

STATUS OF THE PUSH/PULL STRATEGY AGAINST HELIOTHIS

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ABSTRACT

The urgent need to find alternatives to the environmental dissemination of toxic insecticides for cotton pest control has caused us to examine methods of behavioural management based on sensory manipulation. These methods use the insect's own sensory system to misinform its on-board behavioural computer, causing it to display behaviour that does not damage our crops. This is a more logically correct method than our previous attempts to poison insects out of existence. Behavioural control of insects works because they do not think about their actions but, instead, generate a series of well-adapted, highly-selected but unreasoned reactions. Out of several potentially useful methods of sensory manipulation, the Push/Pull Strategy is one of the most potent. This strategy makes the target (cotton) repellent to the insects (push) and introduces a substitute attractant (pull), that is toxic but is highly localised and under excellent environmental regulation. In other words, the P.P.S. causes the insects to avoid the crop and to centre-in on a localised source of toxicant. The method does not involve a general dissemination of insecticides in the environment and it leaves no toxic residues in the crop or soil. It is considered to be virtually impossible for insects to develop effective resistance to the P.P.S.

In practice cotton is sprayed with an extract of neem that is rich in azadirachtin (PAC). The PAC renders the cotton unacceptable to most egg-laying *Heliothis*. Larvae are also repelled and prevented from feeding and growing. The insects are thus pushed away from the crop, an effect which is greatly accentuated by flanking strips of a pigeon-pea trap-crop, which is regularly sprayed with a highly attractive bait to stimulate the moths to feed on a rapidly acting toxicant. Thus used, the trap-crop functions as an early warning of the presence of gravid *Heliothis* and as a measure of success of the PPS, based on the numbers of dead moths recorded in the early morning, per metre row of trap-crop.

We have trialed the PPS for three seasons at Forest Hill (by courtesy of Mr A. Brimblecombe). A very small experiment in 1985/86 showed the PPS to have potential. The 1986/87 season demonstrated, on a slightly larger scale, that egg numbers can be reduced from an average of over 2.5 per plant to less than 0.5. The latest, 1987/88 trials, used PPS in a 5 acre field. Whilst the same beneficial trend was observed, the season's results were distorted by problems in crop establishment, very low *Heliothis* numbers and flooding. We are hoping for better conditions for our large scale trials later this year.

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