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SHORT COMMUNICATION

Pest management in mango by farmers of Central Gujarat

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Mango (*Mangifera indica* L.) nicknamed as king of fruits in India is the major fruit crop. It tops the list of preference of farming community for cultivation due to endless demand in domestic as well as international market. Mango cultivar 'Kesar' is one of the finest delicacies from Gujarat exported to Europe. In the package of practices of cultivation of mango to be followed by the farmers plant protection occupies a significant role. Negligence of this aspect brings about considerable loss of yield and quality. Mango malformation is still an unsolved mystery. Many insects and fungal pathogens attack mango. Keeping this in view, a survey was conducted to assess the adoption level of pest management in mango by the farmers of Central Gujarat.

A survey was conducted in Panchmahals and Vadodara districts. Sixty mango farmers were randomly selected. These farmers were interviewed at their farms during June August, 2005. Information regarding pest management measures practised in these orchards was collected in a structured interview schedule which encompassed the questions pertaining to the status of a pest/disease, its salient cause, symptoms, extent of damage, major management strategies, reasons for non-adoption of the recommended practices etc.

Results and Discussion

Insect pests

Leafhoppers

Leafhoppers were major pests sucking the sap of tender leaves, flowers and fruits. They secreted massive quantities of honeydew, which encouraged growth of fungi leading to growth of sooty mould. The leaf hoppers might be controlled with first spray with cypermethrin or fenvalerate (0.01%) at bud-burst stage, second spray with carbaryl (0.1%) at inflorescence emergence and NSKE (4%) spray after fruit set (Chadha, 2003). Majority of the farmers (82 %) noticed the leafhoppers infestation as an important pest but only 20 percent of the farmers sprayed Dimethoate, whereas 62 percent farmers did not spray any chemicals.

Termite

The food of termite included wood cellulose. Termite attacked mango branches and stem and formed soil channels under which they lived (Srivastava, 1997). For its control, drenching with chlorpyriphos @ 5ml/l were suggested. Majority of the farmers (49%) reported the infestation of termite. Twelve per cent farmers sprayed quinalphos on stem and applied drenching around collar region.

Fruit fly

The female adult punctured the mature fruit and laid eggs in mesocarp. The maggots fed the pulp and brown rotten patch appeared on the fruit surface. Singh (1989) used 0.1 per cent methyl eugenol combined with 0.1 per cent dichlorvos and obtained the maximum catch of 500 male adults per week during 24 June to 2 July. Methyl eugenol wooden block traps soaked in ethanol, methyl eugenol and malathion (6:4:1) might be hanged during fruiting period from April to August @ 10 traps/ha (Shukla and Misra, 2005). Carbaryl (0.2%) or fenthion (0.05%) with molasses might be sprayed commencing at pre-oviposition period and might be repeated at 15 days interval (Shukla and Misra, 2005). Few farmers (12 %) reported the incidence of fruit fly and followed the practice of trapping the adults by using methyl eugenol combined with dichlorvos.

Leaf gall midge

The eggs were laid in tender leaves and maggots fed within leaves inside gall. Jhala et.al. (1987) observed 47.70, 27.21 and 25.80 average percentage of leaves infested by *Procontarinia matteiana* in the mango cultivars alphonso, kesar and rajapuri. Jhala et.al. (1990) found the effectiveness of insecticides against *Procontarinia matteiana* in descending orders of phosphamidon (0.03%), monocrotophos (0.04%), dimethoate (0.03%), quinalphos (0.05%), malathion (0.05%), endosulphan (0.075%), methyl parathion (0.03%) and methyl-o-dematon (0.03%). The infestation was prominently visible during rainy season. However, only few farmers (20%) noticed the infestation of leaf gall midge and sprayed quinalphos.

Red tree ant

Ant was not a pest. However, it created nuisance by biting field workers. It constructed nests by sewing leaves with silken threads produced by larva. Few farmers (8%) reported the incidence of red tree ant and did not spray any chemicals.

Diseases

Mango malformation

Prakash and Misra (1993) expressed that mango malformation was a very serious threat to mango industry, particularly in northern India, the etiology of the disease remained obscure and diverse claims had been made about its causes e.g. physiological, viral, fungal, acarological and nutritional and the disease is serious in the north-west region where temperature was between 10 and 15°C during December-January (winter) before flowering. The most characteristic symptom of floral malformation was a reduction in the length of the primary axis and the secondary branches of the panicle which made the flowers

to appear in clusters. Frequently, the flower buds were transformed into vegetative buds and large number of small leaves and stems which were characterized by appreciably reduced internodes and were compacted together giving a false appearance of witches' broom. Deblossoming (plucking away the malformed panicle) alone or coupled with a spray of 200ppm NAA lowers the number of malformed panicles significantly (Chadha, 2003). All farmers reported the incidence of floral malformation. All farmers were cutting and burning the affected inflorescence.

