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THE PATTERN OF POD DEVELOPMENT IN GREENGRAM (*Vigna radiata* L. wilzcek)

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An experiment was carried out to understand the pattern of various growth events occurring during fruit development in *Vigna radiata* L. wilzcek. At first, the pod rapidly increased in length and then gradually enlarged in width. Fresh weight of pod increased up to tenth day from anthesis and then declined towards maturity. Fresh weight of seeds increased till seventeenth day from anthesis and started declining. Dry weight of pod as well as seeds increased in a sigmoidal pattern. Pod and seed moisture content decreased from anthesis to maturity. Altogether the flowers in greengram took 30 days to become mature pods.

In most of the crop species, the duration of grain filling is a powerful yield determinant (Evans, 1975). The increase in seed weight is almost linear over time in many crop plants. Evans and wardlaw, 1976). The final seed yield is the result of the rate and duration of effecting grain filling (Daynard *et al*, 1971). In legumes the seed growth is not uniform throughout the growth period (Mahon and Hobbs, 1983), instead seeds have distinct periods of rapid growth separated by lag periods of slower growth rate. Dure (1975) highlighted the lack of information regarding seed development and the need for studying the complexity of seed growth patterns. Growth events occuring during seed development appear to be controlled by the time of the neved from anthesis and not to any particular developmental stage of the seed (Heldley and Ambrose, 1980). Hence experiments towards understanding the pattern of growth events concerning seed development could provide better insight of the role of the different factors and such understanding may help to identify the possible constraints on seed yield. The present study was conducted as an attempt to assess the pattern of pod growth and to find out the period of effective grain filling in greengram (*Vigna radiata* L. Wilzcek), a high quality protein source in Asian diet.

MATERIALS AND METHODS

A popular high yielding greengram variety, Co 4 was selected for the study. The crop was raised in an experimental field by providing 30 cm x 10 cm spacing during monsoon. Recommended cultural practices were adopted throughout the crop growth. Sufficien tnumber of flowers were marked on the same day by tieing the flower pedicels with ewel tags just at the time of anthesist Samples were taken (20 pods per samp-

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ling date) from the tagged flowers at fixed intervals. Observations such as length and width of pod, fresh weight, dry weight and moisture content of pod and seeds per pod were made individually. The mean values of the 20 pods were considered in assessing the growth pattern of the characters.

RESULTS AND DISCUSSION

Growth of pod followed a definite course of several phased events. At the beginning the pod growth is rather slow. In about 24 hrs from anthesis the ovary became green and elongated to get itself distinguished as an young pod. At this stage, pod measured about 1 to 2 cm in length and 2 mm. in width. The slow rate of pod growth in the initial stages of development in greengram was in agreement with similar findings in certain other legumes (Shibles *et al.*, 1975). From the beginning the seed number per pod remained unchanged until maturity without any failure of seed development Thus in greengram the seed number per pod seemed well defined from the beginning and this character appeared genetically determined.

