

Better management of cotton refuges

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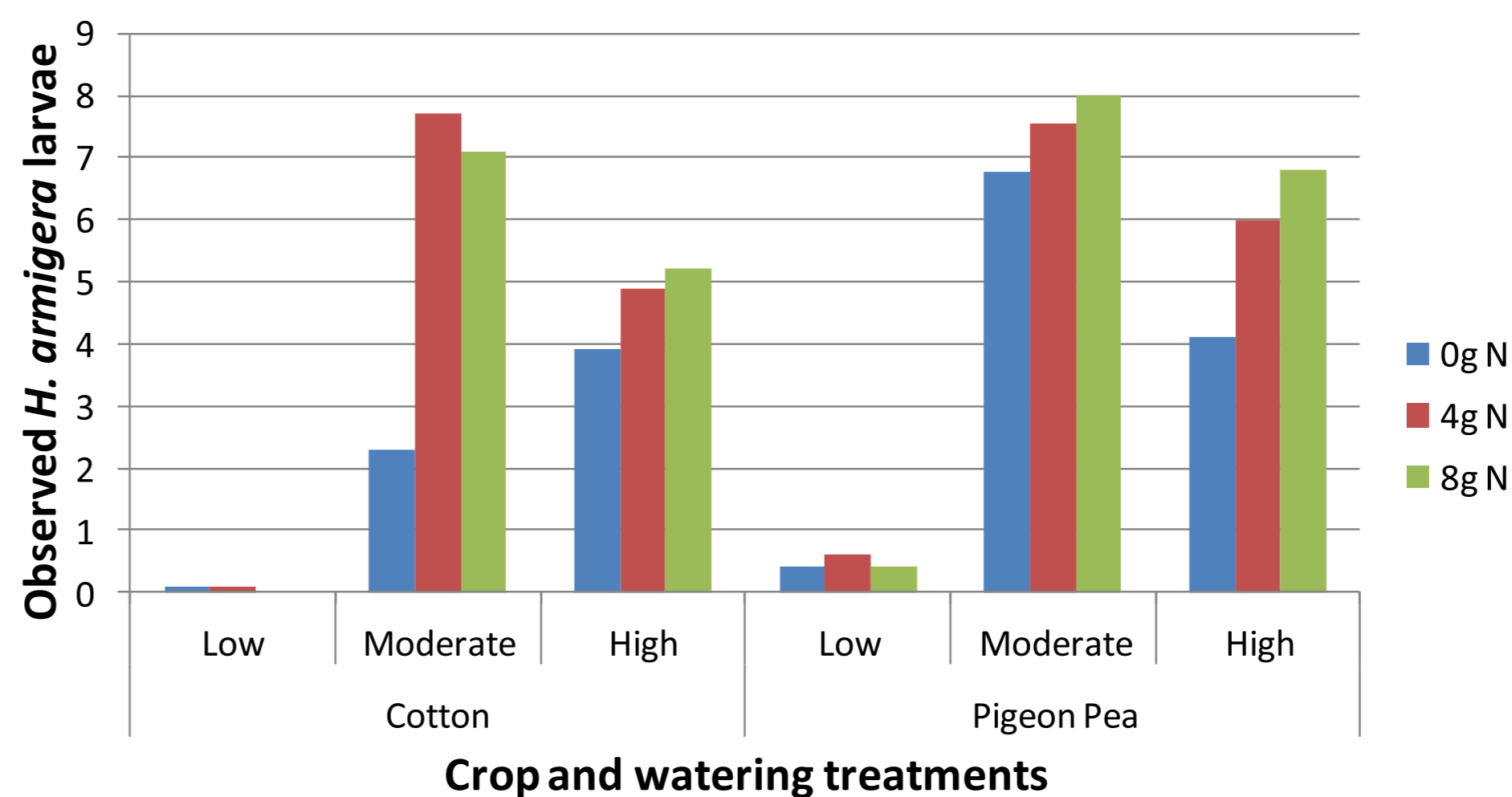
Field experiments stocking varying densities of *H. armigera* revealed several differences between pigeon pea and non-Bt cotton refuges. Survival of *Helicoverpa* eggs was higher in cotton, while survival of larvae and production of moths was higher in pigeon pea. Implementation of an insecticidal spray to control larval predators and competing pests had no significant effect on moth production.

Glasshouse studies have found that non-Bt cotton and pigeon pea plants grown with limited access to water were poor hosts for *H. armigera* larvae, and adding nitrogen under these conditions did not improve survival. Moderate watering resulted in higher survival than did watering to saturation. In cotton plants where water was not limiting, adding nitrogen improved survival rates, although excessive nitrogen levels did not increase survival any further. Results indicate that low production of moths from refuges could be increased by optimising fertiliser applications and watering regimes.



Spined predatory shield bug attacking a *Helicoverpa armigera* larva in a pigeon pea refuge. The plot was stacked at a high 50 second instar larvae per metre.

Larvae survival at Day 6 on plants grown in varied water and fertiliser treatments



Water had the most significant impact on larval survival in both cotton and pigeon pea. The addition of a nitrogenous fertiliser increased survival occasionally, doubling the fertiliser rate had no effect.

Dimethoate and diafenthiuron at 0.5 and 0.6 L/ha respectively had no effect on the production of moths from either pigeon or non-Bt cotton refuges. The spray reduced other pest and predator populations, though had little impact on larval survival.

Effect of spray on *H. armigera* survival at Day 12

