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निदेशक
Dr. Y. G. Prasad
Director

CICR/NFSM IRM/ 2021-22
Date 14 June 2021

Subject: Steps to be taken for management of pink bollworm in cotton during 2021-22...Reg.

Dear Sir,

Greetings from ICAR-Central Institute for Cotton Research (CICR), Nagpur.

Bt cotton is cultivated in 11 states in about 12.3 m ha (95% area) and is seriously affected due to the incidence of pink bollworm (PBW) limiting productivity and profitability of cotton. Resistant populations of PBW are being monitored by ICAR-CICR regularly across the cotton growing states. Surveys indicate that the pest is at its peak during November-December (after 1-2 pickings). Of late, serious PBW incidence is also noticed much early in October in some areas. The pest warrants several concerted steps for its timely management by all stakeholders in cotton cultivation.

ICAR-CICR has disseminated pink bollworm management strategies that include steps from sowing to post-harvest. In order to compensate loss in yield from early formed bolls due to aberrant rainfall conditions that prevailed at different crop growth stages during kharif 2020-21, farmers extended the cotton crop duration beyond December-January in some states.

In view of the higher pest incidence experienced in the previous season and crop extension witnessed which is ideal for multiplication of PBW, we need to be vigilant and continue extension activities as in the previous years to manage pink bollworm so as to avert yield losses and distress of cotton farmers that in turn would have cascading effect on textile industry and Indian economy.

In this context pink bollworm management strategies are appended for awareness, dissemination and interventions for implementation during 2021-22 season at your end.

Thanking you,

Yours sincerely,

(Y.G. Prasad)

ICAR-Central Institute for Cotton Research, Nagpur

PINK BOLLWORM MANAGEMENT STRATEGIES FOR KHARIF 2021

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 and other stakeholders.
2. SAUs to identify high productive short duration Bt varieties/hybrids preferably tolerant to sap-sucking insect pests. The list may be provided to the state agricultural department.
3. Planting of Bt varieties/hybrids and non-Bt varieties on research farms for regular pest monitoring and region-specific assessment of pest situation.
4. Provide training for mass multiplication of parasitoids to provide sustainability in cotton production.
5. Issue regular weekly advisories for benefit of farmers.
6. Conduct front-line demonstrations on best practices for promoting scientific pest management in Bt varieties/hybrids and non-Bt varieties.

For State Agricultural Department

1. Farmers may be apprised of a list of high productive short duration varieties/hybrids that would escape pink bollworm. Farmers may be informed that long duration hybrids would attract higher pink bollworm infestation.
2. Facilitate mass production of biological control agent *Trichogramma bactrae*. The parasitoids may be released during bol formation stage.
3. Farmers may be advised to:
   a. install pink bollworm pheromone traps @ 2 traps per acre at 45 days after sowing,
   b. to remove and destroy 'Rosette flowers',
   c. to initiate 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 out of 20 bolls having white or pink larvae or exit holes) or 8 moths catch per pheromone trap for consecutive 3 days.
   d. to spray Profenofos 50 EC **Or** Chlorpyrifos 20 % EC **Or** Quinalphos 20AF **Or** Thiodicarb 75 WP **Or** Indoxacarb 14.5 SC **Or** Emamectin benzoate 5SG during mid - August to October and use synthetic pyrethroids such as Fenvelerate 20% EC **Or** Cypermethrin 10% EC **Or** Lambda cyhalothrin 5%EC in November (or boll development stage). Insecticide sprays may be taken up in November-December only in fields having at-least 8-10 green bolls per plant. Insecticide spray must be done to protect green bolls only after picking the fully open bolls.
4. Farmers may be encouraged to access pest situation on their farms. About 20 green bolls from 20 random plants may be dissected once a week from mid-September to December. Only on attaining ETL, the above insecticide sprays may be recommended.
5. Recommend termination of all cotton crop by October in north zone states (Punjab, Haryana and Rajasthan) India where sowing is done in April-May and in December/mid-January in central and South zone states where sowing is being taken up in June.
6. Encourage installation of pheromone traps at all market yards and ginneries for mass trapping of pink bollworm moths.
7. Encourage programs for cotton stalk composting or chaffing and incorporation in soil to improve carbon content.

8. Cotton stalks have industrial application for particle boards, energy, charcoal pelleting etc. Area-wide collection and processing may be taken up for effective utilization of cotton stalks for value addition that also provides additional income to farmers. Trichoderma can be used for stalk decomposition.
9. Conduct regular trainings for farmers on pest scouting and eco-friendly management practices.
10. Encourage farmers to follow IPM/IRM practices especially during the first three months of crop growth which will delay or even avert or minimize use of insecticides.
11. Strictly discourage the use of insecticide mixtures.
12. Consider the weekly advisories issued by ICAR-CICR and State Agricultural Universities for dissemination among farmers.
13. ICAR-CICR has developed integrated "CICR Cotton App" and it is available in Google play store. Weekly Advisories issued by ICAR-CICR shall also be made available on CICR Cotton App in addition to ICAR-CICR website. All stakeholders are recommended to use and encourage wide use of ICAR-CICR Cotton Advisory and the App for better cotton production and pest management.
14. Launch Extensive Awareness Campaign to avoid pre-season sowing as well as minimize the sowing window.

