热带有限型和无限型结荚习性大豆不同生育阶段的表现*

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摘 要

本文以10个有限型和10个无限型(或亚有限型)栽培大豆品种为材料,参照 Fehr 和 Caviness(1977)的方法,记载了印度 Pantnegar 地区大豆的各个生育阶段。结果表明:在营养生长期间,从一个生长阶段到另一个生长阶段的间隔天数在 V_5 前是 3.5 天,在 V_5 后是 3.0 天。不同生长习性的大豆之间没有差别。开花后,有限型品种只继续生长1～2节,有的甚至停止生长;而无限型品种则继续性伸长数节。有限型品种的 R_1 和 R_2 同时出现,无限型品种的这两个阶段之间则有足够的间隔时期。总的讲,有限型品种的开花和成熟都比无限型品种早。

VARIOUS GROWTH PHASES IN DETERMINATE VS. INDETERMINATE SOYBEANS IN THE TROPICS

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Soybean cultivars differ in growth habit like determinate (dt_1), semideterminate (Dt_2) or indeterminate (Dt_1). (Bernard, 1972). Bernard (1972) also reported that determinate cultivars have predominated in Japan, Korea and Southern USA, whereas indeterminate soybean cultivars have been growh in northeast China and Northern USA. Practically no work has been done in the

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tropical situation to characterise the deteminate and indeterminate soybean in terms of stages of plant development. Therefore, an experiment involving 10 determinate and 10 semi/indeterminate soybaen cultivars was undertaken.

Materials and Methods

The study was conducted at pantnagar, India during rainy season of 1989. Twenty (10 determinate and semi/indeterminate) popular cultivars of soybean were eveluated in a randomized block design with 4 replications. Individual plot consisted of 3 rows 4 m long spaced 60 cm apart. Continuous observations were taken on five randomly selected competitive plants from a plot and average value was used. Growth stages were recorded as per procedure of Fehr and Caviness (1977).

Results and Discussion

Growth was much more rapid and shorter period intervened for development of some phases in determinate cultivars than indeterminate ones. Similar result was observed by Feuerowska (1981).

The absolute days required to attain V_1 and V_2 stages were 14. 41 days and 18. 14 days (average) in determinate cultivars whereas it was 12. 90 days and 17. 05 days (average) for indeterminate cultivars. The earliest cultivars was Bragg (13. 00 days) among determinate cultivars and Ankur (11. 33 days) among indeterminate cultivars. Whereas PK—472 (15. 50 days) and T—49 (15. 10 days) took longest time to attain the V_1 stage in the respective determinate and indeterminate cultivars.

There was on difference between determinate and indeterminate cultivars in respect of days taken from one vegetative stage to another. The time interval between all the vegetative stages was 3. 5 (average) before V_5 and 3. 0 after V_5 and the range was 2 to 5 days. According to Fenr and Caviness (1977) time interval between stages before V_5 was 5 days and after V_5 was 3 days (average). The determinate cultivars extended their growth after flowering by 1 or 2 nodes, sometimes no growth at all, whereas in indeterminate cultivars growth continued upto several nodes after flowering started (Table 1).

The total average absolute days needed to attain R_1 and R_2 stages were 58. 58 days and 58. 98 days for determinate cultivars. In contrast, 63. 62 days and 66. 11 days were needed for indeterminate cultrvars. The cultivar Bragg (53. 08 days) and Pusa～20 (51. 14 days) flowered earlier among determinate and indeterminate cultivars respectively. The cultivars PK — 472 (determinate) and T—49 (indeterminate) took maximum days i. e. 66. 50 days and 81. 00 days respectively to flowering (R_1 stage). The average days to flowering in case of determinate vari-

eties was 58. 60 days and in indeterminate in was 63. 62 days.

Table 1 Meau umnber of days required for a plant to develop from one vegetative stage/one reproductive stage to amother of 10 determiuate and 10 indeterminate soybean caltivars

Growth type	V_1-V_2 R_1-R_2	V_2-V_3 R_3-R_4	V_3-V_4 R_3-R_4	V_4-V_5 R_4-R_5	V_5-V_6 R_5-R_6	- R_6-R_7	- R_7-R_8	Vegetative node on Which flewering starts in average	Tatal nodes on main stem in average
Determinate	3. 57(days) 0. 42(days)	4. 3 13. 09	3. 2 9. 78	2. 9 6. 19	2. 9 6. 43	— 23. 44	— 9. 52	13. 82	15. 32
Indeterminate	4. 2(days) 2. 68(days)	4. 3 13. 05	3. 2 9. 66	3. 0 8. 25	2. 8 8. 15	- 19. 88	- 8. 93	12. 83	17. 24

The number of days taken between R_1 and R_2 was 0. 4 to 0. 75 in determinate cultivars in contrast to 1. 4 to 3. 75 in indeterminate cultivars (Table 1). We observed more or less similar results as Fehr and Caviness (1977) did regarding days required for a soybean plant to develop from one stage to the next except days taken to develop from R_5 to R_6. In the present investigations in was 6. 43 (determinate cultivars) and 8. 15 (indeterminate cultivars) while Fehr and Caviness (1977) reported that days required to develop from R_5 to R_6 averaged 15 days.

The discrepencies can be explained due to fact that Fehr and Caviness's data were from studies conducted in the cooler United States as soybean development is influenced by temperature, day length, variety and other factors.

To attain the R_8, i. e. , maturity, cultivar Shilajeet was the earliest maturing cultivar (116. 89 days) whereas the PK—472 was the most delayed one (131. 77 days) in case of determinate cultivars. But in case of indeterminate cultivars the JS—81—16—25 was the earliest (126. 54 days) whereas the variety T—49 took the highest number of days to mature (145. 08 days). The average duration of maturity was 127. 35 for the (days) indeterminates as compared to 134. 02 days for the indeterminates.

Conclusions

The evaluation of 10 determinate and 10 semi/indeterminate soybean cultivars indicated that the days taken from one vegetative stage to another was 3. 5 before V_5 and 3. 0 after V_5, and this was same irrespective of growth habits. The determinate varieties extended only 1 or 2 nodes and sometimes no growth at all whereas in indeterminate cultivars growth continued to extend several nodes after flowering started. The R_1 and R_2 stages occured simultaneously in determinate cultivars in contrast to indeterminate cultivars where sufficient time gap was present between these stages. In general, determinate soybeans were earlier to flowering and maturity than indeterminate ones.

参考文献略