



Characterization of Coriander (*Coriandrum Sativum*) based on the Morphological Traits

RK SINGH*! AND SS VERMA

Department of Seed Science and Technology, CCS Haryana Agricultural University, Hisar, Haryana, India

ABSTRACT

An experiment was conducted with twenty coriander varieties for morphological characterization wherein seed characters *viz.* seed shape and test weight and vegetative characters such as plant height, days to 50 per cent flowering, branches per plant, umbels per plant, seed yield per plant and days to maturity were found stable and uniform. A flow chart was developed which will serve as identification keys during genetic purity determination.

Keywords: *Coriandrum sativum* L., Morphological traits, characterization, identification key.

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Coriander (*Coriandrum sativum* L.) is an annual herb ($2n=22$), which belongs to the family Apiaceae and generally grown in winter season as main crop in India. All parts of the plant are edible but the fresh leaves and the dried seeds are most commonly used in cooking. This is mainly used as spice for adding taste and flavour in different food stuffs but also possesses some medicinal properties. The basic objective of varietal identification is to confirm the occurrence of traits that helps in identifying a particular variety when grown in different environmental conditions and generations (Fleener and Smith, 1983). Plant morphology is the main basis to differentiate the varieties easily and efficiently. Accurate identification of varieties is not only a prerequisite for Distinctness, Uniformity and Stability (DUS) testing, but is equally important for the production of quality seed also. Therefore, present study was conducted to characterize coriander varieties based on morphological traits and to develop flow chart to serve as identification key for genetic purity determination of varieties. The laboratory studies were conducted at Department of Seed Science and Technology, CCS, HAU, Hisar while field work at Vegetable Farm of the University. Seeds of twenty coriander varieties were arranged from different research centers across the country. The coriander varieties were sown in Randomized Block Design with three replications. The net plot size was

4 x 2 m and row to row and plant to plant spacing was 50 and 20 cm, respectively. The non-experimental rows were also maintained to avoid border effects. Recommended agronomic package and practices were followed to grow a good and healthy crop. A total of ten competitive plants (excluding border plants) from each plot were randomly selected. These ten plants were used for recording of data pertaining to morphological characters. The morphological traits like plant height at maturity (cm), days to 50 per cent flowering, flower colour, plant appearance, number of branches per plant, number of umbels per plant, number of umbellet per umbel, number of seeds per umbel, days to maturity, seed yield per plant, seed size, seed shape, test weight (g), seedling pigmentation and plant stem pigmentation were compared and related data were recorded accordingly. The data was analysed as per standard method suggested by Panse and Sukhatme (1967).

Substantial variations were observed among varieties for the majority of the traits studied during experimentation and based on these differences, the varieties were grouped into different categories. The plant height was measured at maturity which ranged from 100.1 to 136.2 cm. Out of twenty, seven varieties (RCr-446, RCr-480, RCr-684, NRCSS ACr-1, Hisar Bhoomit, Hisar Surbhi and RCr-41) were grouped as tall, seven varieties (GC-2, RCr-20, RCr-435, JD-1, CS-6, Hisar Anand, Hisar Sugandh) as medium and six varieties (GC-1, RCr-436, Sudha, Sindhu, Swathi and Sadhana) as dwarf varieties. The time taken by coriander varieties

! Present address: Central Potato Research Station, Sahaynagar, Patna, India

*Corresponding Author Email: rk Singh.cprs@gmail.com

to attain 50 per cent flowering ranged from 55 to 110 days. This assisted in making three groups i.e. early, medium and late flowering groups. Three varieties (RCr-41, Hisar Bhoomit and NRCSS ACr-1) were fell into late group (>100 days), seven varieties (Hisar Anand, Hisar Surbhi, Hisar Sugandh, JD-1, RCr-446, RCr-480 and RCr-684) into medium group (76-100 days) and 10 varieties (GC-1, GC-2, CS-6, Sadhana, Sudha, Sindhu, Swathi, RCr-20, RCr-435 and RCr-436) into early (<76 days) group. Similarly, [Sangwan et al. \(2005\)](#) classified forage sorghum genotypes based on plant colour, midrib colour, plant height, days to 50% flowering, seed index, inflorescence compactness and shape. [Lowanshi et al. \(1996\)](#), differentiated fenugreek varieties on the basis of morphological traits *viz.* pod length, seed per pod, plant height, number of leaves per plant etc.

