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EFFECT OF ASHIRWAD STOP VIRUS (MANUFACTURED BY ASHIRWAD AWP78 TECHNOLOGY) AGAINST BLACK THRIPS INFESTING CHILLI

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ABSTRACT

To evaluate the field efficacy of a herbal biopesticide combination, Ashirwad Stop Virus, for suppressing black thrips infestation in chilli and to assess its potential as a residue-free pest management option. A field trial was conducted in chilli using a randomized block design with treated and untreated control plots. Ashirwad Stop Virus was applied as three foliar sprays at weekly intervals when thrips incidence appeared. Thrips populations were recorded one day before treatment and at 2, 3, and 7 days after each spray. Data were compared between treated and control plots to measure pest suppression. Initial thrips populations were similar between treatments. A consistent decline was observed in treated plots after each application, with counts falling from 3.40 to 2.48 after the first spray, further reducing to 1.32 after the second spray, and reaching 0.45 after the third spray at 7 days. Control plots maintained high populations throughout the study. The progressive reduction across sprays indicates cumulative activity of the herbal formulation. The results demonstrate that Ashirwad Stop Virus can effectively reduce thrips numbers under field conditions and shows better population suppression than natural decline observed in untreated plots. The study contribute to evidence supporting botanical combinations as reliable tools for reducing the dependence on synthetic insecticides in chilli and provides field-based evidence on the cumulative efficacy of a multi-herbal biopesticide combination for controlling black thrips in chilli.

KEYWORDS: Chilli, Black Thrips, Ashirwad Stop Virus, Herbal Biopesticide, Scirtothrips Dorsalis, Pest Management, Botanical Formulation

1. INTRODUCTION

Chilli (*Capsicum annuum* L.) stands as one of the most valuable spice and vegetables crops globally, renowned for its colour, pungency, flavour and broad applications in the culinary, pharmaceutical and food processing industries (Reddy et al., 2024). Chili production is crucial for sustainable food systems and agro industrial supply chains, owing to its major contributions to farmer income, rural employment, and national export (Muflikh et al., 2021). Grown in tropical and sub-tropical climates, chili is valued not only economically but also nutritionally and medicinally due to its high levels of vitamins, phenolic compounds, carotenoids,

and capsaicinoids (Akhter et al., 2024). However, despite rising demand domestically and internationally, biotic factors, especially insect pests, frequently limit productivity.

Among all insect pests attacking chilli, the black thrips (*Scirtothrips dorsalis*) has emerged as one of the most destructive and economically damaging species in chilli-growing regions (Yadav et al., 2023). This pest has a wide host range, high reproductive potential, ability to thrive in warm climates, and a rapid life cycle, making its outbreaks frequent and severe (Skendžić et al., 2021). Black thrips are tiny insects that feed on cellular contents

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from tender leaves, buds, petioles, and developing fruits (Shivalingaswamy et al., 2022). Their feeding activity leads to leaf distortion, curling, bronzing, and silvering, as well as reduced photosynthetic area and impaired plant growth (Praveen, 2023). Severe infestations cause considerable scarring and deformations to fruits, making them unmarketable (Zakaria, 2021). Yield losses caused by thrips in chilli are well documented, and the damage can become severe under favorable conditions for pest multiplication (Veeranna et al., 2022). In addition to direct feeding harm, black thrips are efficient vectors of several viral diseases, including leaf curl viruses, which increases yield reductions (Steenbergen et al., 2018).

Effective management of black thrips has become increasingly challenging. For several decades, farmers have relied heavily on chemical pesticides as the primary method of control (Lahiri et al., 2024). While chemical pesticides produce immediate prevention, its widespread and random application has resulted in various issues (Dhananjayan et al., 2019). Repeated exposure of thrips populations to the same chemical groups has led to the rapid development of insecticide resistance, making many commonly used compounds less effective (Mocchetti et al., 2023). Chemical residues on chilli fruits pose risks to consumer health, especially in crops consumed fresh, and strict export regulations often reject consignments exceeding residue limits (Essuman et al., 2023). Continuous pesticide dependence also disrupts natural enemy populations, alters ecological balance, and contributes to environmental contamination (Yarahmadi and Rajabpour, 2024). These limitations have intensified the search for safer, sustainable, and ecologically compatible alternatives that can provide reliable thrips suppression without the adverse effects associated with synthetic chemicals (Souto et al., 2021).

