A REVIEW International Journal of Agricultural Sciences, Vol. 5 Issue 1, January to May, 2009 : 327-333

Molecular mapping and marker assisted selection for trichome mediated insect resistance in tomato

G.M. SAJJANAR AND R.A. BALIKAI*
U.A.S. (D) Regional Agricultural Research Station, BIJAPUR (KARNATAKA) INDIA

ABSTRACT

Control of insect pests is an important factor in the productivity of cultivated crops. Applied breeding for quantitative traits like insect resistance is difficult. The availability of high density molecular linkage maps and QTL mapping technology permit the dissection of quantitative traits and thus making marker assisted selection feasible. A high level of resistance to number of insects has been found in the wild species of tomato. An association between insect resistance and the presence and density of glandular trichomes has been reported by several researchers. The primary components of exudates from glandular trichomes *viz.*, the acylsugars and 2-tridecanone secreted by type IV trichomes of *Lycopersicon pennellii* and type VI trichomes of *L. hirsutum*, respectively mediate the insect resistance. The genetics of these characters in tomato appears to be complex. This paper reviews on mapping and marker assisted introgression of QTLs associated with trichome densities, acylsugar accumulation and expression of 2-tridecanone mediated insect resistance. The development of tomato cultivars with the ability to synthesize sugar esters and increased 2-tridecanone content may substantially increase the level of insect resistance in cultivated tomato. Marker assisted breeding will enable introgression of multiple QTLs of inheritance of insect resistance in tomato *via* gene pyramiding.

Key words : Molecular mapping, Marker assisted selection, Insect resistance, Tomato

INTRODUCTION

Cultivated crops are attacked by large number of insect pests which damage plants and reduce yields. The use of resistant varieties can be regarded as the most efficient method of biological control considering adverse effects of use pesticides. In tomato, the damage caused by is substantial (Schwartz and Klassen, 1981) and result in a significant economic loss to market and processing tomato industry. To develop tomato cultivars with reduced susceptibility to insect pests, early studies identified *Lycopersicon pennellii* (Corr.) D'Arcy and *L. hirsutum f. glabratum*, wild relatives of the cultivated tomato as a source of resistance to several important pests (Table 1).

In common with many members of solanaceae the

Table 1 : Wild sources of resistance to different insect pests in tomato

Insects	References
Lycopersicon pennelli (Corr.) D'Arcy	
Potato aphid (*Macrosiphum euphorbiae*)	
Green peach aphid (*Myzus persicae*)	
Leaf minor (*Liriomyza trifolii*)	
Silver leaf white fly (*Bemisia argentifolii*)	(De Ponti *et al*.,1975; Gentile and Stoner, 1968; Gentile *et al*.,1969; Goffreda *et al*.,1989; Hawthorne *et al*.,1992; Liedl *et al*.,1995, Rodgriguez *et al*.,1993)
Tomato fruit worm (*Helicoverpa zea*)	
Beet army worm (*Spodoptera exiqua*)	
White fly (*Trialeurodes vaporariorum* West W.)	
Carmine spider mite (*Tetranichus cinnabarius*)	
Two spotted spider mite (*T. urticae* Koch.)	
L. hirsutum f glabratum	
Glass house white fly (*Trialeurodes vaporariorum* West W.)	
Army worm	
Heliothis armigera	
Helicoverpa sps	De Ponti *et al*.,1975; Juvick *et al.*,1982; Gentile *et al*.,1969; Kennedy and Sorenson 1985; Kenndy and Henderson, 1978; Fery and Curth bert, 1975; Dimock and Kennedy, 1983; Gentile and Stoner, 1968; Gentile *et al*.,1969; Webb *et al*.,1971; Schuster,1977)
Carmine spider mite (*Tetranichus cinnabarius*)	
Two spotted spider mite	
Colarado potato beetle	
Tobacco hornworm	
Tobacco flea beetle	
Vegetable leaf minor	
Tomato pin worm	

* Author for correspondence