



**COMPARATIVE STUDY OF *DACTYLIANDRA WELWITSCHII* HOOK AND *BLASTANIA CERASIFORMIS* (STOCKS) HOOK. F. IN AJMER DISTRICT OF RAJASTHAN**

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Cucurbitaceae is one of the largest families of flowering plants. Wild cucurbits occupy a central position in vegetables, food items and medicinally important plants throughout the world. There are many important wild species of cucurbits in Rajasthan which are restricted to a narrow patch of a confined geographical area. During the botanical excursions made by the authors in 2019-2020, two species of climbers were spotted in Ajmer district of Rajasthan. The plants were identified as two prominent wild cucurbits of Thar Desert, namely *Dactyliandra welwitschii* Hook and *Blastania cerasiformis* (Stock) Hook f. Although, *Blastania cerasiformis* (Stock) Hook f. is a common climber in Ajmer, *Dactyliandra welwitschii* Hook is a first report from the district. *Dactyliandra welwitschii* Hook and *Blastania cerasiformis* stocks are morphologically similar herbaceous climbers of the cucurbit's family. They have been studied on the basis of few morphological and taxonomical characters. Few morphological characters such as shape and types of leaves, size and color of fruits, number and size of seeds have been selected and examined for identification and field study purposes.

**Key words:** *Blastania cerasiformis* Stocks, Conservation efforts, *Dactyliandra welwitschii* Hook, Herbaceous vegetation, Human introduction, Taxonomical studies.

**Introduction:**

*Dactyliandra spp* is a monoecious (bisexual), annual, extensive climber in the family of cucurbits. The genus *Dactyliandra* on the basis of taxonomic differences, comprises up to four species; two species which are very locally known from North-east Africa are *Dactyliandra stefaninii* and *D.nigrescens*, and two species from South-west Africa, *Dactyliandra leuderitziana* (Namibia), *D. welwitschii* (Angola and in the Thar desert of North-western India including Rajasthan's Thar, Gujrat and

Pakistan).<sup>1</sup> The genus *Dactyliandra* Hook. was first described by the British botanist Joseph D. Hooker in 1871 from Angola, Southwestern Africa. Later the species was described as *Dactyliandra welwitschii* Hook to honor the Australian explorer Friedrich Welwitsch who has collected the type specimen first time. A phylogenetic analysis of plastid and nuclear ribosomal ITS DNA sequences including all *Dactyliandra* species revealed that, after the exclusion of both East-African taxa *D.stefaninii* and *D.nigrescens* which

are basically dioecious (unisexual) in nature. Their placement into genus *Trochomeria spp* and *Dactyliandra leuderitziana*, all species from Thar Desert of India, Pakistan, Gujrat and Angola are defined as a monophyletic group. The Angola-thar discontinuous distribution of *Dactyliandra welwitschii* was later explained as a result of recent introductions in the Indian sub-continent during the times of the slave-trade and British period<sup>1-2</sup>. Although, it was a great wonder when almost a period of 100 years after Welwitsch's discovery, the famous Indian Botanist and Professor Emeritus M.M. Bhandari first reported the *Dactyliandra welwitschii* from Thar Desert in India, 8000 km away from Angola. Either it was overlooked or mistaken for a similar and widespread similar climber of cucurbitaceae *Ctenolepis cerasiformis* (Stocks) Hook.f. (Syn: *Blastania fimbristipula* Fenzl ex Kotshy & Peyr syn: *Blastania cerasiformis* (Stocks) (Fig: 2 B, Table 1)<sup>2</sup>.

Material and Mehtods:

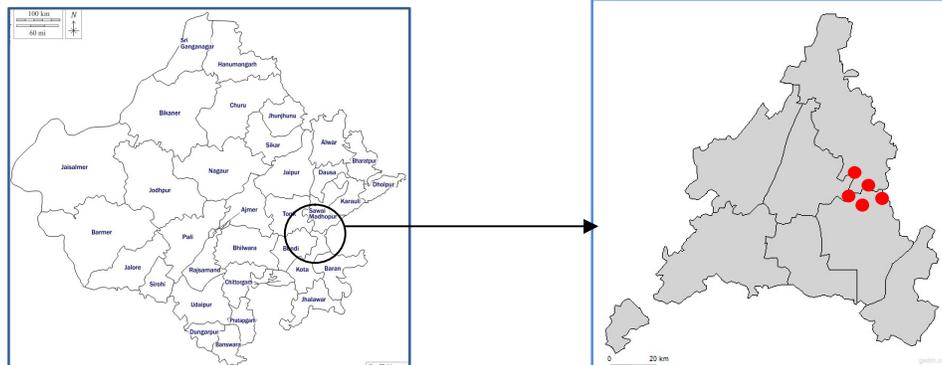


Fig 1: Study Area

(Location of the recorded two species of Cucurbits)