In recent years, herbal biopesticides have gained substantial attention as promising tools for integrated pest management in vegetables and spices. Herbal formulations derived from botanical extracts, essential oils, alkaloids, flavonoids, terpenoids, and other naturally occurring compounds exhibit insect-repellent, feeding-deterrent, ovicidal, antifeedant, or growth-disrupting properties (Aioub et al., 2024). Such products are biodegradable, environmentally safe, and non-toxic to beneficial organisms (Tiwari et

al., 2024). Their multi-component nature reduces the possibility of resistance development, making them suitable for long-term pest management strategies (Shang et al., 2024). Additionally, herbal formulations comply with residue-free agriculture requirements, ensuring better market acceptability of produce (Chikte et al., 2024). Despite these advantages, comprehensive field-based evaluations of herbal biopesticide combinations against black thrips in chilli remain limited (Delai et al., 2024). With rising concerns over pesticide residues and the need for sustainable crop protection, scientifically validated herbal solutions are becoming increasingly essential (Souto et al., 2021).

The present study focuses on evaluating a herbal biopesticide combination, tested against black thrips infestation in chilli. Herbal combinations are expected to act through multiple biochemical pathways, enhancing their pest-control potential compared to single botanical extracts (Reddy and Chowdary, 2021). However, the interaction of these components under field conditions, particularly in relation to thrips dynamics, needs systematic assessment. Field conditions present diverse biotic and abiotic influences that can affect the efficacy, persistence, and mode of action of botanical compounds (Gikas et al., 2022).

Black thrips infest chilli plants throughout all growth stages, causing damage to tender foliage, reproductive tissues, and developing fruits, ultimately reducing plant vigour and marketable yield (Ali, 2020). Their rapid reproduction and tendency to shelter within plant crevices complicate effective management (Murunde, 2023). Botanical biopesticides are suitable candidates for thrips suppression, as many plant-derived compounds possess repellent, toxic, or translaminar properties that enable them to reach concealed feeding sites and provide sustained control (Acheuk et al., 2022). Research on individual botanicals against thrips is available, but evidence on multi-herbal formulations under field conditions remains limited. This gap restricts their practical adoption. Therefore, the present study evaluates a herbal biopesticide combination for managing black thrips in chilli under field conditions.

This study evaluates Ashirwad Stop Virus, a herbal biopesticide combination, for managing black thrips

(*Scirtothrips dorsalis*) in chilli (*Capsicum annuum* L.) under field conditions. Ashirwad Stop Virus contains plant-derived compounds with repellent, toxic, and translaminar activity, enabling effective thrips suppression. The research monitors pest populations across successive sprays and compares treated plots with untreated controls, aiming to support eco-friendly, residue free management strategies for sustainable chilli production.

2. MATERIALS AND METHODS

2.1 Experimental Site and Season

A field experiment was carried out during the year 2024 to evaluate the performance of a Ashirwad Stop Virus, a herbal bio pesticide product manufactured by Ashirwad AWP78 technology, against black thrips (*Scirtothrips dorsalis*) infesting chilli. The trial was conducted under open field conditions following standard cultivation practices for chilli production. The soil of the experimental field was well-prepared, free from residues of previous crops, and brought to fine tilth prior to planting.

2.2 Crop Details

Chilli (*Capsicum annuum* L.) seedlings were raised in a nursery using disease-free and uniform planting material. The experimental field was ploughed, leveled, and prepared according to recommended agronomic standards. Basal fertilization was applied following regional guidelines, with the remaining nitrogen top-dressed 30 days after planting. Seedlings approximately 40 days old were transplanted at uniform spacing, and essential intercultural operations including irrigation, weeding, and plant maintenance were performed in accordance with standard crop management practices.

2.3 Experimental Design

The experiment was conducted using a Randomized Block Design (RBD) consisting of two treatments: T1 - a herbal biopesticide combination and T2 - an untreated control receiving only water spray. Each treatment was replicated three times to ensure statistical reliability. All plots were maintained with uniform dimensions, spacing, and an equal number of chilli plants per plot, allowing for consistent comparison between treatments and minimizing experimental variability.

2.4 Treatment Details

The test substance was a commercial herbal biopesticide combination named Ashirwad Stop Virus, manufactured by Ashirwad Nutrients (2024), containing botanically active extracts known for insect-repelling and insecticidal properties against sucking pests. The formulation was applied as a foliar spray at the recommended field dose as supplied by the manufacturer. The control plots received only water at the same spray intervals.

2.5 Calibration and Spray Application

Before application, the spray volume required for each plot was determined by spraying water uniformly over sample plots to estimate the field capacity of the sprayer. The herbal biopesticide suspension was prepared freshly for each application by diluting the required quantity in clean water.

