Piper barberi gamble - a redescription of the species with a note on the karyotype

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ABSTRACT

P. barberi was described by Gamble (1924) based on the male plants only. Here the species is being redescribed based on the female plant characters as well. *P. barberi* is a unique species among the *Piper* taxa occurring in South India. The somatic chromosome number of *P. barberi* was determined to be 2n = 52.

Key words: *Piper barberi*, South Indian *Piper*, karyomorphology.

The genus *Piper* is represented by about 14 species in South India, distributed mainly in the tropical evergreen and moist deciduous forests of the Western Ghats. This region is also the centre of diversity for the species *P. nigrum*, the black pepper of commerce. Gamble in his floristic study of the region described 13 species including *P. barberi*, while another species was added later (Ravindran, Nair & Nair, 1987). A systematic survey of the region by the National Research Centre for Spices (NRCS) led to the collection of *Piper barberi*, a species reported to be almost extinct. *P. barberi* was erected by Gamble (1924) based on the collection of Barber from the Tinnevally forests of South India. Barber's collection consisted of only specimens from male plant, and Gamble's description of the species was based only on such specimens. An attempt was made by Subramaniyam and Henry (1970) to describe the female specimens of *P. barberi*. However the descriptions is not complete with regard to habit and other morphological details, especially the juvanile branches of the species. Here the species is redescribed based on the live specimens available at the NRCS germplasm conservatory.

P. barberi Gamble, Kew Bull. 387, 1924

Perennis repens, glaborasn, dioecin, ramosa, polymorphica, cujus juveniles surculi sunt tenues persistenter squamatis foliis praediti, orthotropici surculi cum parvis foliis 5-7 cm in longitudinem, 2-3 cm in latitudinem, fructiferi rami cum collis 8-12 cm in longitudinem, 2-5 cm in latitudinem, glaborosi, lanceolati, summitas acumuata, basis inaequaliter acuta, pinnate reticulata. Males spicae angustae, 7-10 cm in longitudinum, feminae spicae 4-7 cm, cylindricae, pendulosae, longo actenui pedunculo suffultae, bracteolae peltatae, orbiculares, ovarium 0.5-10 mm, sessile monocellularis mono-ovularis, stigma cum triplici auricula, papillata, stylus O, fructus carnosus, druposus, 5-6 mm transversus, ruber cum maturescit, semina 2-3 mm, ovoida (oviformia).

Piper barberi Gamble, Kew Bull. 387, 1924

A very distinct species among the south Indian *Piper* having reticulately veined leaves and spikes borne on slender, long dangling peduncle.

A perennial climber, glabrous, dioecious, branching polymorphic, juvanile shoots slender with persistent scale leaves, orthotropic shoots with small leaves, 5-7 cm long, 2-3 cm broad, fruiting branches with leaves 8-12 cm long, 2-5 cm broad, glabrous lanceolate, tip accuminate, base unequally acute, pinnately reticulate. Male spikes narrow, 7-10 cm long, female spikes 4-7 cm, cylindrical pendulous, borne on long, slender peduncle; bracts peltate, orbicular; ovary 0.5-10 mm, sessile, 1-celled, 1-ovuled, stigma 3-lobed, papillate, style O; fruit fleshy drupe, 5-6 across, red when ripe; seeds 2-3 mm, ovoid.

Not related to any other known South Indian Species.

P. barberi : Holotype 613, Babu and Ravindran.

Type: India , Western Ghats, Kerala, Trivandrum District, Breymoor forest area, altitude 700 m MSL.
Holotype: NRCS Germplasm conserva-

