ICAR-Central Institute for Cotton Research, Nagpur

PINK BOLLWORM MANAGEMENT STRATEGIES FOR KHARIF 2019

For Research Institutions (ICAR-CICR) and State Agricultural Universities (SAUs)

1. Monitoring for insect resistance to cry toxins and insecticides. The results and recommendations may be provided periodically to the state agricultural departments.
2. SAUs to conduct village surveys to identify high productive short duration Bt-hybrids preferably tolerant to sap-sucking insect pests. The list may be provided to the state agricultural department.
3. Planting of Bt and non-Bt hybrids on research farms for regular pest monitoring.
4. Provide training for mass multiplication of parasitoids and bio-pesticides.
5. Issue regular weekly advisories.
6. Conduct front-line demonstrations on best eco-practices for effective pest management in Bt-hybrids.
7. Conduct experiments in the field on short duration (150-160 days) varieties in high density planting under non-pesticide-pest-management.

For State Agricultural Department

1. Farmers may be apprised of a list of high productive short duration hybrids that would escape pink bollworm. Farmers may be informed that long duration hybrids would subject to pink bollworm infestation.
2. Facilitate mass production of *Trichogramma bactriae* using mass production protocol available with NBAIR, Bangalore. The parasitoids may be released during October-December across the state.
3. Starting from August, install pink bollworm pheromone traps @ 5 traps per hectare in at least one field per village in about 100 villages spread across in each of the major cotton growing districts. The lures must be changed periodically.
4. Farmers may be advised to remove and destroy ‘Rosette flowers’.
5. Advise farmers for initiation of chemical control measures when pest crossed ETL (Economic Threshold Level)- i.e. 10% damaged flowers (Rosette flowers) or 10% damaged green bolls (at least two bolls out of 20 having white or pink larvae or exit holes) or 8 moths catch per pheromone trap for consecutive 3 days.
6. Suggest spray of Chlorpyrifos or Quinalphos or Thiodicarb during mid-September to October and use of any synthetic pyrethroid in November is suggested. Insecticide sprays in November –December may be taken up only in fields having at-least 8-10 green bolls per plant, generally in irrigated cotton. Insecticide spray must be done to protect green bolls only after picking the fully open bolls.
7. About 20 green bolls from 20 random plants may be dissected once a week from mid-September to December. At economic threshold level of 10-15% loculi damage with live pink bollworm larvae, the above insecticide sprays may be recommended.
8. Recommend termination of all cotton crop by December/mid-January in central zone states and where sowing Is being taken up in June in south Zone.
9. Install pheromone traps at all market yards and ginneries for mass trapping of pink bollworm moths.
10. Programmes for cotton stalk composting to be taken up.
11. Cotton stalks have industrial application for particle boards, energy, charcoal pelleting etc., CIRCOT Mumbai may be contacted for complete details. Area-wide

programmes may be taken up for effective utilization of cotton stalks for value addition that also provides additional income to farmers.

12. Conduct regular training camps for farmers on pest scouting and eco-friendly management practices.
13. Encourage farmers to follow IPM/IRM practices especially during the first three months of crop growth which will delay or even obviate the need for any insecticides.
14. Strictly discourage the use of insecticide mixtures.
15. Consider the weekly advisories issued by CICR and state agricultural universities for dissemination among farmers.
16. ICAR-CICR has developed integrated "CICR Cotton App" and it is available in google store. Weekly Advisories issued by ICAR-CICR shall be available on CICR Cotton App. All stakeholders to use and encourage wide use of the App for better cotton production and pest management.
17. Restriction of cotton Seed sale for sowing and its movement throughout the State to avoid pre seasonal sowing as well as minimize the sowing window.

For Department of Agriculture and Cooperation, Ministry of Agriculture and Farmers Welfare

1. Permit 'refuge-in-bag' (RIB) with 95:5 (90-95% Bt seeds: 5-10% non Bt seeds as permissible limits). The non-Bt seeds must be of the near-isogenic hybrid corresponding to the BG-II hybrid. RIB to be made mandatory.

For Seed Companies

1. Promote short duration early maturing varieties/hybrids, mature in less than 180 days.
2. Discontinue long duration hybrids that promote multiple cycles of pink bollworm and aggravate insect resistance to cry toxins. Such hybrids are also prone to risk of bollworm damage.
3. Ensure that the RIB is followed and refuge seed variety/hybrid provided with Bt-hybrid seeds is also of same maturity duration. If refuge seed is supplied separately, the same may be planted along side.

For Farmers

1. Terminate the crop by December/mid-January (for central and south India) and by October in North India.
2. Crop rotation to be followed to break the life cycle of pink bollworm
3. Procure seeds of authentic Bt-cotton hybrids or variety.
4. Synchronous sowing with early maturing short duration Bt-cotton hybrids/ varieties recommended for the region to escape from pink bollworm attack.
5. Inspect the crop at squaring and flowering stage of the crop for presence of pink bollworm larvae within flowers.
6. Install pheromone traps near ginneries to trap suicidal emergence if any.
7. Install pheromone traps in fields during the season and also near go-downs, ginning mills, market yards, storage rooms etc., to trap post season moths
8. Fields that has suffered heavy damage due to PBW last year may be closely monitored during the current season.
9. Monitoring of pink bollworms using pheromone traps may be initiated 45 days after sowing. Install pheromone traps @ 5/ha for monitoring moth activity of PBW. ETL

(Economic Threshold Level) of PBW is 8 moths catch per pheromone trap for consecutive 3 days.

10. Use lures of authentic quality and change them at recommended intervals.
11. Inspect the crop at squaring and flowering stage of the crop for presence of PBW larvae within flowers and the ETL at this stage is 10% damaged flowers (Rosette flowers). If necessary spraying of recommended insecticide may be advocated.
12. At boll formation stage, farmers are advised to inspect presence and damage of PBW by plucking 20 green bolls from different plants randomly. ETL at this stage is 10% damaged green bolls (at least two out of 20 bolls having white or pink larvae/ exit holes).
13. Strictly avoid spraying pyrethroids before November or any insecticide mixtures at any time to prevent whitefly/aphid outbreaks.
14. Spray of neem seed Kernel extract 5% + Neem oil 50 ml/ + detergent powder/ soap 10gm in 10 litre of water at 50-60 DAS.
15. Release of *Trichogramma bactrae* @ 60000/acre thrice at weekly intervals between 90-120 DAS. Avoid spraying of insecticides at least for 10 days from date of release.
16. Picking of clean and infested cotton may be carried out separately. Clean cotton may be stored or marketed. Infested cotton should be destroyed.
17. Do not use extremely (Red triangle) to highly hazardous (yellow triangle) insecticides as these insecticides are not only ecologically hazardous, but are also detrimental to several important predatory insects such as the coccinellid beetles and several parasitoid wasps.
18. Always follow label claim for use of chemical insecticides for pest control.
19. Never use tank mixtures of any agrochemicals alongwith insecticides.
20. Do not extend cotton crop beyond January.
21. Clean up fields of residual stalks and partially opened bolls.
22. Do not store infested or stained cotton in godowns.

For Ginneries and market yard

1. Maintain cleanliness in and around ginneries.
2. Install pheromone traps at all market yards and ginneries and destroy captured moths.

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