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MORPHOLOGICAL CHARACTERIZATION OF RIDGE GOURD GENOTYPES FOR DUS TRAITS

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ABSTRACT

The present investigation was carried out at Research Farm of the Department of Vegetable Science, C.C.S. Haryana Agricultural University, Hisar, during the last week of February and second week of March, 2023. Forty ridge gourd genotypes were characterized for fifteen different morphological traits as per the DUS (Distinctiveness, Uniformity and Stability) guidelines of PPV&FRA. The observations pertaining to the morphological descriptor, the genotypes were grouped into different categories. The study involved determining morphological traits of ridge gourd such as vine, leaf, flower and fruit characters. The high morphological variation observed for the traits plant growth habit, leaf shape, leaf blade: number of lobes, fruit shape and fruit ridge shape in all the genotypes. The consistency of character expression over two different date of sowing showed the uniformity of these genotypes.

***Key words*:** DUS, Genotypes, Morphological traits, Ridge gourd

Introduction

Ridge gourd (*Luffa acutangula* L.) is originated in India and belongs to the family Cucurbitaceae with 2n=2x=26 chromosome number. It is commonly called as *Turai* or *turiya* or *heereka* or *beerakai*. It is also known as ribbed gourd, angled gourd, angled loofah, Chinese okra, silky gourd and vegetable gourd. Ridge gourd belongs to genus Luffa derives its name from the product loofah, which is used in bathing sponges, scrubber pads, door mats, pillows and mattress. The fibre has also been shown to be an effective insulator for a variety of applications. Dry fruits with good storability are sometimes utilized for decorative purposes as well. It is an emetic that has long been used to treat stomach ailments and fevers (Chakravarthy, 1959). Variability in cucurbitaceous crops occurs in the form of land races, traditional cultivars, wild relatives form and related non edible wild weedy species. In India little attention has been given for the genetic improvement of ridge gourd by collecting diverse germplasm, their morphological characterization. The crop improvement work should be focused on selection of genotypes for better yield and quality. Selection is a basic part of all vegetable crop improvement programme and it is as old as cultivation itself. Morphological characteristics can be used to distinguish genotypes against highly heritable and stable phenotypes. Furthermore, every morphological parameter can be linked to desired qualities or yield components. It's important to identify a species, to classify the species into different group and to give an idea about the crop canopy.

Materials and Methods

In this study, the forty genotypes of ridge gourd were collected from different sources which was investigated at the research farm of Department of Vegetable Science Chaudhary Charan Singh Haryana Agricultural University, Hisar during the last week of February and second week of March, 2023. The experiment was laid out in a Randomized Block Design with three replications. The population of five plants per genotype was maintained by the sowing of seeds at a spacing of 2.5 m×0.6 m. The genotypes were recorded at different stages of crop growth like vegetative stage, flowering stage and fruit

Table 1: Categorization of ridge gourd genotypes with respect to the plant growth habit, leaf shape and leaf blade: number of lobes.