The number of branches per plant varied from 8.0 to 15.8 and three groups were made *viz.*, more branched, medium branched and less branched varieties. Seven varieties (GC-2, CS-6, Swathi, Sudha, Sindhu, Sadhana and RCr-436) found less branching type, nine varieties (GC-1, JD-1, Hisar Anand, Hisar Surbhi, Hisar Sugandh, RCr-20, RCr-435, RCr-446 and RCr-684) medium branching type and four varieties (NRCSS ACr-1, Hisar Bhoomit, RCr-41 and RCr-480) highly branching type. The number of umbels per plant ranged from 53.9 to 98.3. Ten varieties (GC-1, CS-6, Sadhana, Sudha, Sindhu, Swathi, RCr-20, RCr-446, RCr-480 and RCr-684) were grouped as less umbelled (<60), seven varieties (GC-2, Hisar Anand, Hisar Surbhi, Hisar Sugandh, JD-1, RCr-435 and RCr-436) medium (61-80) and three varieties (Hisar Bhoomit, NRCSS ACr-1 and RCr-41) were grouped into more umbelled (>80) varieties. In a similar study, [Al-Safadi \(2008\)](#) reported variation in leaf, umbel and seed shape of *Dacus* and made classifications accordingly.

The days to maturity (time taken from emergence to maturity) varied from 85 to 145 days. Among 20 varieties, ten varieties (GC-1, GC-2, CS-6, Sadhana, Sudha, Sindhu, Swathi, RCr-20, RCr-435 and RCr-436) were grouped as early maturing (<100 days), seven varieties (Hisar Anand, Hisar Sugandh, Hisar Surbhi, JD-1, RCr-446, RCr-480 and RCr-684) as medium maturing (101-125 days) and three varieties (RCr-41, Hisar Bhoomit and NRCSS ACr-1) as late maturing (>125 days) varieties. The seed yield per plant ranged from 3.2 to 6.8 g and three groups were made. Six varieties (GC-2, CS-6, NRCSS ACr-1, Hisar Anand, Hisar Bhoomit and RCr-435) were found high yielder, ten varieties (GC-1, JD-1, Hisar Surbhi, Hisar Sugandh, RCr-20, RCr-41, RCr-436, RCr-446, RCr-480, RCr-684) were medium yielder and

four varieties (Swathi, Sadhana, Sindhu and Sudha) were low yielder. Generally too early varieties were found low yielder. Similarly, characterization based on morphological characters has been reported in many crops like sunflower ([Jagdish et al., 1994](#)), pearl millet ([Kumar et al., 1995](#)), fenugreek ([Chauhan, 2003](#)) and lentil ([Khare et al., 2006](#)).

The seed morphological characters such as shape, size and test weight are easy to detect and could classify the cultivars into few broad categories. All twenty varieties were clubbed into two groups- oval and round shaped varieties based on their seed shape. Nine varieties (NRCSS ACr-1, Swathi, Sadhana, Sindhu, Sudha, Hisar Bhoomit, RCr-41, RCr-435 and RCr-446) were grouped as round shaped while eleven varieties (GC-1, GC-2, JD-1, CS-6, Hisar Anand, Hisar Surbhi, Hisar Sugandh, RCr-20, RCr-436, RCr-480 and RCr-684) were as oval shaped. The test weight (1000-seed weight) of coriander varieties ranged from 7.4 to 17.5 g. Three varieties (NRCSS ACr-1, H Bhoomit, RCr-41) were found to have light weight, six varieties (JD-1, CS-6, Swathi, RCr-20, RCr-435 and RCr-446) medium weight and eleven varieties (GC-1, GC-2, Sadhana, Sindhu, Sudha, Hisar, Anand, Hisar Surbhi, Hisar Sugandh, RCr-436, RCr-480 and RCr-684) heavy weight seeds. Similarly, seed characters was used for classification of cowpea by [Nkouannessi \(2005\)](#), [Naima et al., \(2009\)](#) and [Henshaw \(2008\)](#); [Gnyandev \(2009\)](#) in chickpea; [Sajan et al., \(2008\)](#) in French bean. [Payne \(1978\)](#) reported that the seeds of the same cultivar may vary in shape. This may be due to genetic characters of the varieties, position of seed in the pod and environmental conditions during pod filling. A flow chart developed based on the basis of variations among different vegetative as well as seed attributes evaluated under study ([Fig. 1](#)). This flow chart will serve as identification keys for coriander varieties during determination of genetic purity.

