



An Updates on Genus *Gisekia* L. Found in India

Dheeren Panwar

Department of Botany, S.B.K. Govt. P.G. College Jaisalmer– 345001, Rajasthan, India

ABSTRACT: *Gisekia* L. is a common ephemeral genus found in India. There is only one species recorded in all over India namely *G. pharnaceoides* and have two varieties namely var. *pharnaceoides* and var. *pseudopaniculata*. Currently according to plants of the world online database the var. *pseudopaniculata* has been considered as synonym of *G. diffusa*. Hence present investigation was done to check out the updating status of genus *Gisekia* L. in India and author has experienced that the var. *pseudopaniculata* found in India must be treated as *G. diffusa*. Since there are mere differences in both species hence in present investigation the new keys are introduced along with the digital photos of each plant parts for easy identification.

KEY WORDS: *Gisekia* L., sp. *pharnaceoides*, sp. *diffusa*, India

INTRODUCTION

Gisekia L. is a common ephemeral genus found in India and grows just after first rain of monsoon. In most Indian Floras it has been included in family Molluginaceae (Shetty & Singh 1987 and Bhandari M.M. 1990), [1][2] or Within Aizoaceae (Sankara rao et al 2019) [3] but currently world wide it is placed in a single genus family *Gisekiaceae* (Nakai 1942) which was recognized after APG II System (2003). [4] In India there is only one species *pharnaceoides* was recorded by various authors viz. Clark (1879), [5] Blatter & Hallberg (1919), [6] Shetty & Singh (1987), [1] and Bhandari M.M. (1990) etc. [2] Jeffery (1960) [7] in Kew bulletin introduce a variety *pseudopaniculata* and subsequently followed by the various authors viz. Shetty & Singh (1987) and Bhandari M.M. (1990) in India. After the comprehensive work of Gilbert M.G. (1993) [8] the var. *pseudopaniculata* has been replaced by the species *G. diffusa* and according to current information on Plants of the world online database the var. *pseudopaniculata* is a synonym of *G. diffusa*. The sp. of *Gisekia* L. found in India has much similarities in morphology and often grows together in waste or forest land and amidst between grasses hence difficult to search out and identify. Among these *G. pharnaceoides* is rather common than other species. Since currently the var. *pseudopaniculata* has been treated as synonym of *G. diffusa* the present investigation was done to check out the status of genus *Gisekia* L. in India and because there are mere differences in both species, hence in present investigation the new keys are given along with the digital photos of each plant parts for easy identification.

MATERIAL AND METHODS

Field survey: Survey has been conducted during monsoon season of 2020-22 in west part of India and was mainly confined to Western Rajasthan including Barmer, Jaisalmer and Jodhpur District. Several plants were collected from field for comparative study. Standard protocol was followed for taxonomic description of plants.

Identification & Comparative Taxonomy: Herbarium sheets were prepared using standard protocol and plants were identified by the help of herbarium sheet preserved in Botanical Survey of India regional center Jodhpur (BSJO). Comparative taxonomy was done with fresh collection and preserved sheet. Canon EOS 1300 D and Samsung Galaxy J5 camera were used to snapped the digital photos.

RESULTS

Key to the species

- 1a Plant prostrate, or decumbent, umbel like dichotomously cyme, ± sessile or pedunculate, pedicel curved 2-5 mm, flower diameter 3.5 mm *Gisekia pharnaceoides* var. *pharnaceoides*
- 1b Plant erect, or semi erect, inflorescence dichotomously cyme, pedicel filiform 6-10 mm, flower diameter 2.5 mm *Gisekia diffusa*



[1a] *Gisekia pharnaceoides* L. Mant. 2: 562 (1771); Wight, Icon. t. 1167. 1848; Clark in FBI. 2: 664. 1879; Blatt. Hall. 26 (2) : 532. 1919.

