

Critical notes on *Alysicarpus monilifer* (L.) DC. [Leguminosae: Desmodieae] and its allies

Akram Gholami, Arun K. Pandey² and Anis A. Ansari¹

Department of Botany, University of Delhi, Delhi-110007, India

¹Botanic Garden of Indian Republic, NOIDA – 201303, Uttar Pradesh, India

²Corresponding author; e-mail: arunpandey79@gmail.com

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Abstract

Alysicarpus yunnanensis Yang & Huang, *A. monilifer* var. *mahbubnagarensis* (Raghav Rao *et al.*) Pokle, *A. monilifer* var. *cuddapahensis* Almeida & Almeida and *A. monilifer* var. *venosa* Blatt. & Hall. are reduced as synonyms of *A. monilifer* (L.) DC. *A. narimanii* Almeida & Almeida is allied to *A. heyneanus* Wight & Arnott, hence its comparison with *A. monilifer* does not arise.

Key words: *Alysicarpus*, Leguminosae, Synonymy

INTRODUCTION

The genus *Alysicarpus* Neck. ex Desv. includes about 30 species, distributed in tropical and subtropical regions of the old world (Lewis *et al.* 2005). The major centers of diversity of the genus are Africa (10 spp.), India, Indo-China, Malaysia and Japan (20 spp.) (Lewis *et al.* 2005; Mabberley 2009). In India, it is represented nearly by 27 taxa (18 species and 9 varieties), of which 7 are endemic (Sanjappa 1992; Pokle 2002; Dhabe 2013). India harbours nearly 60 % of the taxa of the genus and is richly represented in the Maharashtra state.

The genus *Alysicarpus* is characterized by its scarious calyx with complex venation and turgid articles of its indehiscent pods which are lomentaceous. The leaves are generally unifoliolate or rarely pinnately 3-foliolate. Pedley (2001) reported that all species of *Alysicarpus* described from Australia possess unifoliolate leaves. However, Pokle (2002) observed sporadic occurrence of trifoliolate leaves in *A. hamosus* Edgew., *A. tetragonolobus* Edgew. and *A. scariosus* Grah. ex Thwait.

During the course of our studies on the systematics of the genus *Alysicarpus*, we collected several specimens of *Alysicarpus monilifer* (L.) DC. from different parts of India. A detailed study of the specimens collected by us revealed that *A. monilifer* exists in different forms. These morphological variations of *A. monilifer*, which are overlapping, prompted taxonomists to describe new infraspecific taxa. In 1918, Blatter & Hallberg described *A. monilifer* var. *venosa* from Rajasthan. Pramanik & Thothathri (1988) transferred *A. monilifer* var. *venosa* to *A. vaginalis* var. *venosa* on the basis of pod reticulation and leaf variations. Almeida & Almeida (1988) described a new variety, *A. monilifer* var. *cuddapahensis* based on leaf and pod shape. Raghav Rao *et al.* (1989) described *A. mahbubnagarensis* on the basis of six morphological characters viz., (i) habit, (ii) size of leaves, (iii) size of calyx, (iv) size, shape and hairiness of pods, (v) size and shape of pod articles, and (vi) size of seeds.

Pokle (1998) questioned the recognition of new species *A. mahbubnagarensis* based on such characters, and reported that *A. mahbubnagarensis* differs from *A. monilifer* in only two characters which are insufficient to raise the taxon to specific level and reduced it as a variety of *A. monilifer* and reiterated that *A. vaginalis* var. *venosa* (Blatt. et Hall.) Pram. & Thoth. shows close similarity with *A. monilifer* rather than *A. vaginalis*.

During the scrutiny of literature, we came across a species of *Alysicarpus*, *A. yunnanensis* Yang & Huang described from North-West Yunnan, China which has similarity with *A. monilifer* in moniliform pod and other morphological characters. Adema (2003), on his notes on Malaysian Fabaceae, has also mentioned that vegetative and pod characters of *A. monilifer* and *A. yunnanensis* are similar and further reiterated that “study of more material of *A. monilifer* and *A. yunnanensis* may show that the differences are insufficient to keep both species separate”. The aforementioned differences are discussed critically under the following subheadings: (1) *A. monilifer* and *A. yunnanensis*, (2) *A. monilifer* var. *mahbubnagarensis* and *A. monilifer* var. *cuddapahensis*, (3) *A. monilifer* and *A. narimanii*, (4) *A. monilifer* var. *monilifer* and *A. monilifer* var. *venosa*.