Sooty mould

The fungus multiplied on the honeydew secreted by leafhoppers making the plant surface black. The saprophytic fungus was not pathogenic but interferes in the normal physiology of the plant by cutting off the effective photosynthesizing leaf area. Spraying insecticides and then removing the sooty mould growth in dry flakes by subsequent application of soluble starch was very effective method of control (Prakash and Misra, 1993). Majority of the farmers (82%) reported sooty mould infection. Few farmers (20%) sprayed Dimethoate.

Powdery mildew

It was manifested by development of a white coloured fungal coating on panicles and young leaves during December to March. Gradually the affected panicles turned brown, dried up, flowers and even well-set pea size fruits also shed. The disease caused by *Oidium mangiferae* was noticed by majority of farmers (80%) but only 25% farmers applied chemical spray of wettable sulphur. Spray of sulphur 80WP (0.2%) or carbandazim 50WP (0.1%) or thiophanate methyl 50WP (0.1%) or hexaconazole 10EC (0.1%) were suggested.

Anthracnose and other leaf spots

During rainy season, anthracnose and many minor leaf spots were seen but the farmers were not noticing them and no sprays were applied. One or two sprays with Carbendazim 50WP @ 1g/l at 15 days interval was suggested.

Dieback and Gummosis

After monsoon during October and November, main stem and branches showed vertical slits and oozing of amber coloured gum from them. This was accompanied by browning and distortion of leaves and dieback of the trees. Application of copper fungicides Bordeaux paste or copper oxychloride 50WP 10% pasting on main stem and 2-3 sprays at monthly interval with carbandazim 50WP (0.1%) or captan 50WP (0.2%) or blitox (0.3%) were suggested. However only 5% farmers were noticing and applying Bordeaux paste.

Plant parasite

Giant mistletoes

The seeds of the parasite were carried by birds and germinated when deposited at junction of branches with trunk and gave rise to haustoria. Few farmers (10%) reported the incidence of giant mistletoes. They did not spray any chemicals.

Farmers noticed the incidence of leafhopper, termite, fruit fly, red tree ant, malformation, sooty mould, powdery mildew, dieback and giant mistletoes. However only some farmers adopted the control measures. The prevalent mode of control was spraying chemicals. Large size of the tree, non-availability of power sprayers and seedling origin mango trees might be the cause of low adoption. The farmers might be persuaded to adopt integrated pest management in mango to realize better yield and quality.

Table 1: Pest management in mango by the farmers of central Gujarat

Pest	Management				Farmers	
	Chemical	Quantity (ml or gms / liter of water)	Number of sprays	Days of interval	No	Per cent
Insect pest						
Leafhopper (*Idioscopus clypealis, I. Nitidulus, Amritodus atkinsoni*)	Dimethoate	2.5	3	15	12 (37)	20 (62)
Termite (*Odontotermes obesus, O. wallonensis*)	quinalphos	3.0	3-4	30	7 (22)	12 (37)
Fruit fly (*Bactrocera dorsalis, B. zonata*)	Methyl eugenol + Dichlorvos soaked in cotton	2 drops each	3	30	7	12
Leaf gall midge (*Procontarinia mattelana, P. (Indodiplosis) mangifoliae, Amradiplosis allahabadensis*)	quinalphos	3.0	3-4	30	12	20
Red tree ant (*Oecophylla smaragdina*)	–	–	–	–	(5)	(8)
Disease						
Mango malformation	Cut & burn the affected inflorescence	–	–	–	60	100
Sooty mould (*Capnodium mangiferae, Meliola mangiferae*)	Dimethoate	2.5	3	15	12 (37)	20 (62)
Powdery mildew (*Oidium mangiferae*)	Wettable sulphur	2.5	2	30	48 (15)	80 (25)
Die-back and gummosis (*Botrydiplodia theobromae*)	Bordeaux paste	–	1	–	3	5
Anthracnose (*Colletotrichum* state of *Glomerella cingulata*)	–	–	–	–	–	–
Plant Parasite						
Giant mistletoes (*Dendrophthoe falcata*)	–	–	–	–	(6)	(10)

Figures in the parenthesis indicates the farmers who reported the pest but did not take up control measures.

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