Fig. 1. A twig of *P.barberi*

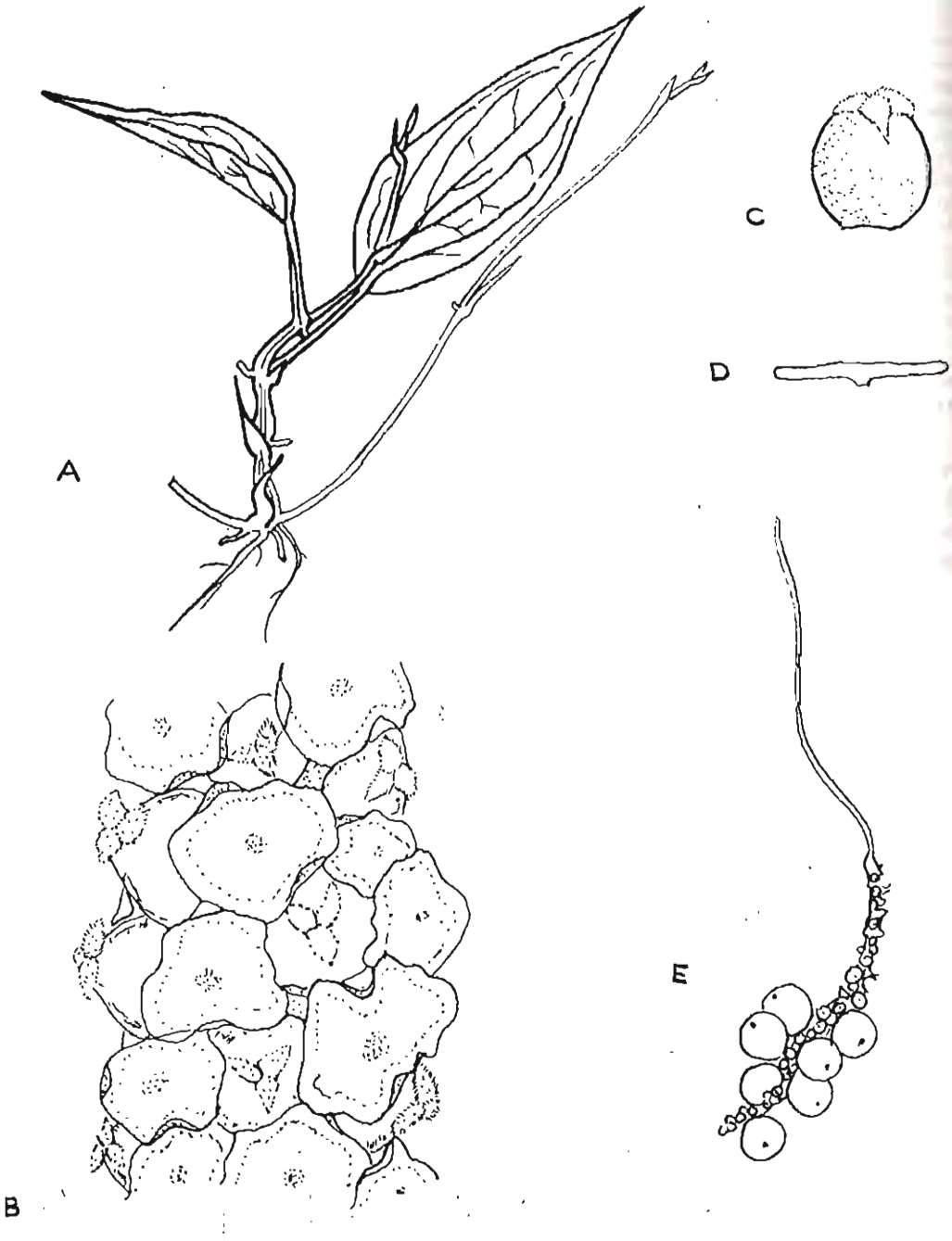

Fig. 2 A. Juvenile branch showing leafless orthotropic shoot.
B. Portion of the female spike enlarged, showing the peltate bract.
C. Ovary. D. Lateral view of the bract. E. Spike with fruits.

tory, Peruvannamuzhi, Calicut and at NRCS Herbarium, Calicut.

P. barberi is a small, slender, glabrous, dioecious climber, climbing on small shrubs and trees. The plant produces three different types of shoots. The juvenile shoots are leafless, slender, having long internodes, producing persistent scale leaf at every node and a few roots. They are green in colour, except at nodes where the colour is pale purple. Orthotropic shoots arise from the juvenile shoot, which climbs up the support trees by means of clinging roots arising at the nodes. These shoots produce small leaves, 5-7 cm long and 2-3 cm broad; lanceolate with 2-3 cm long petioles; base slightly unequal and tip accuminate. From the orthotropic shoot the lateral fruiting branches arise, which bear normal leaves and spikes. The leaves on fruiting branches are 8-12 cm long and 2-5 cm broad, pinnately reticulate, tip accuminate, base acute, unequal (Fig. 1). There are boat shaped prophylls at each node which are persistent for some time, falls off later.