Alysicarpus monilifer (L.) DC., Prodr. 2. 353. 1825; Edgeworth in J. Asiat. Soc. Bengal 21: 170. 1853; Baker in Hooker f., Fl. Brit. India 2: 157. 1876; Gamble, Fl. Madras.1: 238. 1918; Cooke, Fl. Pres. Bombay 1: 368. 1958 (Repr. Ed.); Ali in Biologia 12: 34. 1966. [**Fig. 1**]

=*Hedysarum moniliferum* L. Mant. Pl. 1: 102. 1767.

Type: Coromandel, Herb. *Burman* (G- not seen).

=*A. yunnanensis* Yang & Huang in Bull. Bot. Lab. North-East Forest Inst. 8: 5-13. 1980. **syn. nov.**

Type: China, Yunnan, 1300m, *Jin-sha-jiang* 6460 (Herb. Inst. Bot. Acad. Sin. conservatus) =*A. monilifer* var. *mahbubnagarensis* (Raghav Rao *et al.*) Pokle in Bull. Pure & Appl. Sc. 17B (No.1):31-33. 1998. *A. mahbubnagarensis* Raghav Rao in Asian Jour. Pl. Sci. 1:97-99.1989. **syn. nov.**

Isotype: Andhra Pradesh, Shadnagar, Mahbubnagar, 1985, 2858 MH, K, Holotype-untraceable)

= *A. monilifer* var. *cuddapahensis* Almeida & Almeida in J. Bomb. Nat. Hist. Soc. 85:402. 1988. **syn. nov.**

Holotype: Cuddapaha, 25.1.1958, S.K. Wagh 7768 (BLAT!)

= *A. monilifer* var. *venosa* Blatt. & Hall. in J. Bomb. Nat. Hist. Soc. 26: 240. 1918. **syn. nov.**

Type: Rajasthan, Jaisalmer, Nov. 1917, *Blatter & Hallberg* 7226 (BLAT-Lectotype!)

Annuals or perennials, 10 – 50 cm tall, procumbent to prostrate, much branched, covered with trichomes, woody at base. Stipules scarious and striate, triangular to linear, 2 – 10 mm long. Leaves unifoliate; petioles 4 – 8 mm long, sparsely pubescent; petiolules very short; stipels filiform *ca* 1 mm long; leaflets 5 – 50 x 4 – 15 mm, linear-lanceolate or oblong-elliptic, entire, rounded and mucronate, base rounded or slightly cordate, glabrous above, slightly pubescent below, sometimes dimorphic, lower leaflets ovate, upper ones lanceolate. Inflorescences short axillary or terminal raceme, flowers 4 – 10, pedicels *ca* 1 mm long, hairy; calyx 2.5 – 4 mm long, tube 1.5-2 mm long, four lobed, upper lobe shortly bifid, lobes not imbricate, not longer than the first joint of the pod, corolla purplish-red to pink; standard: claw 1 – 1.5 mm long; blade obovate, 5 – 6 x 2 – 4 mm, emarginate, wings: claw 1.5 – 2 mm long; blade: 3 – 5 x 1 – 2.5 mm; keel petals: claw 1 – 1.5 mm long; blade boat-shaped, 3 – 4 x 1.5 – 2 mm; androecium diadelphous, 9 + 1, stamens 5 – 6 mm long,

