STATUS OF SYZYGIUM GAMBLEANUM RATHAKR. & CHITHRA (MYRTACEAE) FROM SOUTHERN WESTERN GHATS, INDIA

SHEEBA J.IRWIN, D. NARASIMHAN AND R. GANESAN¹

Department of Botany, Madras Christian College (Autonomous), Chennai 600 059 ¹Asoka Trust for Research in Ecology and Environment, Bangalore - 560 024

ABSTRACT

Syzygium gambleanum Rathakr. & Chithra, an endemic species, was relocated after a lapse of about 120 years from its type locality. This paper deals with description, critical notes, observations and threat status of this taxon.

INTRODUCTION

Syzygium Gaertn. a Palaeotropical genus, is represented by nearly 1000 species (Mabberley, 1997) in the world and has its centres of diversity in the tropics of Asia and Africa. It has about 50 species in India (Ahmedullah & Nayar 1987). Gamble (1919) included 21 species for the whole of the Presidency of Madras. Chithra (1983) recorded 31 species of Syzygium from Tamil Nadu alone that include eight species described under Jambosa by Gamble, two cultivated, one new record and five new species.

The Western Ghats have a rich diversity of *Syzygium* with 26 endemic taxa (Ahmedullah & Nayar 1987, Nayar 1996, Ramesh & Pascal 1997, Ravikumar 1999, Sasidharan & Jomy Augustine 1999, Gopalan & Henry 2000). Nearly 85% of the species distributed in India occur in Western Ghats that include 44 species and two varieties. 46% of the *Syzygium* taxa that occur in India are endemic to Western Ghats. These endemics include two newly described species namely *Syzygium periyarensis* Jomy & Sasidharan, *Syzygium sriganesanii* Ravikumar & Lakshmanan and two newly described varieties *Syzygium zeylanicum* (L.) DC. var. *ellipticum* Henry and *Syzygium zeylanicum* (L.) DC. var. *megamalayanum* Ravikumar & Lakshmanan. A few of the endemics were recollected in recent years after the type or after about a century or more. Mohanan (1996) rediscovered *Syzygium bourdillonii* (Gamble) Rathakr. & N.C. Nair from Agasthyamala nearer to its type locality. Sasidharan & al. (2002)

Received on 6th November, 2003; accepted on 2nd December, 2003.

have rediscovered *Syzygium myhendrae* (Beddome ex Brandis) Gamble, a "possibly extinct taxon" from southern Western Ghats. Sujanapal and Sasidharan (2002) have rediscovered *Syzygium palghatense* Gamble in its type locality.

Our studies on endangered and endemic trees of Kanyakumari District on the Southern end of the Western Ghats, for the past three years have led to the rediscovery of *Syzygium gambleanum* Rathakr. & Chithra, from its type locality and its vicinity within the boundaries of the Kalakad - Mundanthurai Tiger Reserve (KMTR). Specimens are deposited at Madras Christian College Herbarium (MCCH).

The specimen was first collected by Col.R.H.Beddome in Muthukuzhivayal, Kanyakumari District (Type of *Syzygium gambleanum*) in 1980 and was described as a new species *Eugenia microphylla* Bedd. Gamble (1919) transferred and placed it in the genus *Syzygium*, as *Syzygium microphyllum* (Bedd.) Gamble. Since this new combination was based on a later homonym *Eugenia microphylla* Bedd. 1871, non Abel 1818, an illegitimate name, Rathakrishnan and Chithra (1983) proposed a new name, *Syzygium gambleanum*.

A complete description, an illustration Fig.(A-H), photographs of population (Photo-1), a twig with flowers (Photo-2) and close up of fruits (Photo-3) from fresh specimens as well as notes on field observations, are presented here to facilitate the identification and further collections from other areas.

Syzygium gambleanum Rathakr. & Chithra in N.C. Nair & A.N. Henry, Fl. Tamil Nadu 1:156.1983; M.P.Nayar & Sastry, Red Data Book of Indian Pl.1.214.1987; Ahmedul. & M.P.Nayar, Endem. Pl. Indian Region 108.1987; M.P. Nayar, Hot spots Endem. Pl. India 196 & 199. 1996; Ramesh & J.P.Pascal, Atlas Endem. W.Ghats 313. 1997; Gopalan & A.N.Henry, Endem. Pl. India 395-398. 2000. S. microphyllum (Bedd.) Gamble, Fl. Madras: 479. 1969. Eugenia microphylla Bedd., For.Man. 110.1871, non Abel. 1818; Duthie in Hook.f., Fl. Brit. India 2:505.1879; Bourdi., Forest Trees of Travancore189.1908; Rama Rao, Fl. Pl. Travancore 170. 1914; Lushington, Vern. list Trees 1: 365, II:A 346. 1915; Brandis, Indian Trees 322.1921.

