RESEARCH ARTICLE | International Journal of Plant Sciences, Vol. 4 Issue 1 : 248-249 (January to June, 2009)

Standardization of water culture technique for *Fusarium* wilt of safflower

ANJALI B. SHINDE AND B.V. HALLALE

Accepted : December, 2008

SUMMARY

Carthamus tinctorius (L.) Safflower suffers from several diseases, which the vascular wilt caused by *Fusarium oxysporium* f.sp. *carthami* Klisiewics and Houston is one of the important diseases of crop in Marathwada region of Maharashtra state causing enormous economic losses. Therefore, present study was undertaken to standardize the water culture technique against Fusarium wilt of safflower for screening large number of varieties. CF concentration of 3.5 per cent was observed as the optimum for screening of safflower germ plasma.

Key words : Fusarium wilt, Water culture, Safflower, *Carthamus tinctorius*.

Carthamus tinctorius L. is known as safflower or Kardi is an important oilseed crop belonging to family Asteraceae, a dicotyledonous plant growing worldwide. It contains 40 per cent edible oil which has high percentage of essential polysaturated fatty acid and lactic acid which help in reducing cholesterol in human blood. The potential yield of this crop is affected by a number of diseases, out of which Fusarium wilt caused by *Fusarium oxysporum* f. sp. *carthamus* Kli and Hou is one of the major diseases of crop in Marathwada region of Maharashtra state affecting the productivity and enormous economic losses. The disease was first reported by Klisiewicz and Houston (1962) from USA. In India it was reported by Singh *et al.* (1975) with severe losses. The disease shows more or less rapid wilting, browning, dropping and dying of leaves followed by death of whole plant. Wilting occurs as result of pathogen in xylem vesseles of the plant showing hypersentitive expression, drooping of leaves, if the infected plant has alive, the pathogen remains in the vascular region and the surrounding tissues of the plant (Pedgaonkar and Mayee, 1981).

MATERIALS AND METHODS

Fusarium oxysporum f. sp. *carthami* kli. and Hou, isolated from safflower var. Annagiri growing in the vicinity of Parbhani fields was used for standardization of water culture technique (WCT) as suggested by Nene *et al.* (1981) and tried with different concentration of culture filtrates (CF) or metabolites. Culture filtrate of the pathogen was obtained by growing the organism on potato dextrose broth medium for fifteen days. Different concentrations of CF *viz.* 1, 1.5, 2, 2.5, 3, 3.5, 4 and 5 percentage were prepared in culture tubes.

The seedlings of safflower var. Annagiri were raised on germination paper and fifteen days old seedlings were transplanted to each culture tube containing 10ml of CF of different concentrations after one week. The observations on linear necrosis, hypersensitive expression, drooping of leaves, intensity of vascular browning, root length and seedling mortality percentage were recorded.

RESULTS AND DISCUSSION

Water Culture Technique (WCT) was designed to know the optimum concentration of cultural filtrate for hypersensitive expressions, necrosis, drooping of leaves, seedling mortality in short period of time.

Therefore, experiment with different concentrations of CF (1, 1.5, 2, 2.5, 3, 3.5, 4 and 5 %). Zero per cent was used as control without CF. Testing of fifty seedlings at each concentration was done. Observations on mortality percentage, hypersensitivity expression, drooping of leaves, density of root hairs were made (Table 1).

From Table 1 it can be inferred that the Cultural Filtrate (CF) 3.5 per cent concentration could induce 100 per cent mortality in castor var. Annagiri seedlings with a weak hypersensitive reaction, necrosis at the collar region, brownish tissue with complete drooping of leaves. Therefore, CF concentration 3.5 per cent was treated as optimum concentration for screening large number of safflower varieties.

Observation was made in wilt of safflower at different growth stages right from infection in seedling stage (Fig. 1A). There was complete wilting (Fig. 1B) of the plant at the concentration of 3.5 per cent CF. Similar results were reported by Mehetre (1988) on the mortality of safflower genotype in which it was observed that wilt affected safflower plant at any stage from seedling to maturity.

Correspondence to:
ANJALI B. SHINDE, Department of Botany, Sharda College, PARBHANI (M.S.) INDIA
Authors' affiliations:
B.V. HALLALE, P.G. Department and Research Centre of Botany, D.S.M. College, PARBHANI (M.S.) INDIA