent. Petioles unarmed. Fruits oval with brownish-yellow pulp, turning bluish-black with age. Seeds (length, width, height): 12–13 × 8–9 × 6–7 mm.

Distribution area: Dumsong-range, Darjeeling, India.

(3) *Trachycarpus martianus* ssp. *khasianus* (Griffith) Lorek stat. et comb. nov. hoc loco.

Basionym: *Chamaerops khasyana* Griffith, *Calcutta J. Nat. Hist.*, 1845, **5**, 339. = ‘Khasia-form’:

Diagnostic characters: Leaves up to 120 cm long; lamina flabelliform, reniform, ca. 60 cm long, ca. 105 cm wide; segments about 65 in number, up to 3.5 cm wide. Petioles with irregular denticulate margins. Fruits oval with yellow pulp, turning bluish-black with age. Seeds (length, width, height): 12–13 × 8–9 × 6–7 mm.

Distribution area: Khasi hills, Meghalaya, India.

It is necessary to discuss how to interpret the observation of Gamble⁸ that he ‘...had once found small plants of what is probably this palm on Rissoom’. Was the population depleted or was it a new population, either artificially or naturally? If the population was depleted there are two possibilities: by fire or clearing by man. The first alternative can be ruled out, as fires do not destroy an entire mature *Trachycarpus* population (T. Husain, pers. commun.)^{1,2}. Clearing, on the other hand, would usually result in visible disturbance, at least in the presence of stumps, which have not been mentioned by Gamble. Therefore, it seems to be most likely that Gamble observed a newly established population. However, we cannot yet answer whether it was a natural population or was the result of human influence.

The locality in Sikkim which was mentioned by Beccari⁵ (‘C. B. Clarke collected also a young plant of *T. martiana* (Herb. Palm Beccari) in Sikkim at Rungbong at about 1200 m elevation’) has not been rediscovered up to now. It is likely that what he found there was the same subspecies as examined by Beccari (see above).

Currently, it is not clear whether the ‘Rissoom form’ = ssp. *latisectus* has its origin at Rungbong or not. May be relocation of the Rungbong locality could throw more light on this question.

T. martianus ssp. *latisectus* should be treated as a subspecies of its own, since it has dissimilar features that distinguish it well from the other subspecies, although it is not clear whether the Rissoom-locality is a natural habitat or not. Especially the broader leaves seem to be a constant character, whereas other characters may be somewhat variable. For example, the colour of fruits is variable and depends on the stage of development. However, the colour of pulp is used in horticulture as an additional feature to identify the subspecies, though even that appears not to be a constant character.

Due to the large geographical area covered by *T. martianus*, different subspecies have been developed. These different biotypes are geographically clearly separated; thus the subspecies rank is regarded as the proper taxonomic category¹⁴. The infraspecific classification of *T. martianus* as presented here is also supported by ITS analysis¹⁵, which showed that *T. martianus* ssp. *martianus* and *T. martianus* ssp. *latisectus* differ in 15 base pairs from *T. fortunei* and *T. nanus*, whereas the subspecies differ from each other only in one base pair.

The new infraspecific classification of *T. martianus* should be seen as an initial step to reclassify the whole genus *Trachycarpus*, as within the last decade there have been critical discussions on the status of some species, and discoveries of plants supposed to represent new species.

Key to the subspecies of *T. martianus*

- 1 Leaf segments up to 3.5 cm broad or less 2
- 1* Leaf segments > 3.5 cm
..... ssp. *sikkimensis*
- 2 Segments about 75 in number, petioles with smooth margins, seeds (length, width, height): 10 × 6–7 × 5–6 mm ssp. *martianus*
- 2* Segments about 65 in number, petioles with irregular denticulate margins, seeds: 12–13 × 8–9 × 6–7 mm ssp. *khasianus*

1. Husain, T. and Garg, A., *Curr. Sci.*, 2004, **86**, 633–634.
2. Lorek, M., *Bot. Jahrb. Syst.*, 2006, **126**, 419–426.
3. Lorek, M., *Palmateer*, 2004, **24**, 13–23.
4. Singh, D. K., Singh, S. and Murti, S. K., *Indian J. For.*, 1995, **18**, 332–336.
5. Beccari, O., *Ann. R. Bot. Gard., Calcutta*, 1931, **13**, 272–286.
6. Kingdon-Ward, F., *Plant Hunter in Manipur*, Jonathan Cape, London, 1952, pp. 94–115.
7. Basu, S. K. and Chakraverty, R. K., *A Manual of Cultivated Palms in India*, Botanical Survey of India, Calcutta, 1994, pp. 57–60.
8. Gamble, J. S., *A Manual of Indian Timbers: An Account of the Structure, Growth, Distribution, and Qualities of Indian Wood*, Office of the Superintendent of Government Printing, Calcutta, 1881, p. 418.
9. Noltie, H. J., *Flora of Bhutan*, Royal Botanic Garden Edinburgh, Edinburgh, 1994, vol. 3, pp. 411–412.
10. Spanner, T., Noltie, H. J. and Gibbons, M., *Edinburgh J. Bot.*, 1997, **54**, 257–259.
11. Griffith, W., *Palms of British East India*, Printed by Charles A. Serrao, Calcutta, 1850, pp. 132–134.
12. Kurz, S., *Forest Flora of British Burma*, Office of the Superintendent of Government Printing, Calcutta, 1877, vol. 1, p. 527.
13. Hooker, J. D., *The Flora of British India*, L. Reeve & Co., London, 1894, vol. 6, pp. 435–436.
14. Venu, P., *Curr. Sci.*, 2002, **82**, 924–933.
15. Stührk, C., Diplomarbeit Department of Biology, University of Hamburg, non-publ., 2006, p. 129.

ACKNOWLEDGEMENTS. I thank Keshav Chandra Pradhan for his help to get access to natural habitats and cultivated stands, Prof. Dr Heinrich E. Weber and Prof. Jens G. Rohwer for helpful comments on earlier drafts of this paper.

Received 6 May 2005; revised accepted 5 February 2007

MICHAEL LOREK

Grillparzer Weg 35a,
42289 Wuppertal,
Germany
e-mail: info@tropengarten.de