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DUS Characterisation of Corn (*Zea mays* L.) Cultivars

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A B S T R A C T

Keywords DUS, Characters, maize composites, morphological characterisation **Article Info** *Accepted:* 28 May 2018 *Available Online:* 10 July 2018	Using DUS characters five composite varieties of maize (Super -1 composite, Composite-6, Composite-8, Composite-14 and Composite-15) were characterised through morphological features of the plant and the seed utilising fifteen descriptive characters. The identification keys based on plant and seed morphology were prepared. All the varieties could be distinguished on the basis of morphological features of the plant, only three could be identified on the basis of seed characteristics. The keys could be used to define parameters of certification and allow for determining similarities and differences in DUS (Distinctness, uniformity and Stability) testing.

Introduction

Maize is one of the important *Kharief* crops commonly grown for both higher and lower belts of Kashmir valley. Due to non-availability of descriptive information concerning morphological characters for identification of the varieties commonly cultivated in the region, production of quality seed is largely hampered. Morphological traits have been widely accepted in plant variety protection, registration and patenting as their description has been found to be capable of showing both identity and distinctness (Camussi *et al., 1983*). Characterisation of morphological variability also allows breeders to identify accessions with desirable characteristics such as earliness, improved ear morphology etc and avoid duplication of accessions in germplasm collection. Traditionally, numerous morphological traits have been used to describe inbred lines and hybrid cultivars of Maize (*Zea mays* L.).

Though many tools are now available to study relationship among cultivars, including various types of molecular markers, however morphological characterisation is the first step in the description and classification. Several workers have used seed characters for distinguishing varieties of different crops (Burbridge 1986, Agarwal, 1990). In the present study, an attempt was made to formulate an identification key for maize

composite varieties cultivated in Kashmir region.

Materials and Methods

The seeds of composite varieties Super-1, Composite-6, Composite- 8, Composite- 14 and Composite-15 were planted at SKUAST (K), Shalimar and the experimental design was a randomised block with two replications per variety with a row to row and plant to plant distance of 60 cm and 20 cm respectively. As the main goal was a practical characterisation of maize varieties, a set of eighteen descriptors (Table 1) were used. Data for morphological traits were collected on fifteen randomly selected plants per replication.

Early plant vigour was recorded 25 days after sowing and tassel characters were recorded after complete tasselling. Leaf width was

recorded on the leaf which subtended the uppermost ear and silk colour was measured 5-6 days after silking.

Results and Discussion

Observations on various characters recorded in five composite varieties revealed that the varieties differed from each other. Early plant vigour was very good in Super-1, C-14, and C-6 whereas it was good in C-8 and C-15. Dense Tassel texture was observed in super-1, C-8 and C-6 while it was medium in C-14 and C-15, based on tassel anther glume colour, only one variety (Super-1) had purple coloured tassel- anther glume whereas rest of the varieties possessed light purple colour. Tassel glume base colouration was observed in C8, C-14, C-15 and Super-1 whereas no colour was observed in C-6. Similarly, silk colour was found to be purple only in C-14 while other varieties had green coloured silk.

Table.1 Morphological Traits studied

Name of the trait	Scale	Description of scale
A. Measurement recorded upto flowering		
Early plant vigour	1-3	1-Poor, 2- Good, 3- Very good
Tassel texture	1-2	1-Lax, 2- Medium, 3-Dense
Tassel anther glume colour	1-4	1-Pink, 2- Green, 3-light purple4- purple
Tassel glume base color	1-2	
Anthocyanin pigmentation	1-2	1-Present2- Absent
Leaf pubescence	1-2	1-Present2- Absent
Leaf orientation	1-2	1-Present2- Absent
Leaf colour	1-2	1-Erect 2- Absent
Leaf texture	1-2	1-Light green, 2- Green, 3- dark green
Leaf width	cm	1-Smooth, 2- Leathery, 3-Normal
Silk colour	1-2	1-Green, 2- Purple
Husk cover	1-2	1-Tight, 2- intermediate
B. Measurements recorded after harvest		
Ear shape	1-2	1-cylindrical, 2- cylindrical conical
Kernel row arrangement	1-2	1-straight, 2- regular
Grain shape	1-2	1-Round, 2- indented
Grain texture	1-2	1-Flat, 2- Beaked
Kernel colour	1-3	1-Orange, 2- Yellow,3-White
Grain size	1-3	1-Small, 2- Medium, 3- Bold

Table.2 Mean leaf width and grain size for five composite varieties of maize

Varieties	Leaf width 'cm'	Grain size 'g'
Super-1	9.10+0.23	28.11+0.34
Composite-6	8.27+0.15	27.64+0.02
Composite-8	8.09+0.10	31.00+0.50
Composite-14	8.68+0.01	26.40+0.32
Composite-15	9.18+0.04	25.11+0.10

All the varieties had erect leaf orientation and therefore the trait could not distinguish the varieties from each other. Similarly all the varieties had medium sized leaves and no pubescence and therefore, these two traits also could not make any distinction between the varieties. (Table 2)

Leaf texture was found to be normal in Super-1, C-14and C-6 whereas it was leathery in C8 and C15. It was also found that none of the genotypes exhibited anthocyanin pigmentation except Super-1. This composite also had light green leaves whereas these were dark green in colour in the case of C14, c8, C15 and C6.

On the basis of ear shape, Super-1 could be distinguished from other varieties because of its cylindrical ears whereas other varieties possessed cylindrical- conical ears. Similarly, C6 could be characterised by intermediate type of husk cover from other varieties which had tight husk cover. Regular arrangement of kernel rows was observed only in C6 whereas other varieties had straight arrangement of kernel rows.

The measurement taken after harvest were also variable for the varieties. Most discriminating grain characteristics was kernel colour that was found to be white in case of C8, Orange in Super-1, C14 and C6 and yellow in C15. Beaked grain texture was observed in C15 and rest of the varieties had flat grain texture. Similarly Indented grain shape was observed in C8 whereas C14, C15,

C6 and Super-1 had round grains. C14 was characterised by medium sized grains whereas, super-1, C15, C6 and C8 had bold seeds.

Morphological traits traditionally have been used as descriptors. It is likely that their use will continue because they are omnipresent in agriculture (Smith and Smith, 1989b). All the varieties could be resolved on the basis of morphological features whereas only three cultivars could be resolved on the basis of seed characters.

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