For Seed Companies

1. Promote short duration early maturing varieties/hybrids that 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 other bollworm damage.
3. Ensure that the RIB is followed and refuge seed variety/hybrid provided with Bt-hybrid seeds is also of same hybrid/ variety and maturity duration.

For Farmers

1. Crop rotation to be followed to break the life cycle of pink bollworm
2. Procure seeds of authentic Bt-cotton hybrids or variety.
3. Timely sowing to be completed in short window with early maturing short duration Bt-cotton hybrids/ varieties recommended for the region to escape from pink bollworm attack.
4. Inspect the crop at squaring and flowering stage for presence of pink bollworm larvae flowers.
5. Fields that has suffered heavy damage due to pink bollworm last year may be closely monitored during the current season.
6. Monitoring of pink bollworms using pheromone traps may be initiated 45 days after sowing. Install pheromone traps @ 2 per acre for monitoring moth activity of pink bollworm.
7. Use lures of authentic quality and change them at recommended intervals.
8. Inspect the crop at squaring and flowering stage for presence of PBW larvae flowers and the ETL at this stage is 10% damaged flowers (Rosette flowers). If necessary spraying of recommended insecticide may be taken up.
9. At boll formation stage, farmers are advised to inspect presence and damage of PBW by plucking 20 green bolls from different plants randomly. ETL (Economic Threshold Level) of pink bollworm is 8 moths catch per pheromone trap for consecutive 3 days and or 10% damaged flowers or green bolls (at least two out of 20 bolls having white or pink larvae/ exit holes).

10. Strictly avoid spraying pyrethroids before November or any insecticide mixtures at any time to prevent whitefly/aphid outbreaks.
11. Spray of neem seed Kernel extract 5% + Neem oil 50 ml/ + detergent powder/ soap 10gm in 10 litres of water at 50-60 DAS.
12. 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 of parasitoid.
13. Picking of clean and infested cotton may be carried out separately. Clean cotton may be stored or marketed. Infested cotton should be destroyed.
14. 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 and also to human being.
15. Terminate the crop by October in North India and by December/mid-January in central and south India.
16. Always use label claim chemical insecticides for pest control.
17. Never use tank mixtures of any agrochemicals alongwith insecticides.
18. Clean up fields of residual stalks and partially opened bolls.
19. Do not store infested or stained cotton in godowns.
20. If cotton is stored in godowns or stalked in field for longer time, put up pheromone trap to capture emerging adult PBW moths.

For Ginneries and market yard

1. Maintain cleanliness in and around ginneries.
2. Install pheromone traps near ginneries/ go-downs, ginning mills, market yards, storage rooms etc., to trap post season moths or suicidal emergence if any.

Boll rot management (Central and Southern zone) – experienced in 2020-21 season

1) Prophylactic sprays of Copper oxychloride 50 WP @25 g+ [Streptomycin sulphate IP 90% w/w+ Tetracycline hydrochloride IP 10% w/w] @1 g in 10 litres of water is suggested during early boll developmental stages (60-90 days after sowing, DAS) at 15 days intervals for the management of inner boll rot, if persistent cloudy weather, high relative humidity, flash and drizzle rain occurred during squaring, flowering and boll development stages.
2) Monitoring of infestation and management of sucking pests (jassids and thrips) and green stink bugs/brown bugs/red cotton bugs as:
   (60-90 DAS): Flonicamid 50 WG@ 4 g or Dinotefuran 20 SG@ 3 g or Diafenthiuron 50 WP@ 10 g in 10 litres of water for control of pre-disposing sucking pests; to prevent external fungal boll rot/ leaf spots, spray of Carbendazim 50% WP @ 20 g or Kresoxim-methyl 44.3% SC @10 ml or Pyraclostrobin 20% WP @ 20 g or Propineb 70% WP @25-30 g (Pyraclostrobin5% + Metiram 55%WG) @20 g or Propiconazole 25% EC @10 ml or (Azoxystrobin18.2% w/w+Difenoconazole11.4% w/w SC) @ 10 ml or (Fluxapyroxad 167g/l + Pyraclostrobin 333 g/l SC) @ 6 g in 10 litres of water is recommended (need based as per occurrence of symptoms or 75-90 DAS)

To

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