English : Small-leaved black plum of Travancore.

Tamil : Neer Venji.

Trees, to 10 m tall; profusely branched; trunk 0.4-2 m in gbh, bark rough, greyish

112



Figs. (A-H): Syzygium gambleanum Rathakr. & Chithra A. Flowering twig, B. Flower, C. Petal, D. Stamen, E. Pistil, F. Flower L.S. G. Fruits; H. Seed.

brown with white patches, fissured, exfoliating in thin flakes in mature trunk and in mature branchlets; young stems 4-angled, turning terete with age. Leaves opposite-decussate, rarely subopposite, variable, lanceolate, elliptic-lanceolate or elliptic, occasionally obovate, $0.6-3 \times 0.2-1$ cm, cuneate at base, conspicuously recurved along margin, actue-acuminate, rarely obtuse, coriaceous, glabrous; midrib prominent; secondary nerves obscure; petioles c. 1 mm long, pink when young, turning green at maturity. Flowers 0.8-1 cm long in 4-6 flowered terminal and axillary umbels, rarely solitary, peduncles green, c. 6 mm long, gland-dotted, irregularly striate; pedicel green, c. 2 mm long, gland-dotted. Calyx tube campanulate, c. 5mm long, verrucose, gland-dotted, green without, pale brown within; lobes 5, suborbicular, c. 1mm long, obtuse at apex, green, margin hyaline, forming a rim. Petals 5, obovate, c. 2 × 2mm, cucullate, obtuse at apex, gland-dotted, white, caducous, margin hyaline and entire. Stamens 36-72, white; filaments 5-6 mm long, inflexed in bud; anthers suborbicular, dorsifixed. Ovary 2-loculed; ovules 7-9; placentation axile; style simple, c. 6mm long, white. Fruit a berry, c. 8 × 5mm, white with a pink tinge, globose when immature and oblongoid when mature with persistent calyx, glabrous; seeds 6-8, c. 0.8 × 0.2 mm, crescent-shaped, bulged

Fl. : May-July & Fr. : June-July.

at base, acute at apex, brown.

Distrib. : Western Ghats of Kanyakumari and Tirunelveli District, Tamil Nadu.

Specimen examined : TAMIL NADU: Kanyakumari district: Muthukuzhivayal, 1400m, s. coll. et no. (Acc.No.20609, MH); Muthukuzhivayal, 1440m, 26.05.2002, Sheeba J. Irwin 4033 (MCCH); Muthukuzhivayal, 1440m, 11.08.2002, Sheeba J. Irwin 4038 (MCCH); Saddle No.4, 1100m, 12.08.2002, Sheeba J. Irwin 4040 (MCCH); Saddle no.4, 1100m, 11.05.2003, Sheeba J. Irwin 4045 (MCCH); Muthukuzhivayal, 1440m, 12.05.2003, Sheeba J. Irwin 4047 (MCCH); Tirunelveli district: 1200m, 1880, R. H. Beddome s. n. (Acc.No.20609, MH); Ane Elambu Odai 1340-1400m, 31.03.1992, B. R. Ramesh & De. Franceschi 154 (HIFP); Oothu, 1100m, 22.08.2001, D. Narasimhan, R. Ganesan & Sheeba J. Irwin, 4020 (MCCH).

Critical notes: This species is represented only by two specimens at Madras Herbarium (MH), one without a collector and collection number and date (Acc. No.20609) and the other is the original material collected by R.H. Beddome in 1880. Among those who explored this area earlier apart from Beddome, Brandis was the only botanist who authentically recorded its occurrence as abundant on the banks of a river in Asambu hills. Ramesh &

Franceschi (Field No.154, HIFP) have collected this species a decade ago for the first time after the type collection in a lapse of about 112 years from a locality that lies 30 km away by crowfly distance from the type locality. However this rediscovered species was simply included in the Atlas of Endemics of the Western Ghats, India (1997) without any emphasis or notes. An examination of the specimens deposited at HIFP reveals that these specimens match well with the specimens found in Madras Herbarium. However, Gopalan and Henry (2000) who explored Agasthiyamalai regions of South Western Ghats did not examine the specimens at HIFP and evaluated the status of this species as a "presumably extinct". *Syzygium gambleanum* has been relocated from its type locality by the authors. Populations of this species were also located in the neighbourhood areas within a radius of 30 km. These populations were carefully observed for about 3 years for their flowering and fruiting. Specimens with flowers and mature fruits were collected and critically examined.