Genotypes	Plant growth habit		Leaf shape		Leaf blade: No. of lobes	
	LWF	SWM	LWF	SWM	LWF	SWM
IC-262188	Short Viny	Short Viny	Orbicular	Orbicular	5 Lobes	5 Lobes
IC-262231	Short Viny	Short Viny	Reniform	Reniform	5 Lobes	5 Lobes
IC-262245	Med. Viny	Short Viny	Orbicular	Orbicular	5 Lobes	5 Lobes
IC-262265	Short Viny	Short Viny	Orbicular	Orbicular	3 Lobes	3 Lobes
IC-262258	Short Viny	Short Viny	Reniform	Reniform	>5 Lobes	>5 Lobes
IC-264830	Short Viny	Short Viny	Reniform	Reniform	5 Lobes	5 Lobes
IC-264908	Short Viny	Short Viny	Orbicular	Orbicular	5 Lobes	5 Lobes
IC-264971	Med. Viny	Med. Viny	Reniform	Reniform	5 Lobes	5 Lobes
IC-265026	Med. Viny	Short Viny	Orbicular	Orbicular	5 Lobes	5 Lobes
IC-278358	Med. Viny	Short Viny	Orbicular	Orbicular	3 Lobes	3 Lobes
IC-279691	Short Viny	Med. Viny	Orbicular	Orbicular	5 Lobes	5 Lobes
IC-341099	Short Viny	Short Viny	Orbicular	Orbicular	5 Lobes	5 Lobes
IC-341110	Med. Viny	Short Viny	Orbicular	Orbicular	5 Lobes	5 Lobes
IC-341116	Short Viny	Med. Viny	Orbicular	Orbicular	5 Lobes	5 Lobes
IC-341122	Med. Viny	Med. Viny	Orbicular	Orbicular	5 Lobes	5 Lobes
IC-341161	Short Viny	Short Viny	Orbicular	Orbicular	5 Lobes	5 Lobes
IC-345576	Short Viny	Med. Viny	Orbicular	Orbicular	5 Lobes	5 Lobes
IC-355952	Med. Viny	Short Viny	Orbicular	Orbicular	5 Lobes	5 Lobes
IC-355959	Short Viny	Short Viny	Orbicular	Orbicular	5 Lobes	5 Lobes
IC-355961	Short Viny	Short Viny	Orbicular	Orbicular	5 Lobes	5 Lobes
IC-355967	Med. Viny	Short Viny	Orbicular	Orbicular	5 Lobes	5 Lobes
IC-355974	Med. Viny	Short Viny	Reniform	Reniform	5 Lobes	5 Lobes
IC-356037	Short Viny	Short Viny	Orbicular	Orbicular	>5 Lobes	>5 Lobes
IC-392531	Med. Viny	Short Viny	Orbicular	Orbicular	>5 Lobes	>5 Lobes
IC-392534	Med. Viny	Short Viny	Orbicular	Orbicular	5 Lobes	5 Lobes
IC-392535	Short Viny	Short Viny	Orbicular	Orbicular	>5 Lobes	>5 Lobes
IC-392538	Short Viny	Short Viny	Orbicular	Orbicular	>5 Lobes	>5 Lobes
IC-392544	Short Viny	Short Viny	Orbicular	Orbicular	>5 Lobes	>5 Lobes
IC-392555	Med. Viny	Med. Viny	Reniform	Reniform	5 Lobes	5 Lobes
IC-393298	Med. Viny	Short Viny	Reniform	Reniform	5 Lobes	5 Lobes
IC-393305	Med. Viny	Short Viny	Orbicular	Orbicular	5 Lobes	5 Lobes
IC-429925	Short Viny	Short Viny	Orbicular	Orbicular	5 Lobes	5 Lobes
IC-429949	Med. Viny	Short Viny	Orbicular	Orbicular	5 Lobes	5 Lobes
IC-429965	Med. Viny	Short Viny	Orbicular	Orbicular	5 Lobes	5 Lobes
IC-429970	Med. Viny	Short Viny	Orbicular	Orbicular	5 Lobes	5 Lobes
DARL/SS/238	Med. Viny	Short Viny	Orbicular	Orbicular	5 Lobes	5 Lobes
DARL/SS/60	Med. Viny	Short Viny	Orbicular	Orbicular	5 Lobes	5 Lobes
Akola-01	Short Viny	Short Viny	Orbicular	Orbicular	5 Lobes	5 Lobes
Konkan Harita	Med. Viny	Short Viny	Orbicular	Orbicular	5 Lobes	5 Lobes
Pusa Nasdar	Med. Viny	Short Viny	Orbicular	Orbicular	>5 Lobes	>5 Lobes

Plant growth habit: Short Viny (<3.5m); Medium Viny (3.5 -5.5m); Long Viny (>5.5m); **Leaf shape:** Orbicular; Reniform; Ovate; **Leaf blade: Number of lobes:** 3 Lobes; 5 Lobes; >5 Lobes; **LWF:** Last week of February; **SWM:** Second week of March

harvesting stage *viz*., plant growth habit, leaf shape, leaf blade: number of lobes, leaf pubescence, stem shape, stem pubescence, flower colour, fruit shape, fruit skin colour, fruit shape of blossom end, fruit shape at peduncle end, fruit skin luster, fruit ridge (rib) shape, flesh texture and flesh colour. The method of estimation varied depending on the trait of interest, but it always involved either measuring or visually estimating the performance of a whole plot or plant parts. A single observer conducted all the assessments to ensure consistency and accuracy. The data on morphological characters were recorded as the Protection of Plant Varieties and Farmers' Rights

Table 2: Categorization of ridge gourd genotypes with respect to the leaf pubescence, stem shape and stem pubescence.

