

# Principles need for control measures v. timing



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Principles of strategies: Monitoring insect pests and natural enemies: It is a fundamental tool in IPM for taking management decisions. Concepts of injury levels: Following the concepts of EIL and ETL to reduce the usage of insecticides and their impacts on environment. Integration of tactics: Proper choice of compatible tactics and blending them so that each component complement the other. Essential Requirements for IPM: i. Proper identification of insect pests ii. Life history and behaviour of the pest iii. Natural regulating factors iv.

Need for control measures v. Timing of control measures vi. Selection of suitable control measures vii. Farmer's participation viii. Government support

Advantages of IPM Compared to Pesticide- based Plant Protection

Programme: i. Proper ii.

Sustainability iii. Economics iv. Health v. Environment quality vi. Social and political stability vii.

Local knowledge viii. Export of agricultural commodities IPM for Rice, Cotton, Sugarcane

### **IPM for Rice:**

Observing ETL concept — Insect ETL Stemborer 10% dead heart Gall midge 10% silver shoot Whorl maggot 25% damaged leaves Leaf folder 10% leaf damage at vegetative stage GLH 5 per hill at vegetable stage 10 per hill at flowering stage BPH 1 per tiller 2 per tiller when spider is present at 1 per hill Earheadbug 5 bugs per 100 panicle at flowering stage 10 bugs per 100 panicle at milky stage i. Avoiding use of excess nitrogen which induces BPH and leaf folder.

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ii. Alternate wetting and drying for BPH. iii. Passing the rope on the crop and draining of water for case worm. iv.

Using light traps to monitor BPH, GLH and stem borer. v. Providing rogue spacing at every 2 m interval to take up the plant protection operation. vi. Avoiding resurgence causing insecticides like synthetic pyrethroids, methyl parathion, and quinalphos for BPH. vii. Avoiding shade for leaf folder. viii.

Use of Neem blended urea (1: 5) which helps in the slow release of nutrient. ix. Use of egg parasitoid *Trichogramma japonicum* for stem borer.

x. Use of egg parasitoid *T. chilonis* and bacterial agent *Bacillus thuringensis* for leaf folder. xi. Use of Neem oil for Ear head bug. xii. Use of resistant varieties, eg.

PY3, CO 42 for BPH

### **IPM for Cotton:**

Observing ETL concept — Pests ETL Leaf hopper 1 -2 per cent White fly 5-10 per leaf Boll worms 10% shoots, squares or bolls damaged Stem weevil 10% infested plants Spodoptera 8 egg masses per 100 m row i. Using light trap to monitor hoppers, Spodoptera and boll worms. ii. Using pheromone traps to monitor and also for mass trapping of boll worms. iii. Collection and destruction of infested plant parts, squares and bolls for boll worms.

iv. Growing trap crop (e. g..) Castor for Spodoptera. v. Manual removal of egg masses (e.

g.) Spodoptera. vi. Hand picking of larvae of boll worm. vii. Avoiding late sowing of crop to escape from whitefly damage. viii.

Following crop rotation with unrelated crops to check the life cycle of important pests like boll worms, stem weevil, leaf hopper, etc. ix. Removal of alternate weed hosts. x. Judicious use of Nitrogen and water for hoppers and whiteflies management.

xi. Use of yellow sticky traps for whiteflies. xii.

Avoiding early stage direct application of pesticides. xiii. Use of Neem based formulations. xiv. Use of predators like Chrysoperla camea xv.

Growing trap crop. xvi. Use of NPV virus. xvii.

Use of egg parasitoid Trichogramma spp. for boll worms.

#### **IPM for Sugarcane:**

i. Trash mulching along the ridges to modify the moisture content of soil which checks the build up of early shoot borer.

ii. Detrashing on 105th day and 210th day for leaf hopper. iii.

Avoiding excess nitrogen for leaf hopper. iv. Draining excess water for scales and mealy bugs. v. Use of predators like Coccinellid beetles for scales and mealy bugs. vi. Use of egg parasitoid Trichogramma spp.

for early shoot borer and inter node borer. vii. Use of Granulosis virus and egg parasitoid Sturmiopsis inferens for Inter node borer. viii. Use of egg parasitoid Isotima javensis for top borer.