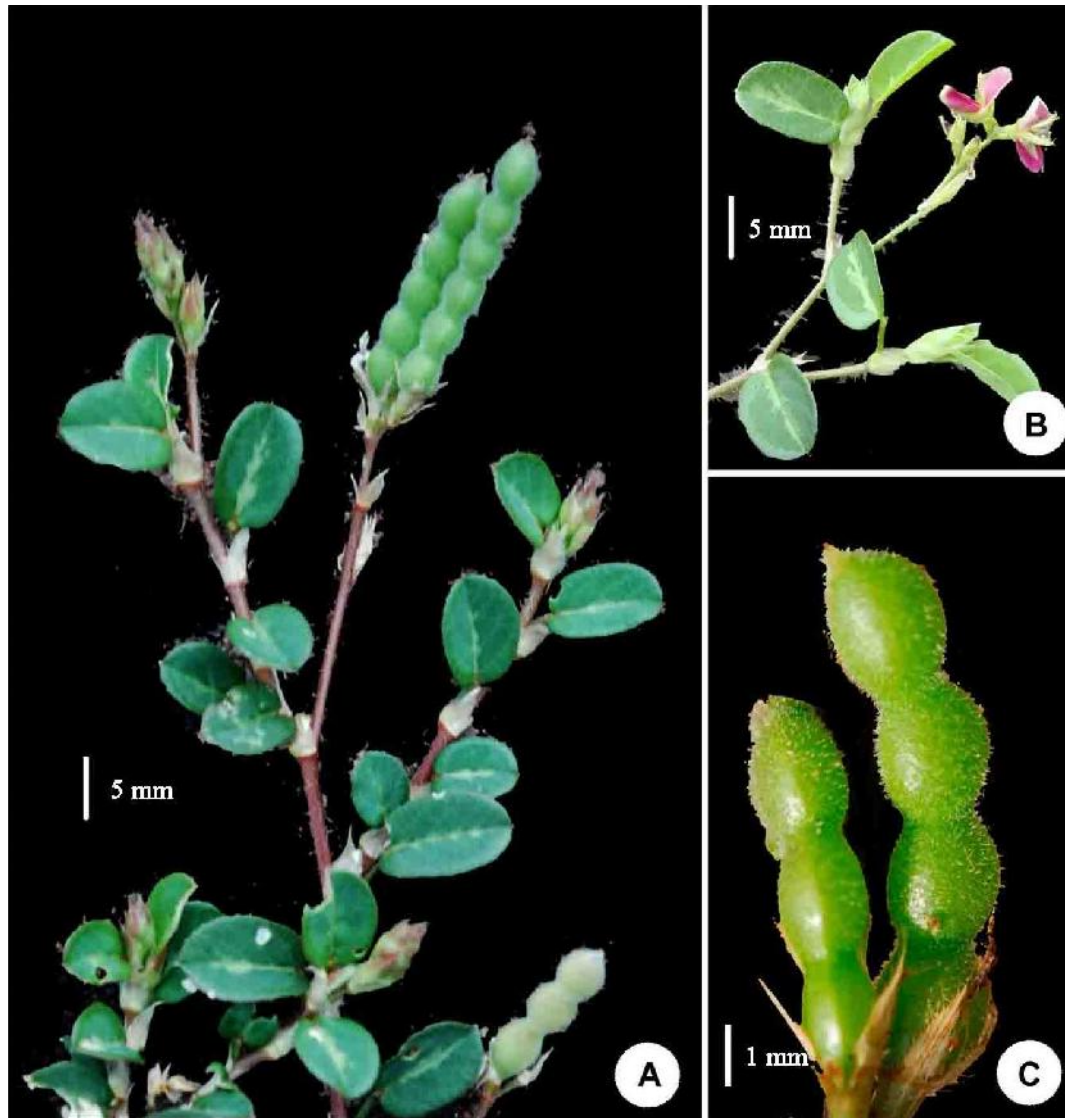


Figure 1. *Alysicarpus monilifer*. A. & B. Flowering and fruiting twigs, C. Immature pods

free part of filament 0.3 – 1 mm long, free stamens 4 – 5 mm long, anthers ditheous, basifixed; ovary oblong, 2 – 3 mm long, pubescent, style 2 – 3 mm long, covered with straight hairs at the base, usually bent at $\frac{3}{4}$ th position. Pods moniliform, 1.2 – 2.5 cm long, joints 4 – 8, turgid, veined or veinless, finely downy with minute hooked hairs; articles 2.5 – 3 mm long and 2 – 3 mm wide, with a smooth to reticulate surface. Seeds yellow to brown, bean-shaped, 1.5 – 2 x 1 – 1.5 mm.

Flowering & Fruiting: August – October.

Distribution: Throughout India. World: Pakistan, China, Philippines, Myanmar & Tenasserim, Maldives, Ethiopia, Madagascar, Niger, Somalia, Sudan; Mauritius.