Description of flowers varies in literature. Beddome (1871) stated that it is oneflowered although he states "I unfortunately could not procure it in flower". Hooker (1879) adopted the Beddome's description. Bourdillon (1908), though claimed that the tree was not seen by him, described that the flowers were in clusters of 5-10. This description seems to have been adopted almost by all later botanists such as Gamble (1919), Brandis (1921) and Gopalan and Henry (2000). Our studies show that the number of flowers in an umbel varies from 4 to 6.

Similarly the description of fruits also varies. Beddome (1871) described the fruits as the size of a large grain of pepper. Hooker (1879) and Bourdillon (1908) borrowed the description from Beddome. Gopalan and Henry (2000) described the fruits as pot-shaped. Fresh fruits were collected this time and they are globose when immature and oblongoid when mature. The description of Beddome appears to have been based on immature fruits. The description by Gopalan and Henry (2000) seems erroneous. Lushington (1915) has recorded an English name for this species "Black (small leaved) Plum of Travancore". This name, according to Lushington, was an adapted name from MacLeane's Manual of Madras Administration (Vol.3) and seems to be an erroneous name as the fruits are white with a pale pink tinge.

LOCATION AND POPULATION STATUS

Bedddome (1871) specifically mentioned the locality as Muti-Kuli-vayal, (Muthukuzhivayal) a valley on the Asamboo hills (Travancore), then in Kerala and now in

Tamil Nadu. However later authors such as Hooker (1879), Rama Rao (1914), Brandis (1921) have imprecisely stated the locality as Asambu hills. [variously written as Asamboo hills and Ashamboo Forest].

Muthukuzhivayal is now part of the KMTR, whereas Asambu hills form a separate forest division in Kanyakumari District. The populations of this species were located in the following localities including the type locality.

Table 1

| | No. | Place | Mature trees > 10 cm gbh | Young trees < 10 cm gbh |
|--|-----|---------------------------|-----------------------------|----------------------------|
| | 1. | Muthukuzhivayal (1440m) | 48 | 27 |
| | | (Type locality) | (19-227 cm) | |
| | 2. | Saddle No.4 (1100m) | 23 | 11 |
| | | | (14-161 cm) | |
| | 3. | Look out at Oothu (1100m) | 3 | - |
| | | | (30-110 cm) | |
| | | | | |

The populations as observed now are given in Table 1.

Additional Observations : This is the only known Syzygium in India with smallest leaves and with an umbellate inflorescence.

Syzygium gambleanum occurs along streams and in marshy lands. Tender branches are pale green, turning orange to pink and finally to brown; reddish black when dry. Leaves are aromatic remind the scent of clove. Tender leaves are pink turning yellow to olive green and to dark green at maturity, shining, sparsely black-dotted, greenish-black above and pale green below when dry.

New flush appears in October. In the last three years only a few trees, were seen to flower. Enquiries with the local Kani tribes reveal that this plant flowers very infrequently and poorly. Two flowers for every 5-6 flowers contain ovules. However mature seeds could be observed only in very few fruits even after repeated search in different localities.

The present field observation agrees with Beddome's remarks, that this tree can form



Figs. (1-3): Syzygium gambleanum Rathakr. & Chithra 1. Population, 2. A twig with flowers; 3. Close up of fruits.

one of the beautiful foliage ornamental trees. If successful propagation techniques can be established, this species can be saved from extinction.

Ethnobotanical Use: Kani tribes who inhabit the type locality and its neighbourhood use bits of leafy twigs of this species to bake tuber of Manihot esculenta Crantz. which imparts flavour.

IUCN Category (revised)

This species is assigned the category critically endangered (CR) based on the following criteria.

| 1. Extent of occurrence | $: < 100^2$ [B1 b(v)] |
|------------------------------|------------------------------|
| 2. Area of occupancy | $: < 10^2 \text{ km}$ (B2 a) |
| 3. No. of mature individuals | :<250 (C1) |

ACKNOWLEDGEMENTS

We are thankful to Dr. Sukdev, I.F.S. Chief Wild Life Warden, Chennai, for providing permission to visit and study the forest areas, and Dr. R. Annamalai, The Field Director, Kalakad - Mundanthurai Tiger Reserve for his support for field studies. We thank Dr.C.Livingstone, Head, Department of Botany, Madras Christian College for providing lab facilities and Dr.P.Dayanandan, Professor (Retd.) Department of Botany, Madras Christian College for his critical comments on the manuscript. We wish to thank Dr. P. Daniel, Joint Director, Botanical Survey of India, Coimbatore for permission to study and photograph the specimens and use the Library. We are thankful to Mr. N.C. Rathakrishnan, Former Scientist, Botanical Survey of India, Coimbatore for confirming the identity and to Mr. A.E. Dulip Daniels, Department of Botany, Scott Christian College, Nagercoil, for help in the field and the illustration.

