

Morphology and cytology of *Cicer canariense*, a wild relative of chickpea¹

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Summary

The short note describes the morphology and chromosome number of *Cicer canariense* Santos Guerra & Lewis. This taxon has been found to have a meiotic chromosome number of $2n = 16$ and not $2n = 24$, as reported earlier. At ICRISAT Center, while other perennial *Cicers* did not perform well, *Cicer canariense* flowered and produced seeds. The species grew vigorously and had multi-podded peduncles and multi-seeded pods. Such traits of *Cicer canariense* can be very useful in the genetic improvement of chickpeas.

The *Cicer* genus encompasses one annual cultivated, eight annual wild, and 34 perennial wild species. *Cicer canariense* Santos Guerra & Lewis is the latest addition to this genus. The species was collected from the Canary Islands (28° N, 15° W, 1200 MASL) in 1960. Due to the *Vicia*-like foliage of the plant, it was initially thought to belong to the genus *Vicia* (Santos Guerra, 1983). Later, however, after detailed studies of flowers, fruits, and seeds, this taxon was considered as a species of genus *Cicer* and named *Cicer canariense* Santos Guerra and Lewis (Santos Guerra & Lewis, 1986). Subsequently, the taxon has been grouped with perennial *Cicer* species (van der Maesen, 1987). We obtained seeds of this species from Dr. L.J.G. van der Maesen, Wageningen Agricultural University, Wageningen, the Netherlands. The plants were grown and evaluated at ICRISAT Center. The seeds were sown in pots in mid-August 1990 and about 10 plants were established. The pots were kept under a rainout shelter until the end of September. We report here the relevant morphological and cytological observations.

Growth habit

Stems are green, climbing, and thin. Canopy reaches a height of about 1 m (Figure 1a).

Leaf

Paripinnate, rachis ending in a tendril. The length of leaf on the 10th node position from the plant base was about 115 mm, and the number of leaflets ranged from 28–30. The leaflets near the rachis base were opposite, while those higher up were alternate. Leaflets were thick, linear, 1 mm wide, 22–25 mm long, tendril length was 20–25 mm, and stipule shape was linear with 2–3 teeth. The tooth length ranged from 10–20 mm. Internode length was 20–25 mm.

Flowering

Plants sown in mid-August initiated flowering by mid-November, but produced relatively few flowers. The plants grown in the field during the chick-

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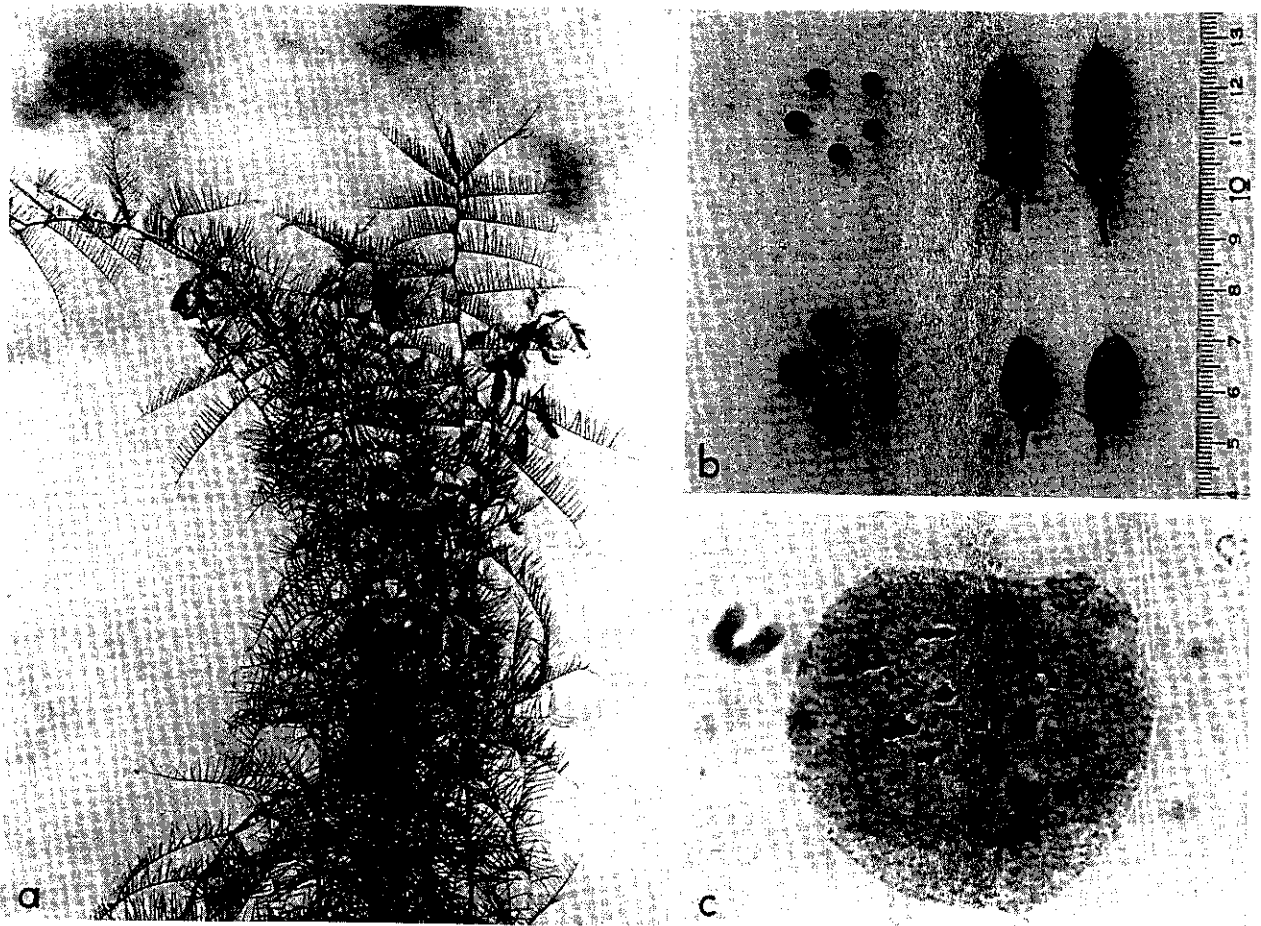


