Possibility of Growing Cauliflower In The Plains of Southern Kerala

Shruthy, O. N.

ABSTRACT

Significant differences were observed among the sowing dates for incidence of physiological disorders and November 1st sowing recorded the least. Least incidence of physiological disorders like riceyness, leafiness, hairiness and buttoning was observed for NS 60N, G 45, Himpriya 60 Himshort and Pusa Meghna. Least incidence of important biotic stress factors like leaf caterpillar (*Spodoptera litura*), *Alternaria* blight (*Alternaria brassicae*), soft rot (*Pythium* sp.) and *Choanephora* rot (*Choanephora* sp.). was observed in November 1st sowing. Among the varieties low incidence of these pests and diseases were noticed in NS 60N, Himpriya 60, G 45 and Himshort. It was also noticed that the crop gave better yield when the minimum and maximum temperature during curd initiation stage was 20.8°C and 30.6°C respectively which coincided with the November 1st sowing.

Keywords: Physiological disorder, buttoning, riceyness, leafiness, hairiness

Introduction

Cauliflower **(***Brassica oleracea* L. var. *botrytis*) is one of the most important vegetable crops of India which is thermosensitive and requires cooler climate for its cultivation. Weather especially temperature plays a crucial role in curd initiation and maturation of cauliflower. Until recently, cultivation of cauliflower was possible only in the hill tracts of Idukki and Wynad districts. Of late, with the advent of tropical cauliflower varieties, cultivation is made possible in plains of Kerala also. So many problems like incidence of physiological disorders, pests, diseases were associated with the cultivation of this crop in non traditional areas. A study on these biotic and abiotic factors which limits cauliflower cultivation in plains of southern Kerala will help to identify and tackle them.

Materials and Methods

A field experiment was carried out at the Department of Olericulture, College of Agriculture, Vellayani (8° 5' N latitude and 77° 1' E longitude) during the period October 2012 to March 2013 to identify tropical cauliflower varieties suitable for plains of southern Kerala and to study the influence of date of sowing and their interaction effects on yield and quality of cauliflower. The experimental site was located at an altitude of 29 m above mean sea level and the area enjoys a warm humid tropical climate. The experiment was laid out in split plot design with four sowing dates i.e. 1st October (D1), 15th October (D2), 1st November (D3) and 15th November (D4) on main plot and 12 varieties on subplots. One month old seedlings were transplanted into the main field at a spacing of 60 x 60 cm. All cultural operations like weeding, fertilizer application, irrigation, earthing up, spraying of pesticides etc. were done equally in all the plots as required.

Physiological disorders like riceyness, hairiness, leafiness, buttoning, pest like leaf caterpillar (*Spodoptera litura*) and diseases like *Alternaria* blight (*Alternaria brassicae*), soft rot (*Pythium* sp.), *Choanephora* rot (*Choanephora* sp.) and curd rot (*Alternaria brassicae*) were observed during the crop period. Number of plants showing physiological disorders, incidence of pests and diseases were recorded and percentage worked out using the formula.

$$\text{Percentage incidence} = \frac{\text{Number of plants affected}}{\text{Total number of plants}} * 100$$

Weather parameters like maximum and minimum temperature (°C), rainfall (mm) and relative humidity (%) were also recorded during the course of investigation.

Result and Discussion

In this study, November 1st sowing recorded least incidence of these physiological disorders. Significant environment interactions on incidence of physiological disorders were earlier reported by Rashid *et al.* (1990), Sharma *et al.* (2001) and Sharma and Behera (2003).

Cauliflower varieties also exhibit variation in their response to fluctuation in temperature especially during curd initiation and development phases leading to several physiological disorders like riceyness, buttoning and leafiness. Least incidence of riceyness, leafiness, hairiness and buttoning was observed for NS 60N, G 45, Himpriya 60 Himshort and Pusa Meghna whereas high incidence was noticed for mid season varieties like Pusa Paushja, Pusa Sharad and Pusa Hybrid 2. Similar variation

between varieties for incidence of physiological disorders at high temperature was reported by Gopalakrishnan (2004), Kumar *et al.* (2009) and Susheela and Rangaswamy (2011).