Habitat: Appears during the rains in grassy places, rocky hillocks and wastelands.

1. *Alysicarpus monilifer* (L.) DC. (Fig. 1) and *A. yunnanensis* Yang & Huang (Fig. 2):

Herbarium specimens of *Alysicarpus monilifer* were collected from different parts of India including Aurangabad (Maharashtra), Badami (Karnataka), Delhi, Jodhpur (Rajasthan) and consulted during visits to CAL, LWG, BAMU, DUH, MH, BSI, (details under specimens

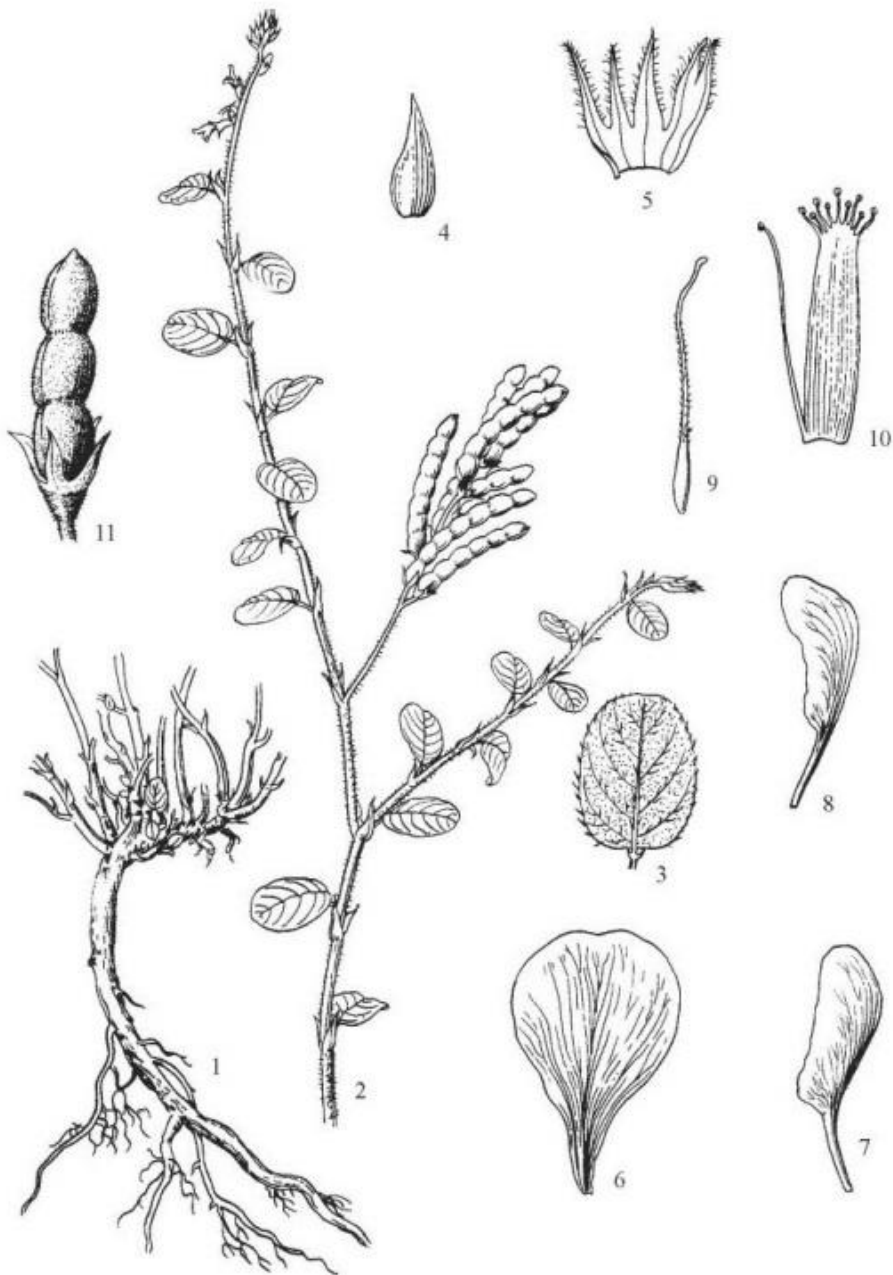


Figure 2. *Alysicarpus yunnanensis* (after Y.C. Yang & P.H. Huang 1980)

