Efficacy of chemical control against G*eotrichum candidum* Link ex fries on post-harvest M*anilkara achras M*ill.

P M Wagh[1] and U N Bhale

[1]Department of Botany, S.S. & L.S. Patkar College of Arts & Science, Goregaon (W), Mumbai- 400063.
Department of Botany, Arts, Science and Commerce College, Naldurg Dist. Osmanabad- 431602.
pradnyakiranwagh@gmail.com

ABSTRACT

Manilkara achras Mill.(Sapota) is an important edible fruit. In India sapota ranks fifth position in production and consumption next to mango, banana, citrus and grapes. During survey of post harvest fungal fruit rot diseases of sapota from various markets of Thane district of Maharashtra, it was found frequently infected by *Geotrichum candidum* causing sour rot of sapota. To reduce the postharvest sapota fruit losses, proper and immediate control of *Geotrichum candidum* is appreciated. In present paper three fungicides viz- Carbendazim (50% WP), Mancozeb (75% WP) and Captan (50% WP) were tested at different concentrations against *Geotrichum candidum* causative fungi on sapota for determination of their effects on the radial growth of causative fungi. The experiments were carried out under *in vitro* condition.There was large variation in sensitivity of these isolates. In case of Carbendazim sensitivity ranged from 2100µg/ml to 4000 µg/ml. In case of Mancozeb sensitivity ranged from 80 µg/ml to 300 µg /ml. But any effect was not found in case of Captan fungicide.

Key words: *Manilkara achras, Geotrichum candidum,* Carbendazim, Mancozeb, Captan

INTRODUCTION

Fruits are the essential requirement of human diet. The native values of healthy fruits are altered because of fungal attack and sometimes fungi produce certain mycotoxins in them and make them unsuitable for human consumption. Sapota is one of the important edible fruit plant. It is source of chuckle, the principle ingredient in chewing gum. It is native of Mexico. It has wide adaptability throughout India. During storage conditions sapota gets severly infected by *Geotrichum candidum* causing sour rot (Mickelbart, 1996).The present paper describes sensitivity of *Geotrichum candidum* against Carbendazim (50% WP), Mancozeb (75% WP) and Captan (50% WP). Carbendazim sprays have been found very useful against anthracnose of grapes, however fungus develops resistance when this systemic fungicide was used excessively (Thind et al., 1994). Benzimidazole fungicides (Benomyl, Carbendazim and Thiabendazole) have been found effective as fruit dip for control of postharvest decay of guava fruits (Arya *et al*, 1981; Bhargava and Singh, 1974; Gupta *et al*, 1973; Majumdar and Pathak, 1991 and 1997).

MATERIAS AND METHODS

Sensitivity test of isolates against Carbendazim (50% WP), Mancozeb (75% WP) and Captan (50% WP) was determined by food poisoning method (Dekker and Gielink, 1979). Czapek Dox Agar (CZA) plates were prepared containing different concentration (50- 5000 µg/ml) of fungicides. Mycelial mats (8mm disc) of the isolates were inoculated at the centre of plates in triplicates. The plates were then incubated at 27 ± 2^{o}C in dark or BOD incubator and radial growth was measured at different intervals.

RESULT AND DISCUSSION

Sensitivity test for 6 isolates of *Geotrichum candidum* was carried out against Captan, Carbendazim and Mancozeb. A MIC result in table 1 indicates that there was quite a large variation in the sensitivity among isolates of *Geotrichum candidum.* In case of Carbendazim some isolates were sensitive and others were resistant. It ranged from 2100µg/ml to 4000 µg/ml. Isolate number 2 of Gc was sensitive (2100µg/ml) and isolate number 4 of Gc was resistant (4000 µg/ml). In case of Captan there was not found significant sensitivity for the inhibition of tested pathogen. In Captan there was not found sensitivity against the pathogen because this tested pathogens were found tolerant against Captan. Mancozeb showed large variation among 6 isolates of *Geotrichum candidum*.

