Review of: "Artificial Intelligence & Nature-Based Solutions in Agriculture: A BT Cotton Pest Management Case Study in India"

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The manuscript needs further improvement on the observations as follows:

Abstract

'Mating disruption technology, a competitor', 'mechanical growing degree day (GDD)-based IPM advisory, a competitor'- They are not '**competitor**' technologies (competition is typically a developer's perception of similar technology), but are used as major components of IPM by other stakeholders for the farmers' benefit. Kindly change the misnomer 'competitor' to '**alternative**'.

Since your AI technology has nothing to do with labour replacement (because a progressive farmer himself monitors the health of the crop if no AI advisory is given), but helps him to reduce input costs, the concluding sentence could be modified in a positive light in line with '**every technology has its own merit, and integrating them with location-specific demand can improve the economy of the farmer and reduce the ecological effects of calendar-based application of pesticides**.'

Introduction

The long first sentence needs trimming by removing terms with similar meanings.

The repetition in the 3rd and 4th paragraphs- The third paragraph 'Pink Bollworm (PBW, Pectinophora gossypiella)..' needs merging with the 4th 'Pink bollworm Pectinophora gossypiella (Saunders) (Lepidoptera: Gelechidae)..' as follows

Pink bollworm (PBW) Pectinophora gossypiella (Saunders) (Lepidoptera: Gelechidae) is the most economically damaging insect pest of cotton, especially the American variety (Gossypium hirsutum), which is widely grown globally today. Though PBW infestation may start at 50 days of crop growth, economic damage is caused when it reaches 100 to 180 days, depending upon cultivars and prevailing climate?.

The crop's resistance to the pest is due to the toxic protein that the worms cannot digest and die. ~~Specify that the Bt protein developed for Helicoverpa (CBW) became less effective to manage PBW~~.

Gossypol, the natural plant chemical in cotton that resists pest attack, is 50% less in Bt cotton than in the natural, indigenous cotton variety [5].- **Combine this sentence with 'The Indian tree type Cotton (G. arboretum) is comparatively tolerant' (see if reference [5] suffices)**.

Box 1: Delete ' They also make a small hole to the exterior to allow air to penetrate.'

Pest Damage, Climatic Risk, and Population Monitoring Threshold

The farmers conduct reckless ~~spray~~ pesticide applications that ~~have no effect on the pests~~ may not serve the purpose

always due to the wrong timing/growth phase, such as eggs or moths, unlike at the larvae stage.

This ~~led to~~ is **one of the causes** of increasing farmers' suicides, which numbered nearly 0.3 million from the 1990s to 2017

In the USA, the PBW was controlled and eradicated during 2006 to 2013 by the genetically modified organisms (GMO) technique ~~(Box 1),~~ (Box 2), but it is not permitted in India, so smart, innovative technology solutions are needed.

It is monitored by ~~laying insect~~ **pheromone traps** in the field and counting the **moths trapped** ~~insect traps per night~~, specified for different species ~~separately by agri-scientists.~~

However, there are reports of illegal, herbicide-tolerant BT-Cotton cultivation in India in scattered places, ~~which must be curtailed~~ [9].

With the motto of "AI for social good," the Wadhwani Institute of Artificial Intelligence (WIAI, www.wadhwaniai.org), Mumbai, developed an AI-based imaging app named "cottonace" during 2019-20 to identify the PBW ~~correctly caught in the pheromone traps at night~~ and count the number of **moths** ~~insects~~ per trap.

Metarhyzeum ?

Table 2 & 3: The results (yield) are found significantly different (p< 5%) using a student's t-test. You may give the t-distribution curve of yields of AI adopters and control in the same graph.

~~The fragrance is very species-specific, so the lure for PBW does not attract even its cousin, the pre-millennium major pest of cotton farming in India, the American bollworm (Helicoverpa armigera, 1).~~(It is a well-known fact)

But if farmers start paying for the AI, then it could be significant, though more than compensated by the extra benefit it brings. **Does this statement hold valid since the App is a 'soft tool' based on image processing? It cannot be compared with a patentable sensor bearing cost. Modify the paragraph accordingly.**

The last paragraph needs an insightful drawing of conclusion. You may compare similar image processing interventions in 'plant health' by reviewing literature and draw conclusions accordingly.