

## Self-made pest control products for organic cotton production in Nimar region, Madhya Pradesh, India

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Home-made organic pest control products offer an ecological, healthy and low-cost alternative to ready-made products available for organic cotton farmers in the Nimar region. Yet the recipes are not standardized and the products vary in quality and concentration of the active ingredients. bioRe<sup>®</sup>, together with the Research Institute of Organic Agriculture (FiBL), engages in research activities to address this challenge and constantly improve pest management strategies in organic farming. The research activities are carried out as a combination of on-station trials and participatory on-farm trials with the farmers.

During the cotton cropping season 2013-14 one on-station and two on-farm trials were conducted with the objective of comparing different spraying intervals of the most commonly used self-made organic pest control products in order to identify an optimum level of crop protection. The study focused on the effect of the spraying intervals on the most important sucking pests (Cotton aphid (*Aphis gossypii*), Cotton jassid (*Amrasca biguttula biguttula*), Whitefly (*Bemisia tabaci*), Cotton mealy bug (*Phenacoccus solenopsis*) and Thrips (*Thripidae*)). Besides sucking pest incidences, data on plant stress symptoms and yield formation as well as economic parameters were also collected. Additionally, on-station trials were established to investigate different measures of early stage crop protection and to evaluate specific effects of three self-made products (Garlic-Onion-Chilli extract, Top Ten and Neem seed extract) against certain sucking pests.

The products were prepared according to recipes standardized by bioRe<sup>®</sup> after careful research and hands-on experience of its associated scientists and extension workers. This knowledge was reproduced in pictorial technical leaflets which are easy-to-understand for the local farmers. A total of 11 leaflets - on seed treatments (2), early stage protection measures (1), pest control sprays (6), effective spraying technique (1) and growth promoter (1) were designed in both English and Hindi and will be used for dissemination activities.

On-station results were inconclusive due to a low pest pressure in this year's cotton season, as well as the small size of on-station trial plots. Results of on-farm trials revealed that a suitable strategy for in-field pest monitoring is needed for farmers to determine how often and at what time point pest control interventions are indicated. Further research is needed to understand the specific effects of home-made products on the different insect species. Optimized dosage and application techniques have to be worked out along with other options for integrated pest control (e.g. bird perches, border crops, soil enhancement practices) which could reduce the frequency of time-consuming spraying practices. These activities would best be conducted in on-farm rather than on-station trials.

# ► Assessment of self-made pest control products for organic cotton in India

## Problem statement

Cotton farmers associated with bioRe® Organisation in the Nimar region of Madhya Pradesh state use self-made products like neem extract (*Azadirachta indica*) and cow urine for pest management. These organic low-cost alternatives to conventional or organic ready-made products vary in quality and concentration of the active ingredient and mainly act as repellents; hence economic thresholds for their application are lower than for conventional products. But no systematic monitoring strategy is in use and farmers often intervene too late.

## Objectives

- Investigate different spraying intervals of self-made organic pest control products in terms of pest infestation, yield and economic profitability  
The intervals are: 1 week, 2 weeks, 3 weeks
- Test the intensive, weekly spraying interval under farmers' conditions and compare it to local farmers' practice

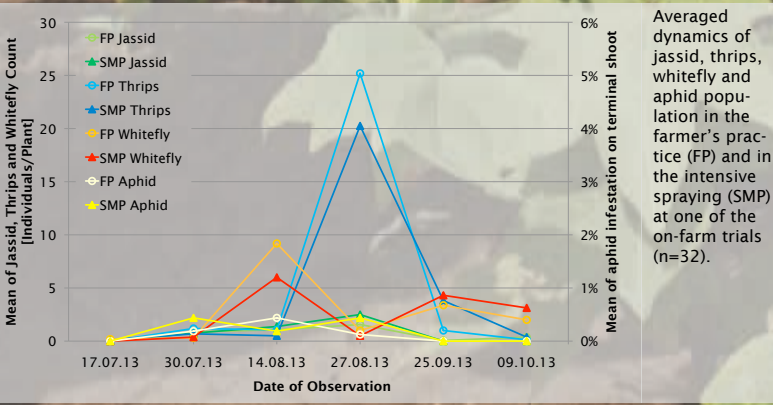


## Methods

- Set up of one on-station and two on-farm trials within the participatory technology development (PTD) program of bioRe®
- Count aphids (*Aphis gossypii*), jassids (*Amrasca biguttula*), thrips (*Thrips tabaci*), whiteflies (*Bemisia tabaci*) and mealy bugs (*Phenacoccus solenopsis*) regularly
- Assess height/node ratio, fruit retention rate and other parameters that indicate plant stress
- Measure and estimate yield based on boll counting (harvest will be completed in February 2014)
- Quantify time and money expenditures for each treatment and make a cost-benefit analysis

## Results

- In the **on-station trial** the effect of the treatments on the pest dynamics varied significantly in the four replications; no clear treatment effect could be found
- Fertilization of a preceding manure trial may have influenced the results
- Overall pest pressure was very low this year
- No significant differences between the treatments could be found in terms of yield and other agronomic parameters
- The 2 week spraying interval showed the highest expected yields by trend and the benefit of the additional yield would outweigh the cost for its pest management
- In the **on-farm trials** the varieties might have influenced the performance of the treatments



**Cost-benefit analysis for the treatments of the on-station trial**

	SMP1	SMP2	SMP3
Number of pumps	55	81	149
Total time expenditure [h]	20.2	30.4	51.3
Equivalent cost of labour [Rs]	504	760	1281
Cost of products [Rs]	1160	1400	2910
<b>ADDITIONAL COST [Rs]</b>	<b>1664</b>	<b>2161</b>	<b>4191</b>
Additional Yield [kg/acre]	92.0	133.3	60.4
Additional Revenue [Rs]	4186	6063	2748
<b>ADDITIONAL BENEFIT [Rs]</b>	<b>4186</b>	<b>6063</b>	<b>2748</b>
<b>NET ADDITIONAL CASH-FLOW [Rs]</b>	<b>2522</b>	<b>3903</b>	<b>-1443</b>

Spraying intervals: SMP1= every 3 weeks, SMP2 = every 2 weeks, SMP3 = every week.  
All specifications per acre, currency: Indian Rupees (Rs)

## Conclusion

Adoption by farmers is arguable as farmers only spray after observing an actual pest pressure in the field  
 → A practicable monitoring strategy is needed