Interaction effects varied significantly and incidence of riceyness, hairiness, leafiness and buttoning was lowest in November 1st sowing of NS 60N, G 45 and Pusa Meghna. Low incidence of these disorders were observed in October 1st sowing of Pusa Hybrid 2 also, but in the latter seasons it exhibited disorders like buttoning, leafiness and hairiness.

Temperature, rainfall and relative humidity are the critical climatic factors that have profound effect on incidence of pests and diseases. The above condition influences the activity and seasonal population dynamics of insects (Huffaker *et al*., 1999; Huey and Berrigan, 2001; Roy *et al.* 2002) and it provides a congenial condition for fungal pathogens causing diseases. Similar situation was experienced in the present study also.

During the course of the study, the important biotic stress factors noticed were leaf caterpillar (*Spodoptera litura*), *Alternaria* blight (*Alternaria brassicae*), soft rot (*Pythium* sp.) and *Choanephora* rot (*Choanephora* sp.). Least incidence was observed in November 1st sowing, since the active vegetative period and curding time coincides with low temperature, rainfall and relative humidity. No significant difference among sowing dates was observed for the incidence of curd rot (*Alternaria brassicae*).

High incidence of pests and diseases like leaf caterpillar, *Alternaria* leaf blight, *Choanephora* rot, soft rot and curd rot were observed for certain treatments during the period. Among the varieties low incidence of these pests and diseases were noticed in NS 60N, Himpriya 60, G 45 and Himshort. Various workers have reported incidence of the above pests and diseases in cauliflower i.e., leaf caterpillar (*Spodoptera litura*) by Monobrullah *et al*. (2007) and Chand and Tripathi, (2008); leaf blight and curd rot caused by *Alternaria brassicae* by Pandey *et al.* (2002), Kohl *et al*. (2010) and Deep and Sharma (2012); *Choanephora* rot caused by *Choanephora* sp. By Pavgi (1970) and Siddiqui (1974) and soft rot caused by *Pythium aphanidermatum* by Sharma and Sain (2005).

Low incidence of leaf caterpillar, *Alternaria* blight, *Choanephora* rot, soft rot and curd rot were observed in November 1st sowing of NS 60N, G 45, Himpriya 60, White snow and Pusa Sharad.

In the present study, the crop gave better yield when the minimum and maximum temperature during curd initiation stage was 20.8°C and 30.6°C respectively which coincided with the November 1st sowing while low yield was experienced when the temperature was high as 24.3°C and 32.5°C respectively which coincided with the November 15th sowing. This result is in corroboration with the findings of Ajithkumar (2005) who reported that maximum, minimum and mean temperatures were negatively and significantly correlated with number of days during the curd induction phase and curd maturity phase.

Cauliflower varieties are very much sensitive to temperature and play an important role in vegetative, curding and reproductive phases of the plant (Premnath *et al.* 1996). In the present study, the performance of mid season varieties like Pusa Sharad, Pusa Hybrid 2, Pusa Paushja, Pusa Shukti and Indam 2435 were greatly affected by high temperature and rainfall. Susheela and Rangaswamy (2011) reported delayed curd formation of cauliflower varieties when mean maximum temperature and average temperature exceeded 33.5°C and 30.5°C respectively which was in line with the above findings.

REFERENCES

Ajithkumar, B. 2005. Response of cauliflower (*Brassica oleracea* var *botrytis*) to weather with varying irrigation schedules and testing of vegetable model for middle Gujarat Agro-climatic Zone. Phd thesis, Anand Agricultural University, 235p.

Chand, N. K. and Tripathi, A. K. 2008. Biology of *Spodoptera litura* (Fab) on different host plants. *Zoological Society of India* 7(2):57-61.

Deep, S. and Sharma, P. 2012. Host age as predisposing factor for incidence of black leaf spot of cauliflower caused by *Alternaria brassicae* and *Alternaria brassicicola*. *Indian Phytopath.* 65(1): 71-75.