Fig. 1. a) *Cicer canariense* plant raised in a pot at ICRISAT Center; b) Seed and pod of *C. canariense* (above), and chickpea (below); c) a pollen mother cell (PMC) showing $2n = 8$ bivalents of *C. canariense*.

pea crop season, i.e. October-February, did not flower and died by end of the season, probably due to the high ambient temperatures. The plants produced 3-4-flowered axillary racemes with peduncle and pedicel lengths of 50-80 mm and 10-12 mm, respectively. The flower was typically papilionaceous, as in chickpea, but about two and a half times as large as chickpea flowers and with purplish petal colour.

Pod

Flower drop was high, probably due to the environment at ICRISAT Center, which is not favourable for this species. Seed set was also low and highly variable (13-70% seed set from pod to pod); often seven ovules per pod were produced. The pods

were inflated, elliptic-obtuse, dehiscent, 28-30 mm long, and 10 mm wide (Figure 1b).

Pubescence

Stem, leaf, peduncle, pedicel, pod wall, etc., had dense and glandular pubescence which produced considerable exudate consisting of malic acid, sugars etc.

Seed

Seeds were globular with a pronounced beak and black and white mosaic seed coat. The 100-seed weight was about 3.75 g.

Chromosome number

Cytological analysis of flower buds was carried out using the standard technique. The buds were fixed in ethyl alcohol, chloroform, and glacial acetic acid (6:3:2 v/v) and squashed in 2% aceto-carmin stain. The smears of young flower buds revealed eight bivalents, i.e. $2n = 16$ (Figure 1c).

This species is quite different from other *Cicer* species, and resembles *Vicia* species. Nevertheless, like the other *Cicer* species, the taxon has characteristic traits such as glabrous style, inflated pods, and glandular pubescence. The chromosome number of this species was earlier reported to be $2n = 24$ (Santos Guerra & Lewis, 1986); however, we found it to be $2n = 16$ like any other *Cicer* species. Since the chromosome number is an important criterion of taxonomical classification, it further confirms that this taxon is a species of the genus *Cicer*.

It is generally not possible to grow and maintain perennial *Cicer* species at ICRISAT Center, and at several other locations in the world (excepting Pull-

man, Washington, USA). The fact that we could satisfactorily grow *C. canariense* at ICRISAT Center indicates that this taxon is quite different from other ones. This species also has vigorous growth, multi-podded peduncles, and more seeds per pod (up to seven compared to about 1.2 seeds per pod in chickpea). These are very promising traits for an efficient chickpea plant type, and we therefore suggest utilization of this species in chickpea improvement.

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