Table 1: Sensitivity of *Geotrichum candidum* isolates against fungicides

Isolates	Place	Fungicides (µg/ml)		
		Captan	Carbendazim	Mancozeb
Gc 1	Gholwad	00	2400	150
Gc 2	Dahanu	00	2100	80
Gc 3	Palghar	00	3000	300
Gc 4	Saphale	00	4000	200
Gc 5	Vivar	00	3500	250
Gc 6	Vasai	00	3100	270
SEm±		0.0	284.50	33.60
C.D. (P=0.05)		0.0	697.02	82.07

SEm± - standard error of mean

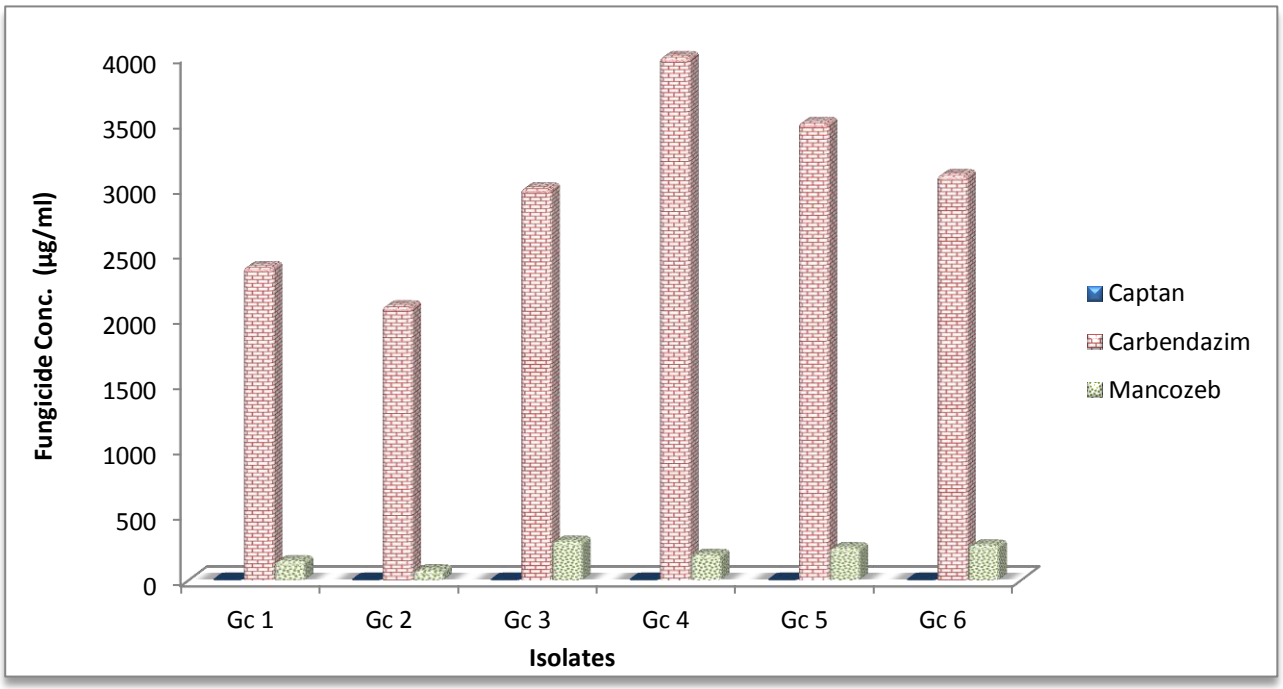

Fig. 1: Sensitivity of of *Geotrichum candidum* isolates against fungicides

In case of Mancozeb sensitivity ranged from 80 µg/ml to 300 µg /ml. Isolate number 2 of Gc was sensitive (80 µg/ml) and isolate number 3 of Gc was resistant (300 µg/ml) (Table 1, Fig.1).