Map source: Bharat map services ([www://bharatmaps.gov.in](http://www://bharatmaps.gov.in))

The species was reported during the botanical excursions made during the rainy season during the years of 2019 and 2020, the plant material was collected to prepare herbarium sheets

Study Area:

Rajasthan is globally positioned between 23<sup>03</sup>' and 30<sup>012</sup>' N latitude and its longitudinal extension is in between 69<sup>03</sup>' and 78<sup>017</sup>'E'. Being the largest state of India, it has a wide spectrum of geographical and topographical diversity. Aravalli range digonally bisects the state into North-western desert and the South-eastern plains. Ajmer district is located in the Aravalli range one of the oldest, folded and residual mountain range of the globe<sup>3-4</sup>(Fig 1). Being a transitional zone, it creates an 'ecotone' and have a mixed type of vegetation, floral and faunal components<sup>5-7</sup>. There are lofty mountain chains and peaks together with newly formed sand dunes in Pushkar and Badi Ghati areas. This ecotone has a diversity of very rare and important plants. There are 19 species related to 8 genera of cucurbitaceous plants in Ajmer district<sup>8-10</sup>.

and photographed for its exact identification at the same time.

Authentication and Identification was done by the detailed study of the flora of the Indian Desert by M.M.

Bhandari and other authentic literature available. The plant is preserved as a herbarium sheet in the department of Botany SPC Govt. College, Ajmer Rajasthan for further reference.

### Results and Discussion:

*Dactyliandra welwitschii* hook. is a monoecious, annual and extensive climber with a herbaceous, much branched, angular and slender stem. Internodes are 1.5 dm long, leaves are up to 7-8 cm long nearly as much broad, digitately compound, usually 5 lobed, rarely 3 lobed (Fig: 2 A & C , 3 A&B). Plant is bisexual, male flowers bracteate and 10-20 in number, borne on 5-8 cm long peduncle. Bracts are stipuli-form, female flowers in fascicles of 3 or usually solitary, Fruits are of 1 cm in diameter, green, turn red when ripe, seeds are 8-12, compressed, angled, somewhat asymmetrically cissoid (6 x 3 mm) in middle, about 1.2 mm thick, narrowed at the ends (Table:1).<sup>1,11</sup>

Cucurbitaceae is a large and important family among dicots, distributed throughout the entire state of Rajasthan. Flora of Rajasthan reflects a largest proportion of African (37%) and Afro-Rajasthan (18%) elements. It shows overall overtopping of African elements, somehow entered the young desert of Thar. However, the native or endemic elements of vegetation are also present in a small but significant fraction (9.4%). About 50 species were reported first time by M.M. Bhandari (1990), including the first reporting of a native plant of Angola and South-western Africa. The plant was identified as *Dactyliandra welwitschii* Hook f., mainly confined to Thar desert<sup>1,11</sup>. Cucurbitaceae is represented by few climbers in Angola. The plants and their relatives mainly restricted to Angola and

Namibia deserts. *Dactyliandra welwitschii* Hook f. is a native plant of African continent, its occurrence in the state of Rajasthan is a result of recent plant migrations an introductions.<sup>2,11</sup> Cucurbitaceae is characterized by stem tendrils, mostly unisexual flowers, plants are climbers on woody trees and fencings. Most plants show anatomical abnormalities as bicollateral vascular bundles<sup>11</sup>.

Order cucurbitales represented by cucurbitaceae and allied to companulales by its phylogenetic considerations. Plants are prostrate climbing, mostly annual or infrequently prennial, usually monoecious, rarely dioecious. Sometimes, exceptions like a small tree as *Dendrosicyos sp* also included<sup>12</sup>. Cucurbits are tendril climbers, mostly with unisexual flowers, 3 carpels, inferior ovary and palmately compound leaves. The family is economically very important, represented by many food plants like *Cucumis sativus*, *Citrus colocynthus*, *Luffa acutangula* and *Cucumis melo*<sup>13</sup>. Raoli-todgarh wild life sanctuary is a rich biodiversity spot. There are many cucurbitaceous climbers in the sanctuary such as *Luffa echinata* and *Trichosanthes anguina*. There are total 19 species related to 8 genera of cucurbits<sup>14</sup>. Spermatoplytic flora (dominated by angiosperms) of Ajmer district is very rich and includes many food, medicinal and useful plants of cucurbits<sup>15-16</sup>.