The lateral plagiotropic shoots produce spikes, which are leaf opposite. Spikes are borne on slender 6-10 cm long, dangling stalks (peduncles). The male spikes are slender, about 7-10 cm long, narrow; male flowers represented by two anthers subtended by an orbicular, peltate bract (Fig. 2). The female spikes 4-7 cm long, pale purplish when young, almost green when mature, female flowers represented by a single ovary, sessile, stigma 3-lobed; papillate, fleshy; fruits usually very few, fleshy drupe, 4-7 mm in dia, round when mature, deep red when fully ripe, seed about 2-3 mm dia, ovoid to round. The seed is slightly pungent.

Table. 1: Karyomorphology of Piper barberi

Chromosome number	Long arm μ	Short arm μ	Total length μ	Arm ratio	Chromosome symbol
1	1.11	0.74	1.85	1.50	m
2	1.11	0.55	1.66	2.01	sm
3	1.11	0.55	1.66	2.01	sm
4	1.29	0.37	1.66	3.49	st
5	1.11	0.55	1.66	2.01	sm
6	0.92	0.55	1.47	1.67	m
7	0.92	0.37	1.29	2.49	sm
8	0.74	0.55	1.29	1.35	m
9	0.92	0.37	1.29	2.49	sm
10	0.92	0.37	1.29	2.49	sm
11	0.74	0.55	1.29	1.35	m
12	0.74	0.46	1.20	1.61	m
13	0.74	0.37	1.11	2.00	sm
14	0.74	0.37	1.11	2.00	sm
15	0.65	0.46	1.11	1.41	m
16	0.74	0.37	1.11	2.00	sm
17	0.74	0.37	1.11	2.00	sm
18	0.92	0.18	1.10	5.11	st

19	0.55	0.55	1.10	1.00	m
20	0.55	0.55	1.10	1.00	m
21	0.55	0.37	0.92	1.49	m
22	0.55	0.37	0.92	1.49	m
23	0.74	0.18	0.92	4.11	st
24	0.55	0.37	0.92	1.49	m
25	0.46	0.46	0.92	1.00	m
26	0.46	0.28	0.74	1.64	m

Karyotype = 13 m (metacentric) + 10 sm (submetacentric) + 3 st (sub terminal or acrocentric)
Ratio of largest chromosome/smallest chromosome = 2.5
Classification of chromosome complement (Stebbins 1971) = 2 B

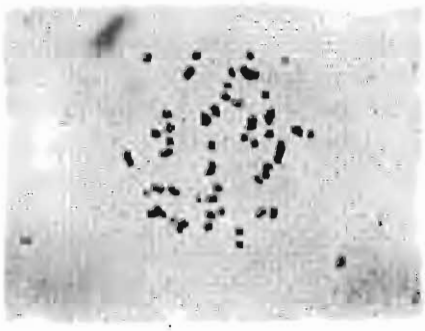

Fig. 3. Mitotic metaphase showing 2n=52 (x 1800)

Cytological investigations revealed that *P. barberi* has a somatic chromosome number of 2n = 52 (Fig. 3), which is the most predominant number in south Indian *Piper* spp. The karyomorphological studies of root tip squashes revealed that the chromosome complement has 13 metacentric, 10 submetacentric and 3 acrocentric pairs (Table-1). The chromosome length ranged from 0.74 to 1.85μ. Based on Stebbins (1971) the karyotype asymmetry could be classified as 2 B.

P. barberi is an interesting species among all the South Indian taxa of *Piper*. This species has little resemblance with any other taxa occurring in the region, but resembles more with some of the Central and Northern South American forms by its reticulately veined leaves, persistent prophylls and long peduncles but at the same time differs from them by its climbing habit and dioecious nature. The climbing forms of New World *Piper* except one species possess erect spikes (Tebbs 1989). In the nature of the long, thin peduncle this species resembles the South American species *P. reptabundum* CDE, but the two differs in leaf characters. These major features make *P. barberi* rather unique among the South Indian *Piper* species. Nothing definitely can be said on the affinities of this species. Probably it is the sole survivor of an ancestral type that reached India from the Central American region before the splitting away of Indian subcontinent from the ancient Gondwana land.

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