examined). At the same time detailed information about its occurrence were gathered from Darjeeling, Assam, Meghalaya and Manipur. After critical studies, it was found that some specimens of *A. monilifer* were similar to *A. yunnanensis*, a species described by Y.C. Yang and P.H. Huang (1980) from Guangdong, China. We compared the morphological features of *A. monilifer* with *A. yunnanensis* and found that both are similar in morphological characters except the pod characters; loment smooth in *A. yunnanensis* while obscurely to distinctly veined in *A. monilifer*. During our field surveys and examination of herbarium specimens in different herbaria, we have observed that both smooth and veined pods do occur in the same specimen which leads us to conclude that both *A. monilifer* and *A. yunnanensis* are conspecific. Adema (2003) reported that a specimen from Philippines was found to be similar to *A. yunnanensis* from China and *A. monilifer* from Africa and India. He noticed that *A. monilifer* and *A. yunnanensis* differ only in pods which are found in the same specimen in our observations, therefore *A. yunnanensis* is reduced here as a synonym of *A. monilifer*.

2. *Alysicarpus monilifer* var. *mahbubnagarenis* (Raghav Rao *et al.*) Pokle and *A. monilifer* var. *cuddapahensis* Almeida & Almeida:

Almeida and Almeida (1988) described a new variety *Alysicarpus monilifer* var. *cuddapahensis* based on two herbarium specimens having very minor differences of leaves being ovate and pods rounded. Both these characters are overlapping and occur in the same specimens of *A. monilifer*. Therefore, the variety is reduced as synonym under *A. monilifer*.

Raghav Rao *et al.* (1989) described a new species *Alysicarpus mahbubnagarensis*, which was, later on, relegated to a variety of *A. monilifer* by Pokle (1998). The holotype is not traceable and the isotype is deposited at MH. On studying the specimens and details provided by Pokle (1998), it is found that the taxon is in fact *A. monilifer* and the differences do not merit for its recognizing as a distinct variety. Therefore, it is reduced as synonym of *A. monilifer*.

3. *Alysicarpus monilifer* (L.) DC. (Fig. 1) and *A. narimanii* Almeida & Almeida (Fig. 3)

In Legumes of South Asia, *A. narimanii* has been included under *A. monilifer* (Kumar & Sane 2003). This treatment of *A. narimanii* has been accepted and included in different databases as synonym of *A. monilifer* (<http://www.flowersofindia.net>; <http://www.gbif.org>; <http://www.theplantlist.org/>; <http://www.ildis.org/>).

Our critical study of the type specimen of *A. narimanii* and specimens of *A. monilifer* reveals that the former species differs from *A. monilifer* in characters like long and lax inflorescence, longer pedicel, longer calyx enclosing pod and quadrangular pod segments which are comparable to *A. heyneanus* Wight & Arnott as given by the authors themselves so synonymy under *A. monilifer* is quite unreasonable and arbitrary. It is to be treated along with *A. heyneanus*. In future, its status will be decided under the complete revision of the genus *Alysicarpus* or in a separate communication if desirable.

4. *Alysicarpus monilifer* var. *monilifer* and *A. monilifer* var. *venosa* Blatt. & Hall.

In 1918, Blatter and Hallberg described *Alysicarpus monilifer* var. *venosa*. Later, it was transferred to *Alysicarpus vaginalis* by Pramanik & Thothathri (1988) based on pod characters and variation in shape and size of leaves. Pokle (2002) suggested that var. *venosa* shows more affinity with *A. monilifer* rather than *A. vaginalis*. He (Pokle 2002) did not agree to the claim of Pramanik and Thothathri and mentioned that “the claim of occurrence of the taxon in Andhra Pradesh and Tamil Nadu is also doubtful as the taxon