The recent reporting of *Dactyliandra welwitschii* Hook f. from Ajmer district explains the further migration or recent human made introduction of the plant in the hills. It also explains everchanging climatic and edaphic conditions in Aravalli hills (Fig: 2 A, 3 B&C) from moderate to extreme

xerophytic habitats, suitable for xerophytic vegetation.

Specimen Examined:

- Botanical garden, behind Vice Chancellor's residence, MDS University campus (Ajmer).
- Near Sand dunes, Budha Pushkar.
- Nausar Ghati, Nag Pahar, Ajmer.
- Shri Aditirth Gaushala (Pushkar), Lohalgall Village.
- Happy Valley, Taragarh.

**Identification key to the closely related species of *Dactyliandra* & *Blastania*.**

1- (A)- Plant monoecious with male and female flowers on the same individual.

.....(2.)

2-Bract margin dentate to shortly ciliate. The cilia length not exceeding half of the bract's diameter

..... Fruits are green, seeds usually 9 to 12

.....*Dactyliandra welwitschii*

Stocks  
(confined to Angola and Thar desert and recently reported in Ajmer District)

2-Fruit green with white strips, seeds only 2, Bract margin long, ciliate.

.....The cilia at least as long as the bract diameter.....Inflorescences

longer with pedicels of female flowers and peduncles of male racemes

.....(*Blastania cerasiformis* (Stocks) A Meeuse)  
(Confined to Thar desert and all over India)

1(B)- Male and female inflorescence are very short and concealed by bract

.....(*Blastania gracinii* (Burm)  
(Confined to rest of Indian and Srilanka)

Plant dioecious with male & female flowers on separate plants.

.....4

4(A)- Species confined to Madagascar.....*Blastania lucorum*

4(B)- Species confined to Africa  
.....*Trochomeria stefaninii*

**Table1:** Comparative Morphological Analysis

| S. No . | <i>Dactyliandra welwitschii</i> Hook.                                   | <i>Ctenolepis cerasiformis</i> (stocks) Hook.f. syn: <i>Blastania cerasiformis</i> stock |
|---------|---|--|
| 1       | Leaves are usually 5 lobed and rarely 3 lobed.                          | Leaves are usually 3 lobed and rarely 5 lobed.   |
| 2       | Fruits are comparatively large (70mm in diameter) Green, red when ripe. | Fruit 50mm in diameter.  |
| 3       | Seeds are usually 9-12 in number.                                       | Seeds are only 2 in number   |
| 4       | asymmetrically cissoid 6 x 3 dm middle.                                 | concave curved 10 x 6 x 1 mm   |
| 5       | Bract margin dentate to shortly ciliate.                                | Bract margin long ciliate, the cilia at least as long as the diameter.                   |

**Conclusion:**

Occurrence of *Dactyliandra welwitschii* from Ajmer is a first report from Ajmer Aravalli Hills and is a new addition to the flora of Ajmer Aravalli range. *Dactyliandra welwitschii* is a monophyletic group and its discontinuous distribution from Angola to Indian sub-continent is a result of recent human introductions in Indian sub-continent during the colonial past and slave trade. *Dactyliandra welwitschii* is supposed to be restricted only within the 12 Districts of the Thar desert in Rajasthan. Its abrupt and sudden occurrence in Ajmer and Aravalli range, explains its regular migration towards the Aravalli mountain and everchanging climatic conditions in the hills.



**Fig- 2:** A. *Dactyliandra welwitschii* Hook B. *Ctenolepis cerasiformis* Stocks syn: *Blastania fimbristipula* (Fenzl)  
C. : Floral twigs *Ctenolepis cerasiformis* (Left) and *Dactyliandra welwitschii* (Right)



**Fig- 3:** A. Compound Leaves *Dactyliandra welwitschii* (upper leaf) and *Ctenolepis cerasiformis* (lower leaf)  
B. Two seeded fruit of *Ctenolepis cerasiformis* (Left), 8 seeded fruit of *Dactyliandra welwitschii* (Right)  
C. *Ctenolepis cerasiformis* fruit and seeds (Left) *Dactyliandra welwitschii* fruit and seeds (Right)

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