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GENETICS OF FLOWER COLOUR AND GLOSSINESS IN INDIAN MUSTARD (*BRASSICA JUNCEA* (COSS)

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ABSTRACT

Genetics of flower colour and glossiness of foliage was studied in the crosses involving four parents, RWH-1 (white flower); RC 1425 (glossy), and RH 30 and RH 7859 (nonglossy and yellow flowers). A segregation ratio of 3 nonglossy : 1 glossy in F_2 generations of different crosses indicated that glossiness is controlled by a single recessive gene. This was confirmed by studying the back-cross generations. Similarly in crosses of yellow and white flower parents a segregation ratio of 15 yellow : 1 white flower in F_2 generations, indicated that flower colour is controlled by two genes where white flower colour is double recessive. This was also confirmed by studying the back-cross generations.

Key words: Indian mustard, inheritance, flower colour, glossy stem.

It is known that some plant characters provide resistance against insect infestation. A study was undertaken to see the inheritance pattern of two such characters glossiness and white flour colour in Indian mustard. These have been reported to provide resistance against mustard aphid (*Lipaphis erysimi* Kalt.) [1–3]. The results of this study are presented here.

GLOSSINESS

The inheritance of glossiness was studied by crossing a glossy parent (RC 1425) and three nonglossy parents (RWH–1, RH 30 and RH 7859). Three crosses, viz. RH 30 x RC 1425; RH 7859 x RC 1425; RWH–1 x RC 1425, and their back-crossed progenies were obtained to study the segregating ratio in F_2 generations. All the parents along with their F_1s, back crosses with both the parents and F_2 progenies were raised to study the inheritance pattern. The F_1s indicated the dominance of nonglossy over glossy and this was also confirmed by the study of back-cross generation (when the recurrent parent is nonglossy). The genetic ratio of 3 nonglossy : 1 glossy was obtained in F_2 generations of all the crosses studied (Table 1). The back-cross generation involving glossy parent as recurrent parent showed a ratio of 1 nonglossy : 1 glossy. From this study it was concluded that single recessive gene pair is

Table 1. Segregation for glossy foliage in Indian mustard

Cross/generation	Normal stem		Glossy stem		Ratio	χ^2	P
	O	E	O	E			
RH 30 x RC 1425							
F_1	All	—	0	—			
F_1 x RH 30	All	—	0	—			
F_1 x RC 1425	103	97.5	92	97.5	1:1	0.310	0.20–0.30
F_2	374	364.5	112	121.5	3:1	0.247	0.20–0.30
RH 7859 x RC 1425							
F_1	All	—	0	—			
F_1 x RH 7859	All	—	0	—			
F_1 x RC 1425	173	168.0	163	168.0	1:1	0.149	0.20–0.30
F_2	557	543.0	167	181.0	3:1	0.361	0.25–0.35
RWH–1 x RC 1425							
F_1	All	—	0	—			
F_1 x RWH–1	All	—	0	—			
F_1 x RC 1425	219	204.0	189	204.0	1:1	1.103	0.90–0.95
F_2	626	613.5	192	204.5	3:1	0.255	0.20–0.30

O—observed, E—expected.

responsible for the inheritance of glossy trait in Indian mustard. This confirms an earlier study [1]. However, Angadi et al. reported that glossy trait was controlled by a single dominant gene [2].

WHITE FLOWER COLOUR

To study the inheritance pattern of white flower colour, RWH–1 (white flowered) was crossed with RH–30 and RC 1425 (both yellow flowered). The data presented in Table 2 indicate that F_1 generations of both the crosses had yellow flower, suggesting that yellow colour is dominant over white flower colour. This is further confirmed by the study of back-cross generations where the recurrent parent had yellow flowers and all the progeny also produced yellow flowers. The segregation ratio in F_2 generation of both the crosses was 15 yellow : 1 white indicating that two gene pairs determine the inheritance of this trait. This was also confirmed by the study of back-cross generation of these crosses where white flowered parent was used as the recurrent parent and a ratio of 3 yellow : 1 white was

Table 2. Segregation for flower colour (yellow/white) in Indian mustard

Cross/generation	Yellow		White		Ratio	χ^2	P
	O	E	O	E			
RWH-1 x RC 1425							
F_1	All	—	0	—			
F_1 x RWH-1	226	231.75	83	77.25	3:1	0.143	0.20–0.30
F_1 x RC 1425	All	—	0	—			
F_2	756	766.87	62	51.13	15.1	0.154	0.20–0.30
RH 30 x RWH-1							
F_1	All	—	0	—			
F_1 x RH 30	All	—	0	—			
F_1 x RWH-1	230	243.75	95	81.25	3:1	0.727	0.30–0.50
F_2	725	735	59	49	15:1	0.136	0.20–0.30

Note. χ^2 value is 2.71 at 1% and 3.84 at 5%.

obtained. From this study it was concluded that white flower colour is controlled by two recessive genes as reported earlier [4].

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