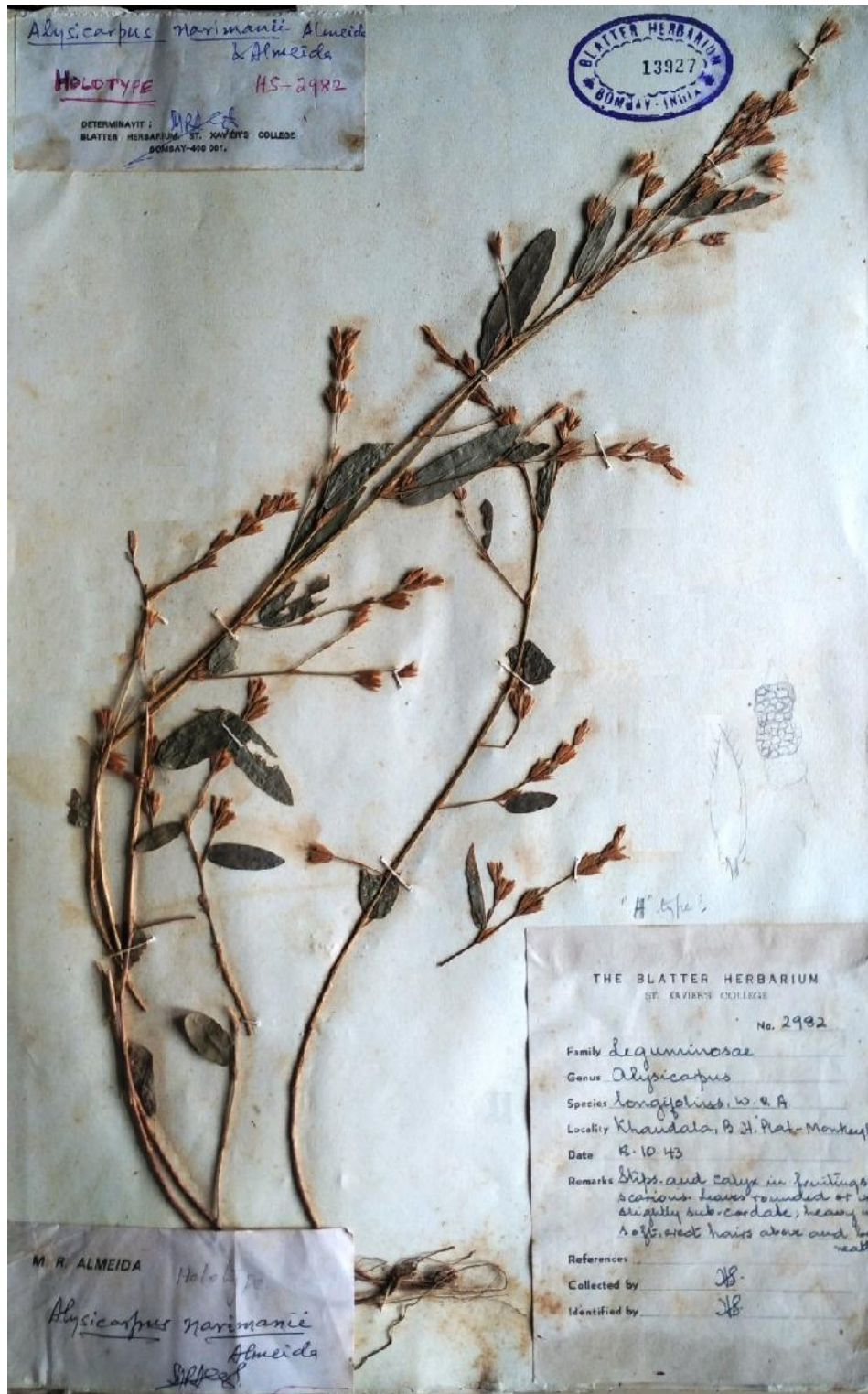


Figure 3. *Alysicarpus narimanii* Almeida and Almeida (Holotype: Khandala, 18.10.1943, H. Santapau 2982 (BLAT))

occurring in the area is quite distinct from the type as well as collections matched with the type". Pokle (2002) suggested that the taxon occurring in these areas is more similar to variety *mahbubnagarensis*. However, during the course of present study, it is found that the var. *venosa* does not differ much with the var. *monilifer* as raised by Blatter & Hallberg (1918). It is therefore reduced as synonymy under var. *monilifer*.

