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SEED DEVELOPMENT AND MATURATION STUDIES IN PIGEONPEA

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Pod and seed development and maturation studies to fix the harvestable maturity showed that the developing seeds were capable of germination from 21 days after anthesis. but maximum germination was recorded only on the 42nd day when the dry weight of seed attained the maximum and the moisture content was between 20 and 24 per cent. By this time, the accumulation of starch and protein was also completed. The matured pod at this stage could be identified by its brown colour and dry testa.

Maturity is the crucial and the most important factor determining the seed size and quality. According to Delouche (1973), seed maturation refers to the morphological, physiological, and functional changes that occur from the time of fertilization until the mature seed is ready for harvesting. Therefore, precise information on optimum stage of harvest based on physical and physiological indices will enable the seed producer to harvest the seed crop in time. For determining the correct stage of harvesting. it is essential to know the changes that occur during the development and maturation of seeds.

MATERIALS AND METHODS

A bulk crop was raised with pigeonpea cultivars viz., CO 5. CORG 5. UPAS 120 and CORG 11 adopting the recommended package of practices. At the time of anthesis, a large number of flowers were tagged with the details of date of flowering and the date on which the developing pods have to be picked. About 100 pods were collectd at seven days interval from the date of anthesis upto 42 days for recording the observations. The length of pod was measured from the base to the tip excluding the stalk and expressed in cm. Then, the seeds were separated from the pods. Immediately after extraction, the moisture content of the seed was determined. The dry weight of the husk and seed per pod, seed/husk ratio, germination potential, starch content and protein nitrogen were also determined.

RESULTS AND DISCUSSION

The pod length attained its maximum on the 28th day after anthesis in all the cultivars and showed a slight reduction thereafter. Maximum increase in length was between the 7th and the 14th day after anthesis (Table 1). These results are in conformity with those reported by Manohar and Sachan (1974) in peas and Savithri *et al.*, (1978) in mungbean.

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Table 1 : Seed development and maturation studies in pigeonpea cultivars

Cultivars	Days after anthesis											
	7	14	21	28	35	42	7	14	21	28	35	42
	Dry weight of seed/pod (mg)						Pod length (mm)					
CO 5	3	5	35	148	167	186	11	32	48	51	50	50
CORG 5	4	5	40	151	174	194	11	38	47	50	49	48
UPAS 120	4	7	50	130	150	162	13	34	46	48	44	43
CORG 11	5	8	62	165	179	200	14	33	49	51	50	50
	Husk weight/pod (mg)						Moisture (%)					
CO 5	8	21	77	106	88	76	80.3	68.0	56.5	40.0	33.5	22.2
CORG 5	9	23	77	123	106	81	82.1	70.2	60 0	38.5	30.0	24.0
UPAS 120	6	27	74	99	83	73	78.0	65.0	52.3	42.3	31.2	20 0
CORG 11	10	28	91	129	111	105	77 3	67.0	52.0	41.0	29 8	21.0
	Seed/Husk ratio*						Germination (%)					
CO 5	0.48	0.23	0.46	1.39	1.89	2.44	–	—	28	48	72	72
CORG 5	0.37	0.23	0.52	1.23	1.65	2.41	—	—	32	52	70	68
UPAS 120	0 67	0.24	0.68	1.32	1.81	2.21	—	–	30	50	65	75
CORG 11	0.52	0.29	0.68	1 29	1.61	1.94	—	–	31	52	65	73

*Statistical analysis was not done.

CD (P — 0.05)	Seed weight/pod	Husk weight/pod	Pod length	Moisture (%)	Germination (%)
Days after antnesis	3 4**	5.0**	4.0*	1.5**	2.0 **
Cultivars	2.8**	4.0**	NS	1.2**	NS
Days after anthesis X cultivars	6.8**	9.0**	NS	2.9**	NS

The husk weight reached the maximum on 28th day after anthesis (Table 1). The husk after reaching the maximum weight started loosing weight which may be ascribed to dessication and dehydration (McIlrath *et al.* (1963). But the dry weight of seed increased steadily and continuously till the end of the maturation period (Table 1). A continuous deposition of reserve food materials might have increased the dry weight of the seed (Madhava Rao and Rajeswar Rao 1975). Maximum increase in the dry weight was observed between 28th and 35th day of development and this is in conformity with the findings of Singh *et al.*, (1980) in pigeon pea. There were significant differences among the cultivars, for the weight of husk and seed per pod. Among the cultivars, CORG 11 was found to be superior in the accumulation of reserve food materials. The steady increase in seed/husk ratio revealed that the weight of husk was more than the weight of seed at initial stages of development and a reverse trend was observed during the latter stages of development and maturation of seed.

In the cultivars studied, the moisture content of seed which was maximum on the 7 th day after anthesis declined steadily with the development and maturation and reached the minimum between 20.0 and 24.0 per cent on the 42 nd day (Table 1). Loss of water is a characteristic feature of seed maturation and is due to dehydration (Mayer, 1973).