Genotypes	Leaf pubescence		Stem shape		Stem pubescence	
	LWF	SWM	LWF	SWM	LWF	SWM
IC-262188	Present	Present	Angular	Angular	Absent	Absent
IC-262231	Present	Present	Angular	Angular	Absent	Absent
IC-262245	Present	Present	Angular	Angular	Absent	Absent
IC-262265	Present	Present	Angular	Angular	Absent	Absent
IC-262258	Present	Present	Angular	Angular	Absent	Absent
IC-264830	Present	Present	Angular	Angular	Absent	Absent
IC-264908	Present	Present	Angular	Angular	Absent	Absent
IC-264971	Present	Present	Angular	Angular	Absent	Absent
IC-265026	Present	Present	Angular	Angular	Absent	Absent
IC-278358	Present	Present	Angular	Angular	Absent	Absent
IC-279691	Present	Present	Angular	Angular	Absent	Absent
IC-341099	Present	Present	Angular	Angular	Absent	Absent
IC-341110	Present	Present	Angular	Angular	Absent	Absent
IC-341116	Present	Present	Angular	Angular	Absent	Absent
IC-341122	Present	Present	Angular	Angular	Absent	Absent
IC-341161	Present	Present	Angular	Angular	Absent	Absent
IC-345576	Present	Present	Angular	Angular	Absent	Absent
IC-355952	Present	Present	Angular	Angular	Absent	Absent
IC-355959	Present	Present	Angular	Angular	Absent	Absent
IC-355961	Present	Present	Angular	Angular	Absent	Absent
IC-355967	Present	Present	Angular	Angular	Absent	Absent
IC-355974	Present	Present	Angular	Angular	Absent	Absent
IC-356037	Present	Present	Angular	Angular	Absent	Absent
IC-392531	Present	Present	Angular	Angular	Absent	Absent
IC-392534	Present	Present	Angular	Angular	Absent	Absent
IC-392535	Present	Present	Angular	Angular	Absent	Absent
IC-392538	Present	Present	Angular	Angular	Absent	Absent
IC-392544	Present	Present	Angular	Angular	Absent	Absent
IC-392555	Present	Present	Angular	Angular	Absent	Absent
IC-393298	Present	Present	Angular	Angular	Absent	Absent
IC-393305	Present	Present	Angular	Angular	Absent	Absent
IC-429925	Present	Present	Angular	Angular	Absent	Absent
IC-429949	Present	Present	Angular	Angular	Absent	Absent
IC-429965	Present	Present	Angular	Angular	Absent	Absent
IC-429970	Present	Present	Angular	Angular	Absent	Absent
DARL/SS/238	Present	Present	Angular	Angular	Absent	Absent
DARL/SS/60	Present	Present	Angular	Angular	Absent	Absent
Akola-01	Present	Present	Angular	Angular	Absent	Absent
Konkan Harita	Present	Present	Angular	Angular	Absent	Absent
Pusa Nasdar	Present	Present	Angular	Angular	Absent	Absent

Leaf pubescence: Absent; Present; **Stem shape:** Rounded; Angular; **Stem pubescence:** Absent; Present;
LWF: Last week of February; **SWM:** Second week of March

Authority (PPV&FRA) shall decide for ridge gourd.

Result and Discussion

According to DUS characterization plant growth habit was categorized into three types *i.e.*, short viny (<3.5 m), medium viny (3.5 -5.5 m) and long viny (>5.5 m). In the last week of February, nineteen genotypes recorded short viny and twenty-one genotypes recorded medium viny. Similarly in the second week of March, only five genotypes indicated medium viny plant growth habit as against short viny in the remaining others. Leaf shape was categorized into three types *i.e.*, orbicular, reniform and ovate. Out of forty genotypes, thirty-three genotypes recorded orbicular leaf shape, whereas, seven genotypes

Table 3: Categorization of ridge gourd genotypes with respect to the flower colour, fruit shape and fruit skin colour.