Type: From Eastern India, cultivated in Uppasala (399/1 Linn. Lectotype, designated by Hedge & Lamond 1971).

var. **pharnaceoides**

A prostrate or decumbent annual radiating herb, branching dichotomously, branches spread up to 20-25 cm., stem thick 3 mm in diameter, cylindrical, striate, micro-papillate at ridge, reddish cream, glabrous. Leaves petiolate, petiole 3-5 mm, opposite, linear lanceolate, acute, 20-35 x 3-6 mm, midrib impressed above, raised below, glabrous green above, whitish below, slightly succulent, inflorescence sessile or pedunculate umbelliform dichotomous cyme. Flowers 3.5 mm in diameter, bracteate, bracts minute, membranous, acuminate, pedicellate, pedicel 6 mm, thick and curved, perianth 5 boat shape, obtuse, margin pinkish white, middle green, stamen 5, filament widen at base, anther sac pink, Gynoecium penta carpellary, carpel apocarpous, ovary elliptical white, style curved, fruit a shizocarp, mericarp spiny papillose, pinkish or green, seed discoid, black, 1.2 mm in diameter, micro foveolate.

Flowering & Fruiting: In rainy season

Specimen Examined: India: Gujarat, Kachchh Dist., Rappar Village, 05.10.2004, R.P. Pandey, BSJO acc no. 39114. Rajasthan, Sikar Dist., Near Kanwat, 26.09.1992, P.J. Parmar BSJO no. 10599, Jalor Dist., Kaniwara along Jalore-Alwar Road, B.V. Shetty BSJO acc no 12617.

[1b] *Gisekia diffusa* M. Gilbert Kew Bull. 48: 348 (1993)

Basionym: *Gisekia pharnaceoides* L. var. *pseudopaniculata* C. Jeffrey in Kew Bull. 14: 235 (1960).

Type: Kenya, Dandu, 05.05.1952, Gillett 13041 (Holotype K; Isotype EA)

An erect or semi erect annual drought escaping herb, branches spread up to 20 cm, stem slender 2 mm in diameter, striate, pinkish cream, micro-papillate. Leaves petiolate, petiole 1-2 mm, linear lanceolate, green glabrous above, white raphides below, acute, midrib impressed above raised below, 10-20 x 2-4 mm. Inflorescence Dichotomous cyme, pedunculate, Flowers 2.5 mm in diameter, bracteate, bracts minute, membranous, acuminate, pedicellate, pedicel filiform 6-10 mm long, perianth 5, elliptical, obtuse, boat shape, margin white or pinkish white, middle green. Stamen 5, filament widen at base, 0.8-1 mm long, anther sac pink. Gynoecium penta carpellary, carpel apocarpous, ovary white, elliptical, style curved. Fruit a shizocarp, mericarp spiny papillose, pink at maturity, seed discoid, black 0.8 mm in diameter, micro foveolate.

Flowering & Fruiting: In rainy season

Specimen Examined: India: Gujarat, Kachchh Dist., Bhuj Road, 10.04.1994, R.P. Pandey BSJO acc no. 19172;

DISCUSSION

The type herbarium sheets available on Global Biodiversity Information Facility (GBIF), online Kew herbarium catalogue and Botanical Survey of India Regional center Jodhpur were compared to the fresh collection and were experienced that the variety *pseudopaniculata* resembles to the type sp. *diffusa*. Both the species *pharnaceoides* and *diffusa* are grows together in open field and resembling much in appearance and have minor differences which are difficult to describe. These minor differences has been deeply examined and compared as follows:



Fig. 1. Plant Habit: (A) *Gisekia pharnaceoides* var. *pharnaceoides* –Prostrate-decumbent; (B) *Gisekia diffusa* -Erect



Fig. 2. Inflorescence pattern in *Gisekia* Sp.: (A) *Gisekia diffusa* -Dichotomous cyme; (B) & (C) *Gisekia pharnaceoides* var. *pharnaceoides* -Single arrow shows extra axillary sessile umbel like dichotomous cyme & double arrow shows cyme with long peduncle at bifurcation of branches. [Scale = 2 C.M.]