A Close perusal of the data on dry weight and moisture content of seed would reval that the increase in dry weight was the result of the accumulation of more dry matter. The increase in weight was perceptible inspite of steady reduction in moisture content. Similar results were reported by Harrington (1972) and Delouche (1973).

In all cultivars, the developing seed started germinating from 21 day after anthesis attaining the maximum on 42nd day (Table 1). Although the developing seeds were capable of germination, they reached maximum germination when they were physiologically matured and hence attained maximum dry weight (Delouche, 1973; Bishnoi, 1974; Manohar and Sachan 1974).

Rapid accumulation of starch was observed between 21 and 28 days after anthesis; thereafter a sharp decline was observed. The protein nitrogen which was high during early stages of development and maturation decreased gradually as the seeds mature (Figure 1). These results are in conformity with the findings of Singh *et al.*, (1980).

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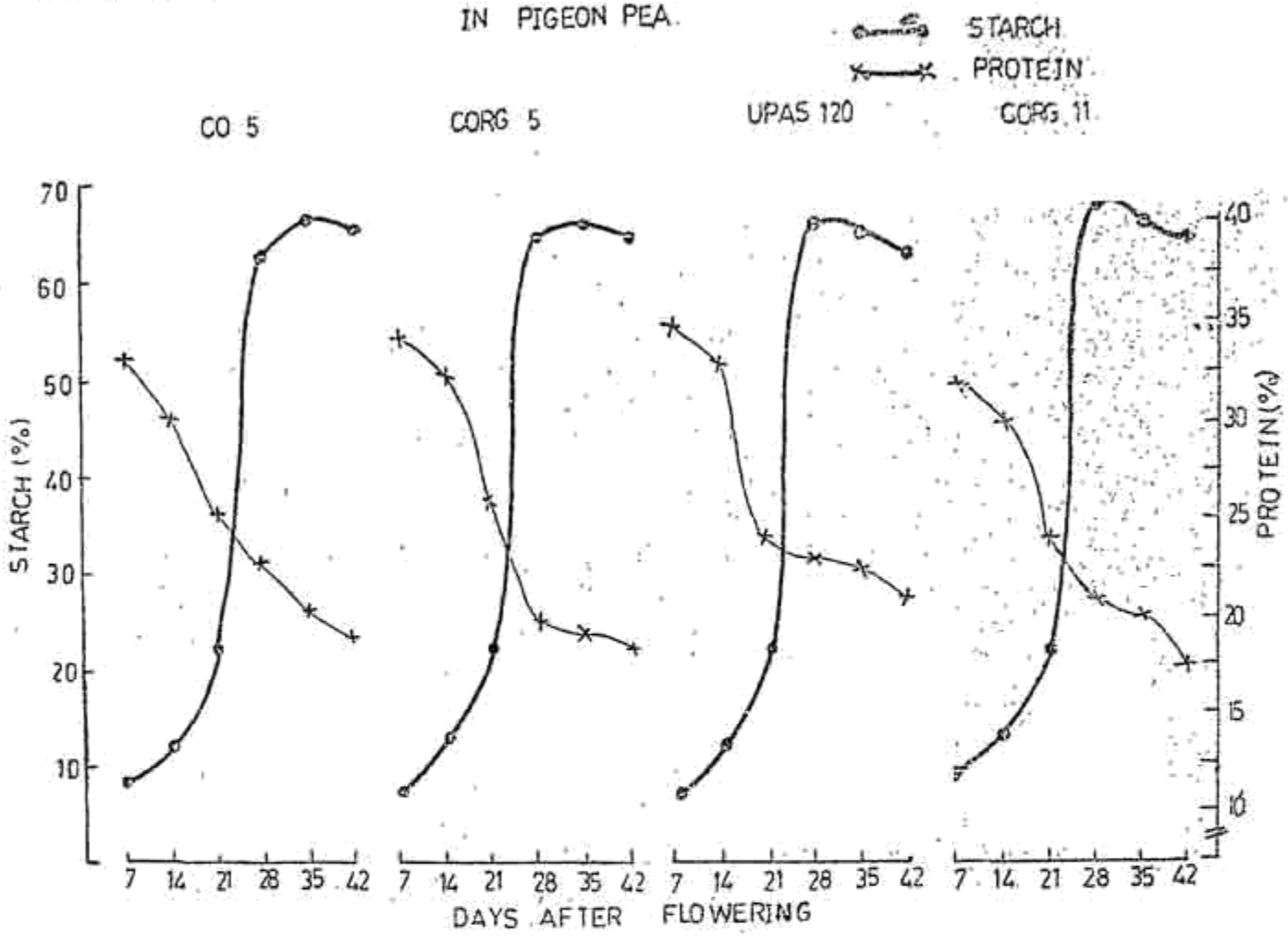
FIG.1. STARCH AND PROTEIN CONTENT AT DIFFERENT STAGES OF SEED DEVELOPMENT IN PIGEON PEA.



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