Genotypes	Flower Colour		Fruit Shape		Fruit Skin Colour	
	LWF	SWM	LWF	SWM	LWF	SWM
IC-262188	L. Yellow	L. Yellow	Elongate	Elongate	Green	Green
IC-262231	L. Yellow	L. Yellow	Elliptical	Elliptical	Green	Green
IC-262245	L. Yellow	L. Yellow	Elliptical	Elliptical	D. Green	D. Green
IC-262265	L. Yellow	L. Yellow	Elongate	Elongate	Green	Green
IC-262258	L. Yellow	L. Yellow	Elliptical	Elliptical	Green	Green
IC-264830	L. Yellow	L. Yellow	Elliptical	Elliptical	Green	Green
IC-264908	L. Yellow	L. Yellow	Elliptical	Elliptical	Green	Green
IC-264971	L. Yellow	L. Yellow	Elliptical	Elliptical	D. Green	D. Green
IC-265026	L. Yellow	L. Yellow	Elongate	Elongate	Green	Green
IC-278358	L. Yellow	L. Yellow	Elongate	Elongate	Green	Green
IC-279691	L. Yellow	L. Yellow	Elliptical	Elliptical	Green	Green
IC-341099	L. Yellow	L. Yellow	Elongate	Elongate	Green	Green
IC-341110	L. Yellow	L. Yellow	Elongate	Elongate	Green	Green
IC-341116	L. Yellow	L. Yellow	Elongate	Elongate	L. Green	L. Green
IC-341122	L. Yellow	L. Yellow	Elliptical	Elliptical	Green	Green
IC-341161	L. Yellow	L. Yellow	Elongate	Elongate	Green	Green
IC-345576	L. Yellow	L. Yellow	Elongate	Elongate	Green	Green
IC-355952	L. Yellow	L. Yellow	Elongate	Elongate	Green	Green
IC-355959	L. Yellow	L. Yellow	Elliptical	Elliptical	Green	Green
IC-355961	L. Yellow	L. Yellow	Elongate	Elongate	Green	Green
IC-355967	L. Yellow	L. Yellow	Elongate	Elongate	Green	Green
IC-355974	L. Yellow	L. Yellow	Elongate	Elongate	Green	Green
IC-356037	L. Yellow	L. Yellow	Elongate	Elongate	Green	Green
IC-392531	L. Yellow	L. Yellow	Elongate	Elongate	Green	Green
IC-392534	L. Yellow	L. Yellow	Elongate	Elongate	Green	Green
IC-392535	L. Yellow	L. Yellow	Elongate	Elongate	Green	Green
IC-392538	L. Yellow	L. Yellow	Elliptical	Elliptical	Green	Green
IC-392544	L. Yellow	L. Yellow	Elliptical	Elliptical	Green	Green
IC-392555	L. Yellow	L. Yellow	Elongate	Elongate	Green	Green
IC-393298	L. Yellow	L. Yellow	Elongate	Elongate	Green	Green
IC-393305	L. Yellow	L. Yellow	Elongate	Elongate	Green	Green
IC-429925	L. Yellow	L. Yellow	Elongate	Elongate	Green	Green
IC-429949	L. Yellow	L. Yellow	Elongate	Elongate	Green	Green
IC-429965	L. Yellow	L. Yellow	Elongate	Elongate	Green	Green
IC-429970	L. Yellow	L. Yellow	Elliptical	Elliptical	Green	Green
DARL/SS/238	L. Yellow	L. Yellow	Elongate	Elongate	Green	Green
DARL/SS/60	L. Yellow	L. Yellow	Elliptical	Elliptical	Green	Green
Akola-01	L. Yellow	L. Yellow	Elongate	Elongate	Green	Green
Konkan Harita	L. Yellow	L. Yellow	Elongate	Elongate	Green	Green
Pusa Nasdar	L. Yellow	L. Yellow	Elongate	Elongate	Green	Green

Flower colour: White; Light Yellow; Yellow; **Fruit shape:** Oblong; Elongate; Elliptical; **Fruit skin colour:** Light Green; Green; Dark Green; **LWF:** Last week of February; **SWM:** Second week of March

recorded reniform leaf shape in the last week of February and the second week of March. On the basis of the leaf blade: number of lobes ridge gourd genotypes were categorized into three types *i.e.*, 3 Lobes, 5 Lobes and >5 Lobes. Among ridge gourd genotypes, twenty-nine genotypes recorded 5 lobes, two genotypes observed 3 lobes, while more than 5 lobes were observed in the seven genotypes in the last week of February and the second week of March, as shown in Table 1.