Fig. 3. Flower & Fruit morphology (a) *Gisekia diffusa* & (b) *Gisekia pharnaceoides* var. *pharnaceoides*: (A) flower lateral view; (B) Tepal; (C) Fruits –Straight filiform pedicel in (a) and thick & curved in (b); (D) Stamen; (E) Gynoecium; (F) Mericarp; (G) Seed. –Note all flower parts, fruit and seed of sp. *diffusa* are smaller than sp. *pharnaceoides* var. *pharnaceoides*. [Bars = 0.5 mm in D, E, F, G; 1 mm in B; 2 mm in A and 3 mm in C]



Habit: Both the species are grown in open sandy planes with together and often midst in grasses and other seasonal plants in rainy season. There is un-describable difference in both species. The species *pharnaceoides* var. *pharnaceoides* is prostrate or decumbent while sp. *diffusa* is erect or semi erects (Fig. 1 A & B). It was experienced that the sp. *pharnaceoides* var. *pharnaceoides* is always germinate earlier to sp. *diffusa*. Also sp. *diffusa* looks tiny and slender compared to sp. *pharnaceoides* var. *pharnaceoides*.

Stem: The stem of sp. *diffusa* was slender i.e. 2 mm in diameter in compare to sp. *pharnaceoides* var. *pharnaceoides* which was 4 mm in diameter. But can't differentiate superficially when both sp. look separately.

Inflorescence: The only Character which can easily be distinguish between both species. The inflorescence was dichotomous cyme in both but have minor changes. In sp. *pharnaceoides* var. *pharnaceoides* the cyme may have peduncle or not. The long peduncle may see at the bifurcation of branch besides this the extra-axillary cymes were often sessile (Fig. 2B & 2C). The cyme looks superficially umbel like because of the curved pedicel in compare to this the inflorescence was purely dichotomously cyme in sp. *diffusa* and the pedicels were filiform and straight (Fig. 2A).

Flower: The flowers of sp. *diffusa* were smaller i.e. 2.5 mm in diameter in compare to sp. *pharnaceoides* var. *pharnaceoides* which were 3.5 mm in diameter (Fig. 3A).

Pedicel: The pedicel nature and size were key characters to identify and differentiate both species. The pedicel of sp. *diffusa* was filiform and 6-10 mm in fruits while sp. *pharnaceoides* var. *pharnaceoides* have curved and thick pedicel of 3-6 mm long. According to Gilbert the size of pedicel in sp. *diffusa* was 10-12 (-14.5) mm in fruit but in my study I have always found up to 6-10 mm and rarely 12 mm perhaps due to soon drying of plant (Fig. 3C).

Perianth: The tepals of sp. *diffusa* were smaller i.e. 1.5 X 1 mm compare to 2 X 1.5 mm in sp. *pharnaceoides* var. *pharnaceoides* (Fig. 3B).

Androecium: The stamens of sp. *diffusa* were smaller i.e. 0.8 mm in size compare to sp. *pharnaceoides* var. *pharnaceoides* which were 1.2 mm long (Fig. 3D).

Gynoecium: The gynoecium was smaller i.e. 0.6 mm in sp. *diffusa* compare to 1 mm in sp. *pharnaceoides* var. *pharnaceoides* (Fig. 3E).

Fruit and Seed: The mericarp of both species were spiny papillose and resembled much except the size. The mericarp of sp. *diffusa* were smaller than sp. *pharnaceoides* var. *pharnaceoides* and the similarly result was in seeds. Also the mericarp has always found Reddish pink in sp. *diffusa* while in sp. *pharnaceoides* var. *pharnaceoides* it was reddish pink or whitish pink and after drying become straw colored in both. The pigment should be noticed at maturity otherwise it may look green. The seeds of both sp. were discoid shining black with micro foveolate surface (Fig. 3F & G).

CONCLUSION

By the current investigation it was clear that the *Gisekia pharnaceoides* var. *pharnaceoides* found in India must be treated as sp. *diffusa*. The flower parts of sp. *diffusa* were smaller to sp. *pharnaceoides* var. *pharnaceoides*. It was also experienced that it is slightly different from the individuals found in Africa and having shorter peduncle than the counterpart found in Africa. Many plants were found with shorter pedicel of 3-6 mm which is the key character of sp. *paniculata* given by Gilbert but this key is insufficient to differentiate between sp. *diffusa* and sp. *paniculata*. It may be possible that the sp. *paniculata* is found in India hence need of further investigation at deep level to compare between sp. *diffusa* and sp. *paniculata* for better differentiating both.

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