Variation in the sensitivity of different pathogens in relation to many fungicides have been reported (Jones and Ehret, 1976; Dekker and Gielink, 1979; Gangawane and Shaikh, 1988; Hollomon, 1978; Bhale, 2002). Annamalai and Lalithakumari (1996) suggested that it is essential to establish the base line sensitivity for the fungicide against sensitive strain. Brain (1980) considers that heterogeneous population of nuclei consisting of resistant and sensitive nuclei in the isolates might be responsible for variation in the MIC of fungicides. Recently Bhale and Gogle (2008) reported the development of carbendazim resistance in *Alternaria spinaciae* incitant of spinach (*Spinacia oleracea* L.) Chatage and Bhale (2011). In case of *G.candidus* the sensitivity of 10 isolates were reported against chlorothalonil and mancozeb, there was variation showed 650 µg/ml to 2000 µg/ml and 20 µg/ml to 300 µg/ml respectively.

LITERATURE CITED

Annamalai P and Lalithakumari D, 1996. Decreased Sensitivity of *Dreechslera oryzae.* Field isolates to Edifenphos, *Ind. Phytopath.* **43**(4): 553-558.

Arya AA, Dwivedi DK, Pandey RS, Shukla DN, Bhargava SN and Lal B, 1981.Chemical control of *Aspergillus* rot of guava. *Indian Phytopathology,* **34**:351-360.

Bhale UN and DP Gogle, 2008. Effect of passage on the Development of cabendazim Resistance in *Alteraria spinaciae* incitant of leaf spot of spinach (*Spinacea oleraceal*.)*Geobios,* **35**: 37-40.

Bhale UN, 2002. *Studies on Management of some important Diseases of Spinach in Maharashtra*. Ph.D. thesis: Dr. Babasaheb Ambedkar Marathwada University, Aurangabad. PP 52-55.

Bhargava SN and Singh AP, 1974.Thiabendazole storage of guava fruits. *Indian Phytopath.,* **27:613**.

Brain GCA, 1980. Resistance in perenosporaleS to acylalanine type fungicides. Ph.D. thesis, Univ. Guelph, Ontario, Canada, pp 10.

Chatage VS and Bhale UN 2011. Efficacy of Fungicides Against *Alternaria Pluriseptata* and *Geotrichum Candidus* Incitant of IVY Gourd Fruit. *Int. J Latest Trends Bot. Sci.,* **1**(1):1-4.

Dekker J and Gielink AJ, 1979. Acquired resistance to pimaricin in *Cladosporium cucumerinum* and *Fusarium oxysporumf*. sp. narcissi associated with decreased virulence . *Neith. J. Plant Pathol*., **85**:67-73.

Gangawane LV and Shaikh SA, 1988. Development of resistance to aluminium ethyl phosphate in *pythium aphani dermatum*. *Indian phytopathology.* **41**(41): 638-641.

Gupta JP, Chatrath MS and Khan AM, 1973. Chemical control of fruit rots of guava caused by *Collectotrichum gloeosporioides*. *Indian Phytopath.,* **26**:650.

Hollomon DW, 1978. Competative ability and Ethirinol sensitive strains of Barley powdery mildew. *Appl. Biol.* 90:195-205.

Jones AL and Ehret GR, 1976. Tolerance to fungicides in *Venturia* and *Monilinia* of tree fruits. *Proc. Ann. Phytopath. Soc.* **3:**84-90.

Majumdar VL and Pathak VN, 1991. Effect of hot water treatment on Post-harvest diseases of guava (*Psidium gaujava*) fruits. *Acta Botanica India,* **19**:79.

Majumdar VL and Pathak VN, 1997. Control of fruit rots of guava by chemical fungicides. *J. Mycol.Pl. Pathol*.**27**:17.

Mickelbart MV, 1996. Sapodilla: A potential crop For subtropical climates. In: *J. Janick (ed.), Progress in new crops*. ASHS Press, Alexandria, VA. pp. 439-446.

Thind TS, C Mohan and Kumar S, 1994.Observations on field isolates of *Gloeosporium aampelophagum* with reduced sensitivity to carbendazim in Punjab. *Indian J.Mycol.Pl.Pathol*., **24**:46.