The data presented in Table 2 indicated that the ridge gourd genotypes were categorized on the basis of leaf pubescence as either present or absent. All the forty

Table 4: Categorization of ridge gourd genotypes with respect to the fruit shape of blossom and peduncle end and fruit skin luster.

Genotypes	Fruit shape of blossom end		Fruit shape at peduncle end		Fruit skin luster	
	LWF	SWM	LWF	SWM	LWF	SWM
IC-262188	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-262231	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-262245	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-262265	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-262258	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-264830	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-264908	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-264971	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-265026	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-278358	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-279691	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-341099	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-341110	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-341116	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-341122	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-341161	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-345576	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-355952	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-355959	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-355961	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-355967	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-355974	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-356037	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-392531	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-392534	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-392535	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-392538	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-392544	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-392555	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-393298	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-393305	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-429925	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-429949	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-429965	Rounded	Rounded	Rounded	Rounded	Matt	Matt
IC-429970	Rounded	Rounded	Rounded	Rounded	Matt	Matt
DARL/SS/238	Rounded	Rounded	Rounded	Rounded	Matt	Matt
DARL/SS/60	Rounded	Rounded	Rounded	Rounded	Matt	Matt
Akola-01	Rounded	Rounded	Rounded	Rounded	Matt	Matt
Konkan Harita	Rounded	Rounded	Rounded	Rounded	Matt	Matt
Pusa Nasdar	Rounded	Rounded	Rounded	Rounded	Matt	Matt

Fruit shape of blossom end and peduncle end: Rounded; Pointed; **Fruit skin luster:** Matt; Glossy;
LWF: Last week of February; **SWM:** Second week of March

genotypes noted presence of leaf pubescence in both the date of sowing. The ridge gourd genotypes grouped according to the stem shape *i.e.*, rounded and angular. Stem shape for all the forty genotypes was observed angular in the last week of February and the second week of March. The ridge gourd genotypes was classified on the basis of stem pubescence as either present or absent. Stem pubescence was recorded as absent, in the last week of February and the second week of March. The flower colour noticed in ridge gourd genotypes were categorized into three types *i.e.*, white, light yellow and yellow. All the forty genotypes were recorded as light

Table 5: Categorization of ridge gourd genotypes with respect to the fruit ridge (rib) shape, flesh texture and flesh colour.

Genotypes	Fruit ridge (rib) shape		Flesh texture		Flesh colour	
	LWF	SWM	LWF	SWM	LWF	SWM
IC-262188	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-262231	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-262245	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-262265	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-262258	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-264830	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-264908	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-264971	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-265026	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-278358	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-279691	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-341099	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-341110	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-341116	Deep	Deep	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-341122	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-341161	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-345576	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-355952	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-355959	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-355961	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-355967	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-355974	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-356037	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-392531	Deep	Deep	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-392534	Deep	Deep	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-392535	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-392538	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-392544	Deep	Deep	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-392555	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-393298	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-393305	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-429925	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-429949	Deep	Deep	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-429965	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
IC-429970	Deep	Deep	Soft/Spongy	Soft/Spongy	Cream	Cream
DARL/SS/238	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
DARL/SS/60	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
Akola-01	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
Konkan Harita	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream
Pusa Nasdar	Medium	Medium	Soft/Spongy	Soft/Spongy	Cream	Cream

Fruit ridge (rib) shape: Superficial; Medium; Deep; **Flesh texture:** Smooth; Soft/Spongy; Fibrous-Gelatinous; **Flesh colour:** White; Cream; **LWF:** Last week of February; **SWM:** Second week of March

yellow colour in the last week of February and the second week of March.

As shown in Table 3, the ridge gourd genotypes were categorized according to the fruit shape *i.e.*, oblong, elongate and elliptical. Out of forty genotypes, twenty-seven genotypes recorded elongate fruit shape, while elliptical fruit shape were recorded in thirteen genotypes in the last week of February and the second week of March. Based on the fruit skin colour, ridge gourd genotypes were classified into three types *i.e.*, light green, green and dark green. Out of forty genotypes, maximum thirty-seven genotypes recorded green-coloured fruit skin,

whereas, two genotypes recorded dark green-coloured fruit skin and light green colour was recorded in one genotype in the last week of February and the second week of March.