CONCLUSION

The study revealed that morphological characters *viz.*, plant height, days to 50% flowering, number of branches per plant, number of umbels per plant, days to maturity, seed yield per plant, shape and test weight are the very important diagnostic characters for varietal identification in coriander while characters like flower colour, seedling pigmentation and stem pigmentation failed to differentiated coriander varieties. The identification keys developed on the basis of vegetative and seed attributes will help in deciding genetic purity during laboratory tests by seed analysts and plant breeders.

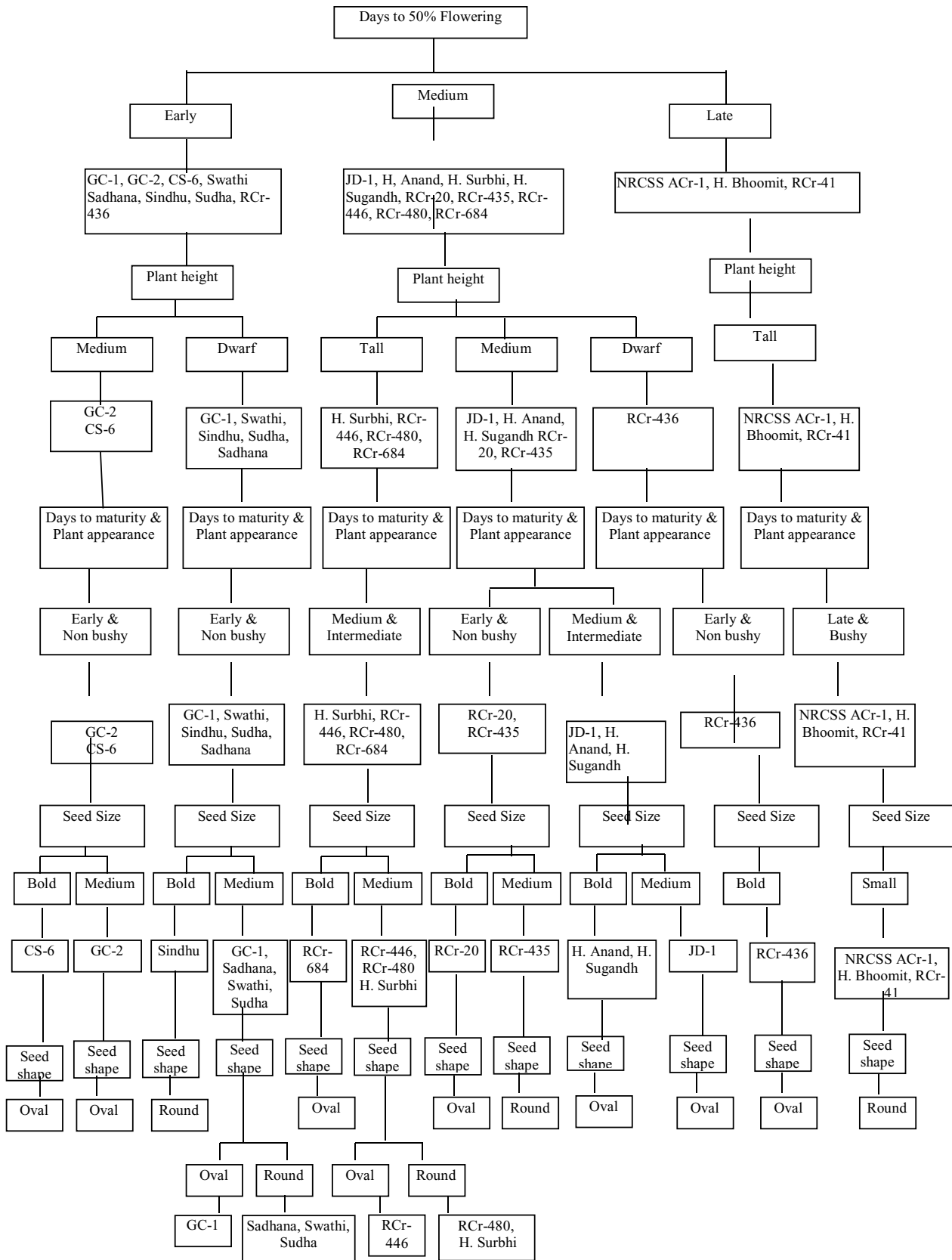


Fig. 1: Identification keys for coriander varieties based on seed and plant characters

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