CHAPTER VI

SUMMARY

- Investigations were carried out under UHDP on major pests of mango with pesticide usage pattern, seasonal population dynamics, monitoring tools, newer insecticide molecules, plant products and bio control agents to manage mango pests and development of Bio intensive pest management (BIPM) module during 2013 to 2015 at Tamil Nadu Agricultural university, Coimbatore. The salient findings are summarized in this chapter.

- There were 21 pests noted during the survey out of which mango hopper, thrips, ash weevil and stone weevil were recorded as major and leaf webber, gall midge and fruit fly were recorded as moderate.

- During the survey, six predators were found preying on pests of mango. Among the predators recorded, spiders were noted as the dominant and potential predators.

- The incidence of mango hopper was observed at its peak in February III week synchronizing with reproductive phase while the second minor peak was noted in the I week of September at vegetative phase after pruning. The relationship of abiotic factors on the incidence of hopper population was non significant.

- The incidence of leaf webber was higher during IV week of April and during IV week of September. Leaf webber showed significant positive association with maximum and minimum temperature and significant negative relation with minimum relative humidity.

- The infestation of thrips *Scirtothrips dorsalis* was recorded maximum during second week of April followed by second peak occurrence during 4th week of September at vegetative stage after pruning. The thrips infestation was totally absent during January, May, November and December. The maximum temperature, evaporation and sun shine hours had positive and significant relationship with thrips infestation while minimum relative humidity showed significant negative relationship.

- The occurrence of ash weevil under UHDP was maximum during 3rd week of September while incidence of gall midge *Procontarinia mattiena* was high during
4th and 5th week of September and it 2nd week of October with no significant relationship with weather factors.

- Among the natural enemies recorded the peak population of spiders was observed during month of March (2.35 numbers/20 panicles) and in September last week (2.2 numbers /20 panicles) although the spider population was observed throughout the year. The peak population of green lace wing and praying mantis were observed in March 1st week.

- Yellow sticky traps attracted maximum number of adult hoppers in II fortnight of February (308.14/trap) whereas least attraction was noticed in I fortnight of June. The correlation weather factors indicated a significant negative relationship with maximum and minimum relative humidity while regression analysis indicated significant association of weather parameters with collection of hoppers on yellow stick trap. The collection of hoppers in yellow stick traps erected at 2 meter height was maximum (123.8 hoppers/trap) as compared to the minimum collection (105.7 hoppers/trap) at 1 meter height.

- Light trap with pink colour (565-625 nm) showed a maximum collection of hoppers followed by orange colour (590-625 nm) light trap with maximum collection of hoppers at night time 930 PM.

- The high collection of male fruit fly adults during I fortnight of June 21.1/trap showed a significant negative association of sunshine hours (r= - 0.557) whereas temperature and relative humidity showed non significant positive relationship. The collection of fruit flies was high in traps erected at level 1 and 1.5 m height and found statistically superior to fruit fly trap erected at 2 m height.

- Among the six mango varieties, Totapuri, Alphonso, Imampasand, Ratna, Mallika, Banganapalli screened for their ovipositional preference of mango hoppers, the mean number of oviposition mark per leaf was high in variety Alphonso (3.79) followed by Ratna (3.72) whereas Banganapalli and Mallika showed lower oviposition marks.

- Regarding leaf webber infestation, Imampasand showed high number of larvae (6.08) per web followed by 5.17 larvae per web in Totapuri. The variety Ratna showed least larval population per web (2.58) and minimum leaf damage per web.
Variety Ratna showed susceptibility to red spider mite infestation up to cent per cent followed by Alphonso and Imampasand while variety Totapuri, Mallika and Banganapalli showed nil incidence.

The insect pollinator *Lucilia papuensis* was recorded as a major and dominant flower visitor in UHDP mango orchard with mean number of 95.14 visits / 5 inflorescence / 10 min per day followed by little bee *Apis florea* with mean number of 34.29 visits while *Apis cerana indica* recorded 16.14 visits /5 inflorescences/10 min/day.

*Lucilia papuensis* was more active at 0900 to 1000 hrs with 15.57 visits /5 inflorescences /10 min and also spent more time in flowers (26.30 sec/flower/visit). The least time spent was by *T.iridipennis* (4.30 sec/flower/visit).

Among several pesticides tested, the mortality of mango hopper was maximum in imidacloprid 17.8 % SL 0.007% both in laboratory and field experiment on par with thiamethoxam 25 % WG 0.005 per cent.

Among the plant products neem oil 1 % was efficacious with the mean hopper mortality of 79.7% under field condition, The entomopathogen, *Lecanicillium lecanii* 0.5 % with mean mortality of 86.04 per cent was superior to *Beauveria bassiana* 0.5% which showed a mean mortality of 77.92 per cent. The field performance of *Lecanicillium lecanii* was better than *Beauveria bassiana* after II round of spraying in controlling mango hopper.

Although the treatments had no significant effect on the deterrence of egg laying by hoppers, the nymphal population recorded in panicles 10 days after spraying showed the superior efficacy of buprofezin 25 % SC 0.05 % (0.33 nymphs) which was found on par with pungam oil 1 % (0.56 nymphs).

The mortality of leaf webber larvae to pesticide treatments under laboratory and field condition revealed the superiority of quinalphos 25 % EC 0.05%. The other insecticides found effective under field condition were fipronil 5 % SC 0.01 %, chlorpyriphos 20 % EC 0.04 % and dichlorvos 76 % EC 0.05 %. Among botanicals pungam oil 1 % showed higher efficacy than neem oil 1%. Entomopathogen
*Lecanicillium lecanii* 1.15% WP was also promising with mean mortality of 64.65% under field condition.

- Acephate 75% SP 0.075% and dimethoate 30% EC 0.05% were found effective in controlling thrips with mean population of 8.67 and 9.33 per shoot as compared to 34.22 in control with 74.67 and 72.72% reduction over control respectively.

- Evaluation of insecticides through field testing and laboratory bioassay indicated the superiority of acephate 75% SP 0.075% and fipronil 5% SC 0.01% in checking the population of ash weevil.

- Among the insecticides tested against mealy bugs superiority of dimethoate 30%EC 0.05 per cent with minimum mean live mealy bug population of 1.25 numbers per colony was observed. Neem oil 1% and Pungam oil 1% were not effective.

- Imidacloprid 17.8% SL 0.007% showed a mean mortality of 99.17 per cent followed by dimethoate 30% EC 0.05% 91.67 against aphid under laboratory condition.

- The management of gall midge both in newly emerging flush and 7 days old leaves with insecticides showed the superior efficacy of quinalphos 25 EC 0.05% in both the experimental conditions followed by dimethoate 30 EC 0.05% and fipronil 5% SC 0.01%.

- Studies on the toxicity of pesticides to stone weevil revealed the superior efficacy of dichlorvos 76% EC 0.05% and neem oil 1%.

- The insecticides evaluated on the fruit fly damage at ready to harvest condition indicated the superiority of dichlorvos 76% EC 0.05% with only 5.95% infested fruits.

- The BIPM module developed for pest management in mango recorded lesser pest population of mango hoppers (1.30/10 panicles) as compared to farmers practice (8.66) and untreated control (49.66). The total crop yield and revenue recorded were maximum in BIPM module. BIPM implemented plot also recorded higher cost: benefit ratio of 1:4.25 as compared 1:2.85 in farmers practice.