Table 4, indicated that the ridge gourd genotypes were classified based on the fruit shape of blossom end and peduncle end as either rounded or pointed. The fruit shape of blossom end and peduncle end was recorded for all the genotypes in the last week of February and the second week of March. The ridge gourd genotypes were classified on the basis of the fruit skin luster as either matt or glossy. All the forty genotypes recorded matt fruit skin luster in the last week of February and the second week of March. Based on the fruit ridge (rib) shape of ridge gourd genotypes were clustered into three types *i.e.*, superficial, medium and deep. Out of forty genotypes, maximum thirty-four genotypes recorded medium fruit ridge shape, whereas, deep fruit ridge shape were observed in six genotypes in both the date of sowing. The flesh texture of ridge gourd genotypes were categorized into three types *i.e.*, smooth, soft/spongy and fibrous/gelatinous. All the forty genotypes recorded soft/spongy flesh texture in the last week of February and the

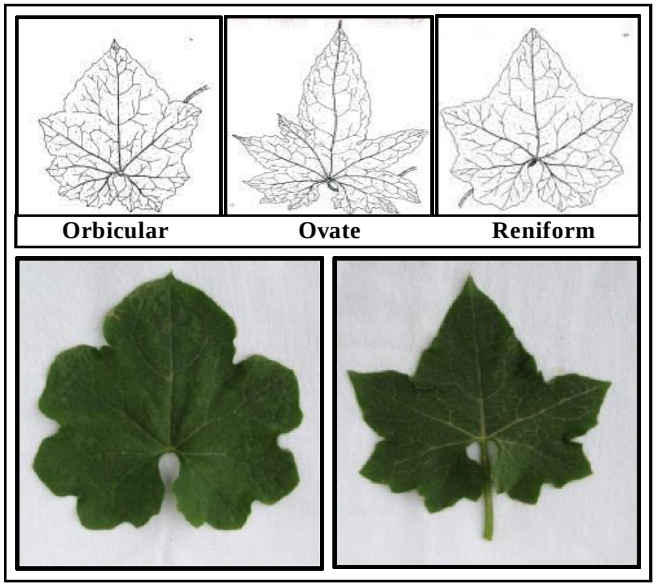

Fig. 1: Leaf Shape of ridge gourd.

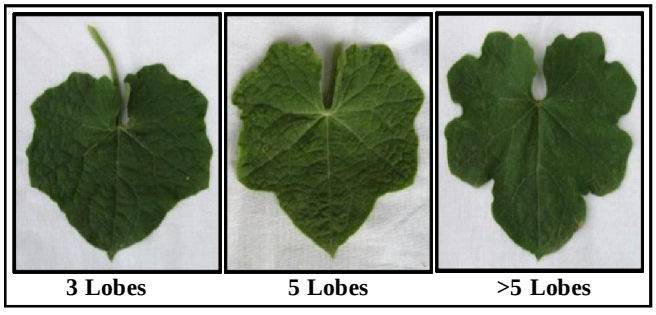

Fig. 2: Leaf blade: Number of lobes of ridge gourd.

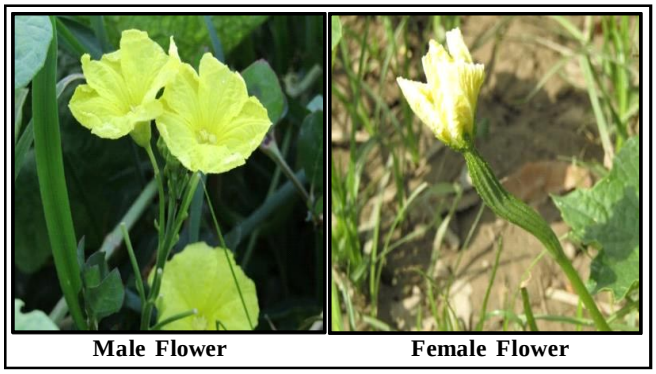

Fig. 3: Flower colour (Light yellow) of ridge gourd.