CONCLUSIONS

Based on critical examination of herbarium specimens, relevant literature and field studies, we conclude that: *A. yunnanensis* be treated as a synonym of *A. monilifer*; *A. narimanii* does not show similarity with *A. monilifer* and its status need to be re-defined, which has been compared with *A. heyneanus* by authors themselves; *A. monilifer* var. *venosa*, *A. monilifer* var. *mahbubnagarensis* and *A. monilifer* var. *cuddapahensis* are morphologically similar. These varieties cannot be maintained and are treated as synonyms under *A. monilifer*.

SPECIMENS EXAMINED (*A. monilifer* and allies):

INDIA. **Andhra Pradesh**, Anantapur, Mudigubba, 30.10.1998, *Ravi Patil* 257 (BAMU); Anantapur, University campus, 29.10.1998, *Ravi Patil* 248 (BAMU); Anantapur, S.K. University campus, 16.10.2000, *A.S. Dhabe* 988 (BAMU); Anantapur, Kalasamudram, 16.10.2000, *A.S. Dhabe* 990 (BAMU). **Bihar**, Champaran, 10.12.1962, *B.V. Shetty* 160 (CAL); Brahmyoni Hill Gaya, Bihar, 30.09.1978, *R.K. Gupta* 66870 (LWG). **Delhi**, Asola Bhatti, 28.09.2014, *A. Gholami & A.K. Pandey* 4576 (DUH). **Gujarat**, Pavagarh, 24.10.1999, *A.S. Dhabe* 657 (BAMU); Gondal, Gir Road, 27.10.1999, *A.S. Dhabe* 670 (BAMU); Kalol, 04.01.1978, *V. Singh* 5657 (CAL); Piparlao, 27.12.1971, *V. Singh* 5489 (CAL); Bhawnagar, 18.08.1960, *M.Y. Ansari* 63608 (CAL); Beyt Island, 16.11.1962, *T.A. Rao* 1260 (CAL). **Jharkhand**, Palamau, near Chatarpur, Jharkhand, 09.08.1956, *V. Chandra & party* 35280 (LWG); Natarhat Plateau, 15.08.1956, *V. Chandra & party* 36212 (LWG); Talghat, 11.08.1956, *V. Chandra & party* 35500 (LWG). **Karnataka**, Bethamangala, Kolar district, Mysore, 10.01.1957, *G. Saron & Party*, 40566 (LWG); Bijapur, Badami road, 03.11.1998, *Ravi Patil*, 267 (BAMU); Bidar, 29.09.1998, *R. P. Patil* 243 (BAMU); Caves Plateau, Badami, Bagalkot, 03.11.1999, *A.S. Dhabe* 688 (BAMU); Mysore, 03.11.1960, *R.S. Raghavan* 68111 (CAL); Belgaum, 03.11. 1952, *S.D.M.* 28665 (CAL); Mysore, 05.12.1940, *K.C. Jacob*, 20115 (MH). **Kerala**, Trivandrum, 16.11.1979, *M. Mohanan* 63895 (CAL, MH); Bomdallum, 27.11.1913, *M. Rama Rao* 1910 (CAL); Bomdallum, 05.12.1913, *M. Rama Rao* 2053 (CAL). **Madhya Pradesh**, Hanuman Dhara, Chitrakoot, 08.01.1959, *A. Singh & party* 54858 (LWG); Hoshangabad, Powerkheda, 22.09.1956, *Hiralal* and party 32761 (LWG); Rewa way, Tindwa Tal. 10.11.1956, *Kaul & party*, 42452 (LWG); Ramova Dam, Gwalior, 10.11.1957, *Kaul & Party*, 46221 (LWG); Sidhi, 31.07. 1968, *G. Sengupta*, 12936 (CAL); Sidhi, 03.03.1971, *G. Sengupta*, 14740 (CAL); Orchha, 30.03. 1990, *K. Kishore & M. Prasad* 45402 (CAL); Gobera, 25.02.1979, *Gamble* 29879 (CAL); Ratlam, 14.11.1957, *J.A.V.* 27545 (CAL). **Maharashtra**, Aurangabad, University campus, 17.09.2013, *A. Gholami & A.K. Pandey* 8004,4528, 4529,4531, (DUH); Kannad,13.09.1998, *Ravi Patil* 207 (BAMU); Nagpur, 31.10.1995, *D.S. Pokle* A140 (BAMU); Aurangabad, 04.08.1973, *D.P. Dorle* 10 (BAMU); Aurangabad, Daulatabad, 08.10.1994, *D.S. Pokle* A006 (BAMU); Aurangabad, Daultabad, 17.09.1979, *D.S. Pokle* 3610 (BAMU); Nanded, Islapur, 14.12.1997, *A.S. Dhabe* 915 (BAMU); Nanded, Kinklat, 05.11.1979, *B.R. Zate* 989 (BAMU); Nanded, Shikarghat, 04.11.1982, *Madhukar* 5143 (BAMU); Nanded, Ambadi, 19.08.1981, *B.R. Zate* 1964 (BAMU); Nanded, Ambadi, 13.09.1977, *B.R. Zate* 435 (BAMU); Nanded, Sitakhandi, 18.10.81, *W. Khan* 1967 (BAMU); Amravati, 30.10.1995, *D.S. Pokle* A127 (BAMU);