Gopalakrishnan, T. R. 2004. *Three decades of vegetable research in Kerala Agricultural University*. Kerala Agricultural University, Thrissur, pp 130- 131.

Huey, R. B. and Berrigan, D. 2001. Temperature, demography, and ectotherm fitness. *Am. Nat.* 158: 204–210.

Huffaker, C., Berryman, A. and Turchin, P. 1999. Dynamics and regulation of insect populations. In: Huffaker, C. B.,

Gutierrez, A. P. (eds.). Ecological Entomology. Wiley, New York, pp. 269–305.

Kohl., J., Tongeren, M. V., Groenenboom, B. H., VanHoof, R. A., Driessen, R. and Heijden, V. D. 2010. Epidemiology of dark leaf spot caused by *Alternaria brassicicola* and *A. brassicae* in organic seed production of cauliflower. *Pl. Path.* 59(2): 358-367.

Kumar, S., Sharma, J. P., Rattan, P., Chopra, S. and Kumar, S. 2009. Evaluation of exotic introductions of cauliflower (*Brassica* oleracea var *botrytis*L.) for yield and quality traits. *Environ. and Ecol.* 27: 433-435.

Monobrullah, M., Bharti, P., Shankar, U., Gupta, R. K., Srivastava, K. and Ahmad, H. 2007. Seasonal incidence of *Spodoptera litura* on cauliflower and tomato. *Ann. Pl. Prot. Sci.* 15(1): 73-76.

Pandey, K. K., Pandey, P. K. and Singh, B. 2002. Slow blight response of early group of cauliflower (*Brassica oleracea* var. *botrytis* subvar. *cauliflora*) to alternaria blight (*Alternaria brassicae*) under artificial inoculation conditions. *Indian J. Agric. Sci.* 72(11): 682-684.

Pavgi, M. S. 1970. Singh leaf and blossom rot of cauliflower caused by*Choanephora cucurbitarum* INDIA.*Pl. Prot. Bull.* 18(3): 67-70.

Premnath, N., Sundhari, V. and Singh, D. P. 1996. *Vegetables for Tropical Region*. Publications and Information Division, Indian Council of Agric. Res., Pusa, New Delhi, pp. 150-157.

Rashid, M. A., Ahmed, S., Mondal, S. N. and Hossain, A. K. 1990. Effect of time of planting on the performance of some cauliflower varieties of Bangladesh. *J. Agri. Res*. 15: 38-41.

Roy, M., Brodeur, J. and Cloutier, C. 2002. Relationship between temperature and development rate of *Stethorus punctillum* (Coleoptera: Coccinellidae) and its prey *Tetranychus mcdanieli* (Acarina: Tetranychidae). *Environ. Ent.* 31: 177–187.

Sharma, P. and Sain, S. K. 2005. Use of biotic agents and abiotic compounds against damping off of cauliflower caused by *Pythium aphanidermatum*. Indian Phytopath. 58(4): 395-401.

Sharma, S. R. and Behera, T. K. 2003. Stability of yield and qualitative components in early Indian cauliflower (Group 1b). *Indian J. Hort.* 60(3): 268-272.

Sharma, S. R., Singh , R., Behera, T. K. and Chandra, A. 2001. Genotype × environment interactions and stability performance of medium early Indian cauliflower (Group II). *Ann. Agric. Res.* 22(3): 346-348.

Siddiqui, M. R., Nath, R., Majumdar, A., Gaur, A. and Singh, D. 1974. First record of *Choanephora cucurbitarum* (Berk. and Rev.) on cauliflower seed crop. *Seed Res.* 2: 41-45.

Susheela, P. and Rangaswami, M. V. 2011.Influence of temperature inside the greenhouse on growth attributes and yield of cauliflower. *Karnataka J. Agric. Sci.* 24 (5): 706-708.

Author

Shruthy, O. N.
Department of Olericulture, College of Agriculture, Vellayani, Trivandrum
Kerala Agricultural University