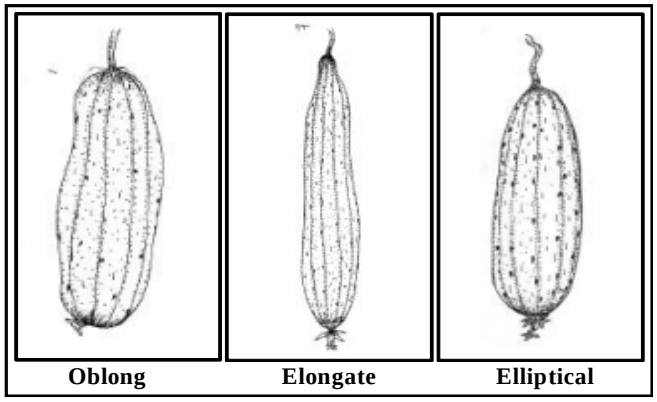

Fig. 4: Fruit shape of ridge gourd.

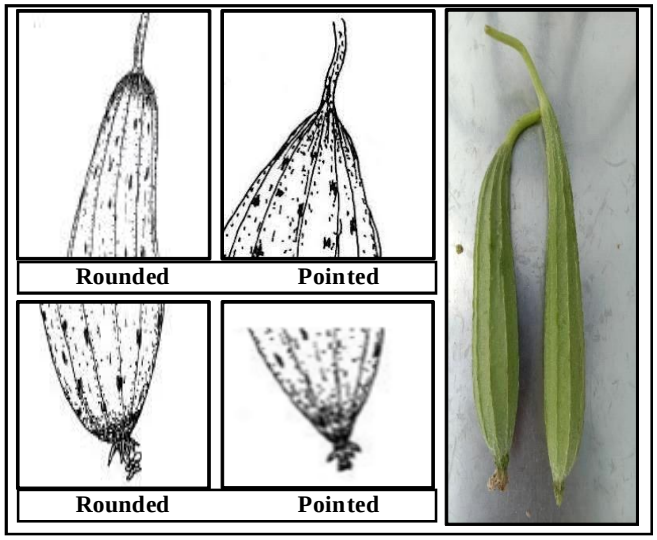

Fig. 5: Fruit shape of blossom end and peduncle end of ridge gourd.

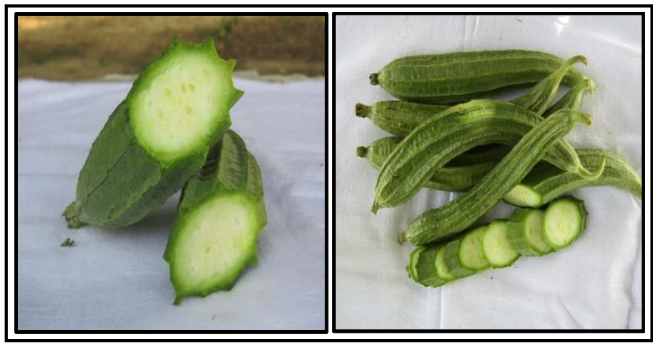

Fig. 6: Flesh colour (Cream) of ridge gourd.

second week of March, The ridge gourd genotypes classified based on the flesh colour were categorized into two types *i.e.*, white and cream. Cream flesh colour were observed in all the forty genotypes in the last week of February and the second week of March, as shown in Table 5. Aktar (2015) and Mavi *et al.*, (2021) in sponge gourd; Choudhary *et al.*, (2015) in muskmelon; Choudhary *et al.*, (2016) and Mashilo *et al.*, (2017) in watermelon; Morimoto *et al.*, (2005), Mladenovic *et al.*, (2012), Leo *et al.*, (2014), Kalyanrao *et al.*, (2016) and Sachin *et al.*, (2017) in bottle gourd; Jahan *et al.*, (2019) and Mitu *et al.*, (2018) in ridge gourd; Sekerci *et al.*, (2020) in pumpkin; Saputro *et al.*, (2020) in apple cucumber and Rahman *et al.*, (2021) in bitter gourd; they found that one or more of the morphological characters mentioned above exhibited similar variations in their respective genetic materials.

Conclusion

The results of the morphological analysis exhibited that the descriptor was sufficient to distinguish the genotypes. Some of the genotypes that were collected in this study showed high similarities in certain characters. These characters are not relevant for the main objectives of this research and can be considered as noise. Therefore, in future studies, these traits can be excluded from the analysis to reduce complexity and increase efficiency. The descriptor relied on subjective criteria that were not quantifiable. A better approach would be to use objective and measurable criteria to obtain more accurate results**.**

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