



SHORT COMMUNICATIONS

Variations for Red Rot Resistance in Somaclones of Sugarcane

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Sugarcane somaclones regenerated through leaf callus cultures of variety CoS 91279 showed wide variations for red rot resistance against four isolates of *Colletotrichum falcatum* Went. Out of 42 somaclones tested, only three viz. Soma 16, 27 and 37 were found moderately resistant by plug method of inoculation. Rest of the somaclones showed varying degrees of susceptibility. Most of the somaclones, though regenerated from toxin resistant calli, were found moderately to highly susceptible against the test pathogen. Two somacolnes viz. Soma 37 and 27 were found resistant by nodal method of inoculation.

KEY WORDS : Somaclones, red-rot, disease resistance, tissue culture

Red-rot, being one of the most serious diseases of sugarcane has wiped out numerous elite varieties in northern India in the past. The varietal failure due to this disease in Uttar Pradesh has been reviewed from time to time (Kirtikar *et al.*, 1972; Singh *et al.*, 1978; 1985). It has been observed that the resistance of a particular variety breaks down with the time due to the appearance of new virulent strains of the pathogen in nature (Kirtikar *et al.*, 1965). The maintenance of resistance against the ret-rot is usually done by the continuous flow of resistant varieties through breeding. Tissue culture techniques now have a supplementary role in the conventional breeding for improvement as well as resistance. Sugarcane subclones resistant to various diseases have been developed from susceptible donors through the induction of somaclonal variation (Sreenivasan and Jalaja, 1995). The present work was undertaken to study the red-rot behaviour in somaclones of sugarcane variety CoS 91269.

Callus cultures were established from young leaf explants of 10 months old plants of sugarcane variety CoS 91269 (moderately resistant to ret-rot) on Ms medium (Murashige and Skoog, 1962) containing 8.0 g/l agar, 20 g/l sucrose and 4.0 mg/l 2, 4-dichlorophenoxyacetic acid (2,4-D). Toxin resistant calli were developed by growing them in presence of culture filtrates of *Colletotrichum falcatum* Went, the causal

organism of red-rot disease. Numerous plantlets were regenerated from such calli by subculturing on shoot regeneration medium. After hardening for 3 week, the plantlets (somaclones) were planted in the field in R generation.

On maturity, 42 somaclones were randomly selected from R population and planted conventionally in R₁ generation alongwith appropriate standards. Plug and nodal methods of inoculation were followed for studying spores of four different isolates of the pathogen as well as their mixture. The results were scored on 0-9 scale (Srinivasan and Bhat, 1961).

The reactions of somaclones against four isolates of the ret rot pathogen by plug and nodal methods of inoculation are presented in Tables 1- 3. The data showed that, out of 42 somaclones screened, only three viz. Soma 16, 27 and 37 were found to be moderately resistant (MR) by the plug method. Rest of the somaclones showed varying degrees of susceptibility. Four somaclones were moderately susceptible (MS) and ten were susceptible (S). Maximum 25 somaclones were highly susceptible (HS) to ret rot (Table 1). None of the somaclones proved to be resistant by plug method of inoculation. Two somaclones namely Soma 27 and 37 were found resistant by nodal method while most of them were moderately susceptible (11) to susceptible (24) (Table 1).

Table - 1 : Reaction of somaclones against the mixture of four isolates of *C. falcatum* by plug and nodal methods of inoculation.

Methods Of Inoculation	Resistant (0 - 2.0)	Moderately resistant (2.1 - 4.0)	Moderately susceptible (4.1 - 6.0)	Susceptible (6.1 - 8.0)	Highly susceptible (above 8.0)	Total No. of somaclones screened
Plug Method	nil	Soma 16, 27, 37	Soma 12, 38, 49, 50	Soma 20, 21, 28, 34, 39, 41, 44, 48, 51, 52	Soma 11, 13, 14, 15, 17, 18, 19, 22, 23, 24, 25, 26, 29, 30, 31, 32, 33, 35, 36, 40, 42, 43, 45, 46, 47	
Total	-	3	4	10	25	42
Nodal Method	Soma 27, 37	Soma 12, 16, 38, 49, 50	Soma 17, 20, 21, 28, 34, 39, 41, 44, 48, 51, 52	Soma 11, 13, 14, 15, 18, 19, 22, 23, 24, 25, 26, 29, 30, 31, 32, 33, 35, 36, 40, 42, 43, 42, 46, 47	nil	
Total	2	5	11	24	-	42

A comparison of two promising somaclones namely Soma 27 and 37 with pathological (Co 312, Co 453) and agronomical (CoS 687, CoS 767) standards indicated that the somaclones were moderately resistant, according to 0-9 scale, against all the four isolates of pathogen tested individually by plug method. The data showed that the somaclones were better than the donor variety CoS 91269 in ret rot reactions against

all the strains tested except R 8605 (Table 2).

Data presented in Table 3 showed that Soma 37 and 27 fell into the category of resistant clones (score 1.6) as compared to all the standards if tested by nodal method of inoculation.

Recovery of high frequency of MS, S and HS somaclones regenerated even from toxin resistant callus suggested that the shift was towards suscepti-

Table - 2 : Screening against four different isolates of *C. falcatum* by plug method of inoculation.

Variety/Soma-clones	Score against the isolates				Reaction to red rot
	R 8411	R 8605	R 8701	R 8810	
Co 312	9.0	9.0	9.0	9.0	HS
Co 453	9.0	8.1	9.0	9.0	HS
CoS 687	3.2	3.4	7.6	6.8	S
CoS 767	3.5	3.9	3.6	3.5	MR
Soma 37	3.5	3.3	3.6	3.4	MR
Soma 27	4.0	3.7	3.6	3.6	MR
CoS 91269	3.7	3.2	4.0	3.8	MR

Table - 3 : Screening against the mixture of four isolates of *C. falcatum* by nodal method of inoculation.

Variety/Somaclones	Score	Reaction to red rot
Co 312	9.0	HS
Co 453	8.4	HS
CoS 687	6.2	S
CoS 767	3.7	MR
Soma 37	1.6	R
Soma 27	1.6	R
CoS 91269	2.8	MR

bility and the somaclonal variation for resistance may occur during differentiation. Wide variation in somaclones for red rot reaction possibly originated due to existence of high genetic complexity and chromosomal mosaicism in modern commercial sugarcane varieties (Sreenivasan and Jalaja, 1995; Jambhale et al., 1995).

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