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“Bridging the gap between increasing knowledge and decreasing resources”

## Self-Made Pest Control Products for Organic Cotton Production in Nimar Region, Madhya Pradesh, India

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### Abstract

Homemade organic pest control products offer an ecological, healthy and low-cost alternative to ready-made products. Yet the recipes are not standardised and the products vary in quality and concentration of the active ingredients. bioRe®, together with the Research Institute of Organic Agriculture (FiBL), engages in research activities to address this challenge and improve pest management strategies in organic farming.

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 home-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. Besides sucking pest incidences, data on plant stress symptoms and yield formation as well as economic parameters were also collected. Additional on-station trials were established to investigate different measures of early stage crop protection and to detect specific effects of three self-made products against certain sucking pests.

The products were prepared according to recipes standardised by bioRe® 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, early stage protection measures, pest control sprays, effective spraying technique and growth promoter were designed in both English and Hindi and will be used for dissemination activities.

On-station results were inconclusive due to low pest pressure in this season, as well as the small size of the trial plots. Results of on-farm trials revealed that a suitable strategy for pest monitoring is needed for farmers to determine at what time point pest control interventions are indicated. Further research is needed to understand the specific effects of homemade products on the different insect species. Optimised 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) that could reduce the frequency of time-consuming spraying. These activities would best be conducted in on-farm trials.

**Keywords:** Cotton, organic pest management, participatory technology development (PTD), self-made pest control products

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# Homemade pest control products for organic cotton production in the Nimar region, Madhya Pradesh, India

## Background

Smallholder cotton farmers use homemade organic pest control products (HOPCP) like extracts of Neem (*Azadirachta indica*) for pest management. These products offer an ecological and low-cost alternative to ready-made products, yet they mainly act as repellents and the quality and concentration of the active ingredient is variable. As no systematic pest monitoring strategies are applied (scouting, economic thresholds, etc.), farmers often intervene too late.

## Objectives

- Assess different pest management options using a participatory technology development approach
- Develop recommendation leaflets with standardized recipes of the most common homemade products

## Materials and Methods

- On-station and on-farm trials to assess different spraying intervals of HOPCP in terms of pest infestation, yield and economic profitability
  - Intervals: every 1 week, 2 weeks, 3 weeks and farmer's practice
  - Focal insect species: aphids (*Aphis gossypii*), jassids (*Amrasca biguttula*), thrips (*Thrips tabaci*), whiteflies (*Bemisia tabaci*) and mealy bugs (*Phenacoccus solenopsis*)
- On-station trial assessing different measures of early stage crop protection in terms of seedling survival
  - Treatments: Neem powder ring, Neem-Hing spray, combined sowing with mung bean and two different seed treatments
- On-station trial comparing specific effects of three HOPCP on the population dynamics of focal sucking pests
  - Products: Neem extract, Garlic-Onion-Chilli and Top Ten
- Organisation of farmer workshops for knowledge exchange and trial evaluation

## Results

- As overall pest pressure was very low, no significant treatment effects were found in any of the trials (Fig. 1)
- Trial plots were too small, and other factors (residual fertilizer effects, varieties, etc.) might have influenced crop performance
- By trend, 2-week interval showed highest yields and was economically feasible (Table 1)
- Recommendation leaflets in Hindi and in English were produced, and are available for dissemination to farmers (Fig. 2)
- Farmers were interested in testing Neem powder rings for early stage crop protection
- Farmers indicated that regular spraying would be too time-consuming for them

## Conclusions

- A practicable monitoring strategy is needed, including scouting and economic thresholds
- Research on the specific effects of the individual products should be intensified
- The effectiveness of less time-consuming options for integrated pest control (bird perches, border crops, etc.) should be assessed with/by farmers

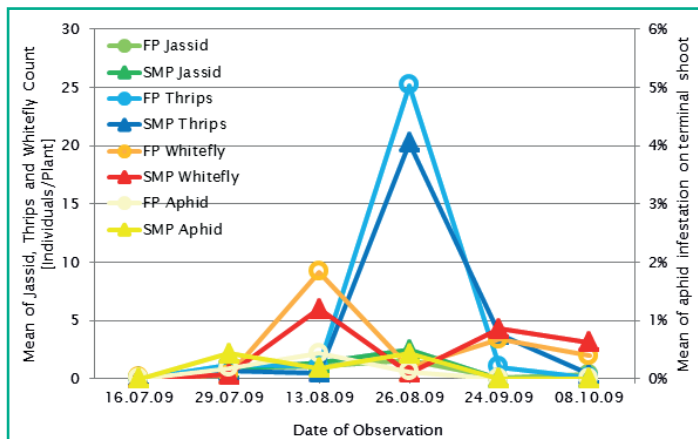
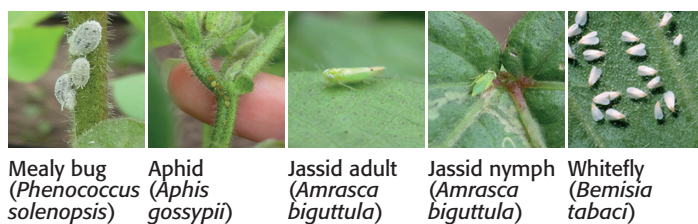


Figure 1: Population dynamics of jassids, thrips, whiteflies and aphids in the farmers' practice (FP) and in the weekly spraying interval (SMP) at one of the on-farm trials (n=32)

Table 1: Cost benefit analysis for spraying intervals (on-station trial). Spraying intervals: SMP1 = 3 weeks, SMP2 = 2 weeks, SMP3 = 1 week; all units are per acre, currency: Indian Rupees (Rs)

	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>
<b>ADDITIONAL YIELD [kg/acre]</b>	<b>92.0</b>	<b>133.3</b>	<b>60.4</b>
<b>ADDITIONAL REVENUE [Rs]</b>	<b>4186</b>	<b>6063</b>	<b>2748</b>
<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>



Figure 2: Example of a recommendation leaflet in Hindi

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## More Information

<http://www.systems-comparison.fibl.org/>

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