Fresh weight

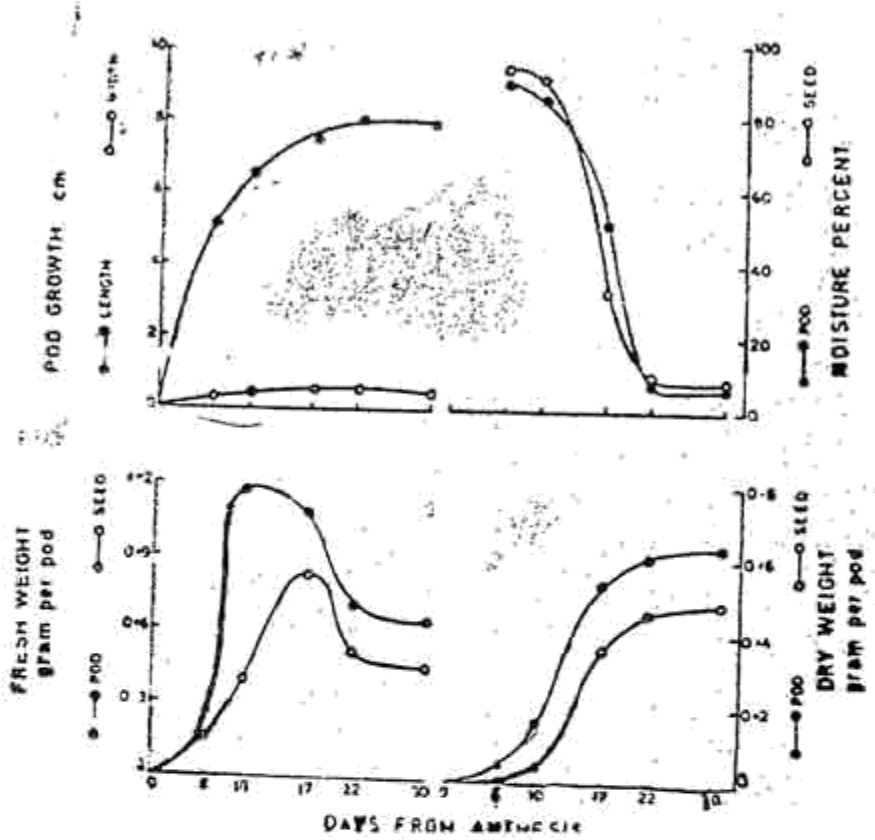
Beginning on the second day, pod and seeds started gaining fresh weight rapidly. Pod reached its maximum fresh weight (1.149 g) around tenth day from anthesis, whereas seeds per pod attained their maximum fresh weight (0.819 g) about seventeenth day. Fresh weight of pod and seeds declined towards maturity due to drying out of moisture. Similar bell shaped growth of pod and seeds were reported in groundnut (Schenk. 1961.)

Dry weight

Pod and seed growth with respect to dry weight followed a sigmoidal trend. Up to sixth day from anthesis the dry weight of pod increased slowly. From sixth to 22nd day there was a rapid increase in pod dry weight. During this sixteen day duration alone about 89.0 per cent of final dry weight of pod was deposited in greengram. Similarly up to tenth day from anthesis seeds increased in dry weight very slowly. Between tenth and 22nd day seeds gained major bulk (87.0 per cent of final seed weight)of seed dry weight. Sigmoidal trend of pod and seed growth in greengram appeared to be in contrast to earlier reports in legumes of diauxic and linear trend of seed growth (Carr and Skene, 1961; Flinn 1974; Eeuwans and Schwabe, 1975).

Based on dry matter growth the seed development in greengram can be divided in to the three distinct phases. First phase beginning from anthesis up to tenth day was marked by a slow increase in weight. From tenth to 22nd day was the second phase during which period there was a rapid accumulation of dry weight and this period can be said as the effective period of grain filling in greengram. From 22nd day to maturation

PROGRESSIVE GROWTH PATTERNS DURING POD DEVELOPMENT IN GREENGRAM-VAR. Co.4



was again another phase of growth with slow rate of dry weight increase. Thus greengram takes 30 days from anthesis to seed maturity. During the twelve days of effective grain filling alone nearly 70.0 percent of seed yield is translocated from source to sink in greengram (Kuo *et al.*, 1978).

Moisture content

Moisture content of pod and seed showed a declining trend right from the beginning. The decline however, was not uniform. Up to tenth day from anthesis the moisture loss in pod and seed was slow. Between tenth and 22nd day the moisture level decreased rapidly in pod as well as seed. During this twelve days period the moisture content had fallen from 85-90 per cent to as low as 8-10 per cent. Milthorpe and Moorby (1979) lend support to the above fact by attributing the loss of moisture during development to replacement of osmotic materials by starch and other large molecules with a low hydration capacity.

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