

CHANGES IN SEED CHARACTERS WITH MATURITY IN GRAM

CICER AURIATINUM L.

D. M. HEGDE. G. RAGHUNATHA and H. NARAYAN SWAMY

University of Agricultural Sciences, Bangalore

The quality of the seed and its characters are affected by the stage of harvesting, particularly when it is to be used as vegetable green pulse. Several indices which have been used to determine the proper time to harvest include, the age of the pods (Woodruff, 1951) and the changes in physical and chemical properties of the seeds (Hoover, 1957; Hoover and Dennison, 1954 and 1953; Reghunatha *et al.*, 1973). The inadequacy of such information on gram led to the conduct of the present studies.

Materials and Methods

The investigation was carried out at the Agricultural College Farm, Dharwar, on the black soil during *rabi*, 1972 using gram variety 'Annigeri 1' in plots of 12 Sq m. The crop was taken up on the residual fertilizer and moisture left over after growing a maize fodder crop. About 1500 flowers were tagged immediately after they were completely open. The development of the flowers into pods was observed. Once the development reached a stage when the seeds could be separated from pericarp by hand, (18 days after flowering) the first stage of harvesting was fixed. About 100 pods were harvested at 1 - day interval and 11 such harvests were made. The changes in fresh and dry weight of seed; per cent seed shell - out from fresh and dry pods; moisture percentage in pods and seeds and crude protein, were studied with maturity stages, in duplicate lots. Correlations were worked out to study the relationship of maturity stage with these characters.

Results and Discussion

The results on the variation in the seed characters with maturity stages and the correlation coefficient values are presented in Table 1.

The fresh and dry weight of seed and per cent seed shell . out from fresh and dry pods increased gradually from 18 days after flowering to reach a peak at 28 days after flowering. Converse to the trend with these characters, the moisture percentage in pods and seeds and the crude protein showed a decreasing trend with advance of maturity from 18 days after flowering to reach their minimum values at 28 days after flowering.

The fresh weight of seed was 0.111 g at 18 days after flowering. This reached a peak of 0.245 g at 28 days after flowering with a rapid increase upto

23 days and then a gradual rise. Similar trend was observed with dry weight of seed which increased from 0.063 g to 0.164 g. The per cent seed shell - out from fresh pods increased from 63.8 to 77.0. The per cent seed shell - out from dry pods, however, maintained consistent increase in the value with maturity stages. The increase was from 63.2 per cent to 79.6 per cent.

The moisture percentage in both pods and seeds showed a gradual decrease. In pods the moisture content decreased from 74.4 per cent to 53.0 per cent. The seed moisture decrease from 77.1 per cent to 49.7 per cent. This indicated greater loss of moisture in the seed than in the whole pod.

Table 1
Variations in some characters with maturity stages in gram

Days from flowering	Fresh weight of seed g	% fresh seed-shell out	Dry weight of seed g	% dry seed shell out	Moisture % in pods	Moisture % in seeds	Crude protein % in seeds
18	0.111	63.8	0.063	63.2	74.4	77.1	23.18
19	0.144	67.9	0.086	70.2	72.3	67.3	23.20
20	0.163	76.5	0.099	71.4	72.2	65.1	22.90
21	0.162	76.4	0.099	73.7	71.3	64.1	22.72
22	0.169	74.1	0.103	74.6	66.4	64.1	27.40
23	0.205	76.5	0.126	76.1	61.3	62.7	22.41
24	0.213	76.1	0.136	68.1	60.8	56.4	21.86
25	0.217	75.9	0.138	78.5	59.9	56.4	21.86
26	0.222	75.3	0.142	78.8	58.5	56.4	21.70
27	0.243	77.4	0.162	79.4	53.8	50.2	21.52
28	0.245	77.0	0.164	79.6	53.0	49.7	21.13
Rate of change per day	0.013	1.32	0.010	1.64	-2.14	-2.74	-0.205
Correlation coefficient	**	**	**	**	**	**	**
	0.9754	0.7112	0.9819	0.9202	-0.9803	-0.9558	-0.9936

The crude protein per cent was found to decrease gradually from 23.18 to 21.13. Similar pattern of gradual reduction in crude protein with advance of maturity has been observed in many crops. Considering the quantum of reduction in crude protein, it was less than 1 per cent upto 23 days after flowering over that at 18 days after flowering. Further advance in maturity was associated with greater reductions in crude protein.

All the correlation coefficients were highly significant. The fresh and dry weight of seed; per cent seed shell - out from fresh and dry pods presented positive relationship with advance of maturity. The moisture per cent in pods and seeds and the crude protein expressed negative coefficients of correlation.

The changes in moisture percentage and per cent seed shell - out are in agreement with the results obtained by Hoover (1957) and Hoover and Dennison (1953) on southern peas, Singh and Gupta (1972) on soybean and Raghunatha *et al.* (1973) on cowpea. Ross and Pollock (1970) have observed that the seed development began after 18 days after flowering and increased rapidly in size and dry weight until maturity.

The seeds harvested at 23 days after flowering i. e. at 63 per cent moisture, contained 22.4 per cent crude protein which was more or less similar to that at 18 days (23.2 per cent). With delayed harvesting coupled with greater loss in moisture, it was noticed that there was considerable loss of protein in the seeds. Therefore it would be desirable to harvest the crop at 23 days after flowering, for utilizing the green seeds as vegetable. In cowpea it has been suggested to harvest the green pods at 60 per cent moisture for using as green vegetable or for canning (Raghunatha *et al.*, 1973).

Summary

Study was made on the changes in the seed characters of gram 'Annigeri - 1' with maturity stages. Daily harvests were made from pod formation upto 28 days after flowering. Among the various characters observed fresh and dry weight of seed and percent seed shell - out from fresh and dry pods increased with advance of maturity. Conversely, the moisture percentage in pods and seeds and the crude protein decreased with age of the pods. Based on these observations, it would be desirable to harvest the crop 23 days after flowering for utilising the green seeds as vegetable.

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സംഗ്രഹം

മുപ്പു കൂട്ടുന്നതിനനുസരിച്ച് 'ആനീജേരി-1' എന്ന ഇനം പയറിന്റെ കായ്കളാകുന്ന ഗുണവ്യത്യാസങ്ങൾ ബാഗ്റ്റർ കാർഷിക സർവ്വകലാശാലയിൽ പഠിക്കുകയുണ്ടായി. മുപ്പു കൂട്ടി വിളവെടുക്കുമ്പോൾ കായുടെ തൂക്കത്തിൽ വർദ്ധനവുണ്ടാകുന്നതായും എന്നാൽ ജലാംശവും മാംസ്യം ശവും കുറഞ്ഞുവരുന്നതായും കണ്ടു. പൂവുണ്ടായി 23 ദിവസം കഴിഞ്ഞു കായ് പഠിക്കുന്നതാണ് ഉത്തമമെന്നും തെളിഞ്ഞു.

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