REFERENCES

- AHMEDULLAH, M. AND M.P. NAYAR. Endemic Plants of Indian Region. Vol.1. Botanical Survey of India, Calcutta, 1987.
- ASHTON, P.S., Myrtaceae in (eds) Dassanayake M.D and F.R. Fosberg. A Revised Handbook to the flora of Ceylon Vol. II, Oxford & IBH Publishing Co, New Delhi, 1981.
- BEDDOME, R.H. The Flora Sylvatica for Southern India. Vol.2. Gantz Brothers, Madras, 1871.
- BOURDILLON, T.F. The Forest Trees of Travancore. Travancore Government Press, Trivandrum, 1908.

- BRANDIS, D. Indian Trees. Bishen Singh Publishers, New Connaught Place, Dehra Dun, 1921(repr. ed).
- CHITHRA V. in Nair, N.C. and A.H. Henry. Flora of Tamil Nadu. Vol.1. Botanical Survey of India, Coimbatore, 1983.
- GAMBLE, J.S. Flora of the Presidency of Madras. Vol.1. (repr.ed) Botanical Survey of India, Calcutta, 1967.
- GOPALAN, R. AND A.N. HENRY. Endemic Plants of India. Camp for the strict endemics of Agasthiyamalai hills, SW. Ghats. Bishen Singh Mahendra Pal Singh, Dehradun, 2000.
- HOOKER, J.D. The Flora of British India. Vol.2. (repr. ed.), Reeve & Co., London, 1879.
- JEAN-PHILIPPE PUYRAVAUD, PRIYA DAVIDAR, JEAN PIERRE, PASCAL AND B.R.RAMESH. Analysis of threatened endemic trees of the Western Ghats of India sheds new light on the Red Data Book of Indian Plants. Biodiversity and Consrevation, 12:2091-2106. 2003.
- LUSHINGTON, A.W. Vernacular List of Trees, Shrubs and Woody Climbers. Vol.I. & Vol.II-A. Government Pres, Madras, 1915.
- MABBERLEY, D. J. The Plant Book. A portable Dictionary of Vascular plants. Cambridge University Press, UK. 1997.
- Mohanan, M. Rediscovery of Syzygium bourdillonii (Gamble) Rathkr. & N.C. Nair (Myrtaceae), an endemic and little known species of Western Ghats. J. Econ. Tax. Bot. 20(3): 279-731. 1996.
- MOHANAN, N. AND M. SIVADASAN. Crop Plant Relative of Agasthyamala, Western Ghats, Kerala in Sivadasan M. & Philip Mathew, Biodiversity, Taxonomy and Conservation of flowering plants, Mentor Books, Calicut, 1999.
- NAYAR, M.P. AND A.R.K. SHASTRY. Red Data Book of Indian Plants. Vol.1.Botanical Survey of India, Calcutta, 1987.
- NAYAR, M.P. Hotspots of Endemic Plants of India, Nepal and Bhutan. TBGRI, Palode, 1996.
- RAMA RAO, M. Flowering Plants of Travancore. Government Press, Trivandrum, 1914.
- RAMESH, B.R. AND J.P. PASCAL. Atlas of Endemics of the Western Ghats (India). French Institute, Pondicherry, 1997.

- RAVIKUMAR, K. Novelties from high Wavy Mountains, Southern Western Ghats, Theni District, Tamil Nadu, India. *Rheedea* 9(1):55-75. 1999.
- SASIDHARAN, N. AND JOMY AUGUSTINE. A new species of *Syzygium* Gaertn. (Myrtaceae) from Southern Western Ghats, India. *Rheedea* 9(2):155-158. 1999.
- SASIDHARAN, N., P. SUJANAPAL AND J. AUGUSTINE. Reappearance of Syzygium myhendrae (Beddome ex Brandis) Gamble and *Elliphantus tomentosus* Kurz in the Southern Western Ghats. J. Econ. Tax. Bot. 26: 609-611, 2002.
- SUJANAPAL, P. AND N. SASIDHARAN. Relocation of Syzygium palghatense Gamble (Myrtaceae) and description of its hitherto unknown fruits. *Rheedea* 12: 189-191. 2002.
- VISWANATHAN, M.B. Plant Diversity of the Kalakkad Mundanthurai Tiger Reserve (KMTR) Tamil Nadu - 4 conservationist's view in Sivadasan. M & Philip Mathew, Biodiversity, Taxonomy and Conservation of flowering plants, Mentor Books, Calicut, 1999.