Mirzapur, Nanded, 19.10.1983, Madhukar, 6011(BAMU); Nanded, Kinwat, Sitakhandi, 13.12.1997, A.S. Dhabe 907 (BAMU); Bhokar and Hadgaon, Sitakhandi, 03.08.1980, W. Khan 948 (BAMU); Nandurbar, Akkalkuwa, 23.10.1999, A.S. Dhabe 648 (BAMU); Buldana, Jalgaon, 26.10.1962, K. M. Balapure 66029 (LWG); Sawantwadi, Vengurla, 18.10.1995, D.S. Pokle 110 (BAMU); Dhadgaon, 05.03.1965, R.D. Pataskar 104110 (CAL); Pimprani Jungle, 22.08.1965, R.D. Pataskar 105905 (CAL); Mumbai, 09.09.1954, S.K. Jain 6794 (CAL); Dhule, 5.2.1965, R.D. Pataska 104110 (CAL). **Odisha**, Chandbali to Cuttack, 21.03.1961, J.G. Srivastava & party 94812 (LWG); Sambalpur, 30.10.1959, G. Panigrahi 20538 (CAL). **Punjab**, Chandigarh, 14.11.1959, T.A. Rao 10854 (BSD); Gurdaspur, 24.08.1969, U.C. Bhattacharyya 37593 (BSD). **Rajasthan**, Kalimati, Mount Abu, 28.10.1999, A.S. Dhabe 674 (BAMU); Pilani, 01.04.1956, Janki Prasad 31160 (LWG). **Tamil Nadu**, Coimbatore, 01.12.1998, A.S. Dhabe 984 (BAMU); Coimbatore, Madhukarai, 01.12.1998, A.S. Dhabe 979 (BAMU); North Arcot, 20.11.1963, K. Ramamurthy 17605 (MH); North Arcot, 25.11.1977, E. Vagravelu 52055 (MH); South Arcot, 16.02.1979, K. Ramamurthy & V. Chanrasckaran 60232 (CAL, MH); Periar, 16.02.1979, N.C. Nair 60856 (CAL); Coimbatore, 29.12.1956, K.M. Sebastine 1875 (CAL, MH); Coimbatore, 22.11.1956, K.M. Sebastine 1490 (CAL); Valantheravai, 21.12.1986, Balasubramaniam 1061 (CAL); Uttarakosamangai, 01.01.1988, Balasubramaniam 1504 (CAL); Ramanathapuram, 10.12.1983, S. R. Srinivasan 79723 (MH); Ramanathapuram, 16.02.1979, N.C. Nair 60859 (MH); Salem, 24.11.1964, E. vajravelu 21920 (MH); Pennagaram, 14.12.1964, E. Vajravelu 22434 (MH); Srivilliputhur, 15.11.1953, J. Sakharam Rao 96425 (MH); Valantheravai, 21.12.1986, V. Balasubramaniam 1061 (MH); Nilgiri, 18.11.1970, G.V. Subba Rao 37268 (MH); Kanyakumari, 19.11.1941, K. Sherian, 20159 (MH). **Telangana**, Hyderabad, 27.11.1995, D.S. Pokle A162, 163 (BAMU). **Uttar Pradesh**, Lucknow, 17.11.1958, P. C. Nanda 1871(CAL); Mirzapur, 20.11.1958, P. C. Nanda 1877 (CAL). **West Bengal**, Mourigram, 01.05.1963, S.S. Bennet 175 (CAL).

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