https://doi.org/10.29321/MAJ.10.A02160

Madras Agric. J. 74 (3) : 132—134 March, 1987

STUDIES ON SEED DEVELOPMENT AND MATURATION IN BAJRA

K. VANANGAMUDI*

In bajra, physiological maturity was attained 30-40 days after anthesis concomitant with higher seed weight, comparatively low moisture content, larger accumulation of proteinandand high viability vigour potentials

Seed quality is basically dependent on grain filling and on the metabolic or synthetic efficiency during seed development and its maturation. Seed maturation refers to the morphological, physiological and functional changes that occur from the time of fertilization until the matured ovules are ready to harvest. (Delouche, 1973).

In quality seed production, harvesting the seed crop when the majority of the seeds are at the optimum stage of seed maturity, is of considerable significance, since existence of differences in degree of differentiation and maturity of seeds in a seed lot will affect seed quality. Precise information on optimum stage of harvest based on physiological indices will enable the seed producers to advance harvest in the event of an impending adverse weather conditions, and thereby avoid severe field damage to the seed crop.

MATERIALS AND METHODS

Ten plants were selected at random from a KM 2 hybrid seed production plot raised during June, 1980. During anthesis, the earheads from the primary tillers of the seed parent were tagged indicating the date of anthesis. Then, the earheads were collected on 10th, 20th, 30th, 40th and 50th after anthesis and the seeds were separated for studying the following physical, physiological and biochemical characterstics viz, (i) moisture content of seed, (ii) dry weight of 1000 seeds, (iii) germination, (iv) root length, (v) shoot length, (vi) vigour index, (vii) dry matter production and (viii) protein content of seed.

RESULTS AND DISCUSSION

The moisture content of 10-and 20 day old seeds was 82.7 and 44.3 per cent, respectively as against 23.4 and 18.1 percent respectively of 30- and 40-day old seeds A steady and significant decline in moisture content of seed was observed during seed development and maturation phases Evidently, this was more steep during the early stages of development rather than at maturity phase, This is in conformity with the earlier findings of Kresting *et al.*, (1961) in sorghum. The 1000 seed

* Assistant Professor, Department of Seed Technology, TNAU, Coimbatore-3

Table 1 Seed development and maturation in bajra

	Days after anthesis					CD (P=0 05)
	10	20	30	40	50	
Moisture content of seed (%)	82.7	44.3	22.5	15.2	8.3	8.20
Dry weight of 1000 seeds (g)	0.98	2.50	6.12	6.30	6.24	1 21
Germination (%)	—	72	95	98	97	3.00
Root length (cm)	—	9 8	20.2	21.6	22.0	2.00
Shoot length (cm)	—	2.7	11.5	12.3	12.0	0.90
Vigour index	—	900	3012	3322	3298	352
Dry matter production (mg)	—	29	47	5[illegible]	51	3.00
Protein content (%)	2.0	6.5	10.0	10.8	10.8	0.70

weight of seeds collected on the 10th and 20 th day after anthesis was 0.98 and 2.50g, respectively; the respective 1000 seeds weight of seeds collected on the 30th, 40th and 50th day were6 12, 6.24 and 6.30g which, while being on par with one another, were superior to the valus recorded on 10th and 20th day. Kersting *et al*, (1961) and Delouche (1973) have employed the dry weight of seed as a measure of physiological maturity of seeds. A steep increase in the dry weight of seeds registered between 10 and 30 days after anthesis, marked the development phase, and beyond that the increase was gradual and non-significant which indicated the maturation phase. Madhava Rao and Rajeswara Rao (1975) reported in pigeon peas that a continuous deposition of reserve materials caused increase in seed dry weight throughout the developmant and maturation. In the present investigation, maximum dry weight was observed when the seed moisture content was about 15 per cent. Vanangamudi and Ramaswamy (1979) have reported similar results in cotton.

A critical study of germination of developing seeds revealed that seeds of 10 days maturity did not germinate; however on, 20th day about 72 per cent of seeds germinated. Purusothaman and Balasubramanian (1963) reported that immature seeds capable of germination As the seeds developed, they showed a garadual increase in germination capcity attaining a maximum of 98 per cent at maturity. Similar results were reported by Vanangamudi and Ramaswamy (1979) in cotton Although the maturing seeds were capable of germination, they reached the maximum vigour only when the seeds were physiologically mature (maximum dry weight). The analysis of the data on shoot and root length of seedlings,

vigour index and dry weight of seedlings recorded from seeds at varying periods of maturity established the superiorty of mature seeds harvested after 30 days of development and maturation over those harvested at earlier periods. In sugarcane, Lee and Loo (1958) reported the production of weak and vigorous seedlings from seeds collected at 15 and 30 days after pollination respectively Thus, the studies have amply demonstracted the importance of harvesting seeds at the optimum stage as well as the concomitant reduction in vigour due to early harvests. Te Maychíng (1973) reported reduction in seed vigour due to early harvests.

The protein content of 10 0 per cent recorded for the seeds collected from 40-days-old earheads was superior to all others. The minimum value of 2.0 per cent was registered with 20-day-old seeds. In barley, the seed protein reached their maximum values at 32 to 36 days after ear emergence (MacGreger, 1970). In the present study, this was observed between 30 and 40 days after anthesis.

REFERENCES

DELOUCHE, J C. 1973. Seed maturation. Seed production manual produced co-operativelY by N. S. C and the Rockfeller Foundation, pp. 162-165.

KERSTING, J. F., F. C. STICKLER and A. W. PAULI. 1961 Grain sorghum caryops s development. *Agron. J., 53* : 34.

LEE, S. and Y. S. LOO. 1958. Report of some experiments on the germination of true sugarcane seeds. *Rept Taiwen Sugar. Expt. Stat.*, 1958 No. 18. pp 1-13.

MACGREGOR, A. W D. 1970. Changes in barey, kernels during growth and maturationl Pap. No. 296, Board of grain commissio ners for Canada. Grain Res. Lab. Canada. pp.256-259'

MADHAVA RAO, K. V. and G. RAJESWARA RAO. 1975. Growth, respiration and Endo genous auxins of developing and germinating seeds of pigeon poe (*Cajanus indicus* Spreng). *Seed Res., 3* : 1-10.

PURUSHOTHAMAN, G. and K. M. BALASUBRAMANIAN. 1963 Germinability of immature rice grains. *Madras Agric. J., 50* (5) 203-205.

TEMAYCHING. 1973. Biochemical aspe:ts of seed vigour *Seed Sci. Technol., 1* : 73 : 88

VANANGAMUDI, K. and K. R. RAMASWAMY. 1979. Studies on boll and seed maturation in CBS 156 hybrid cotton and its parents *Cotton Dev.* : 9-15.