2.6 Spray schedule

Three foliar applications of the herbal biopesticide were carried out during the crop cycle. The first spray was administered immediately after the initial incidence of black thrips was observed. The second and third sprays were applied at seven-day intervals following the first and second applications, respectively.

2.7 Observation and Sampling Procedure

Pre-treatment thrips counts were recorded one day before the first spray. Post-treatment observations were taken at 2, 3, and 7 days after each application, following the same schedule for all three sprays to ensure consistency.

2.8 Data Analysis

Thrips count data were compiled for all treatments and sampling intervals. Means were compared between treated and control plots to assess the effectiveness of the herbal biopesticide. Statistical analysis such as ANOVA may be applied depending on journal requirements to determine treatment differences (Lahiri et al., 2024).

3. RESULTS

3.1. Pre-treatment thrips population on chilli

The effect of the herbal biopesticide combination (Ashirwad Stop Virus) on black thrips population in chilli was evaluated through pre-treatment counts and post-spray observations after each of the three

applications. Initial thrips populations were comparable between treatments, with pre-spray counts of 3.85 ± 0.12 in treated plots and 4.12 ± 0.13 in the control as indicated in figure 1.

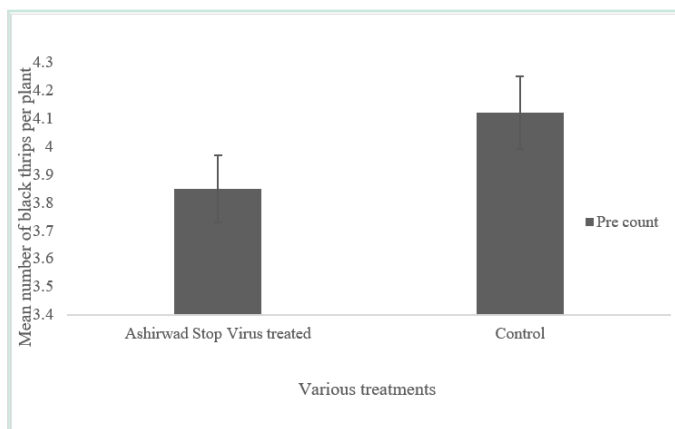


Fig. 1: Pre-treatment mean population of black thrips on chilli plants in Ashirwad Stop Virus-treated and untreated control plots prior to spray application.

3.2. Effect of first spray of Ashirwad Stop Virus on black thrips population

Following the first spray, a steady decline in thrips numbers was recorded in the treated plots, decreasing from 3.40 ± 0.10 (2 DAS) to 3.15 ± 0.09 (3 DAS) and further to 2.48 ± 0.08 at 7 DAS. In contrast, thrips populations in the control plots continued to rise, reaching 4.70 ± 0.10 at 7 DAS as shown in figure 2.

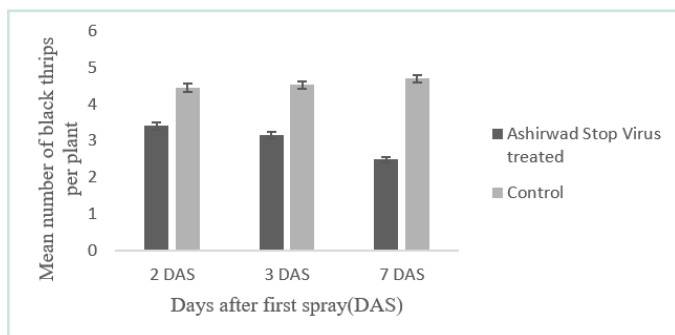


Fig. 2: Mean population of black thrips on chilli plants after the first application of Ashirwad Stop Virus, recorded at 2, 3 and 7 days after spraying (DAS).

3.3. Effect of second spray of Ashirwad Stop Virus on black thrips population

A similar pattern was observed after the second spray (figure 3). Treated plots exhibited a marked reduction

in pest numbers, recording 1.82 ± 0.07 (2 DAS), 1.65 ± 0.06 (3 DAS), and 1.32 ± 0.05 (7 DAS). Meanwhile, the control plots maintained substantially higher population levels, with only a slight reduction to 4.10 ± 0.08 at 7 DAS, indicating continued pest pressure. The performance of Ashirwad Stop Virus aligns with the general suppression trend reported for microbial and botanical biopesticides. In related evaluations, *Beauveria bassiana* (2×10^8 cfu/ml at 5 ml/L) and *Le-canicillium lecanii* (2×10^8 cfu/ml at 4 ml/L) produced markedly low thrips populations, recording 0.24 and 0.65 thrips per three leaves, respectively, confirming their strong pathogenic and growth-regulating effects on *S. dorsalis* (Chavan et al., 2020).

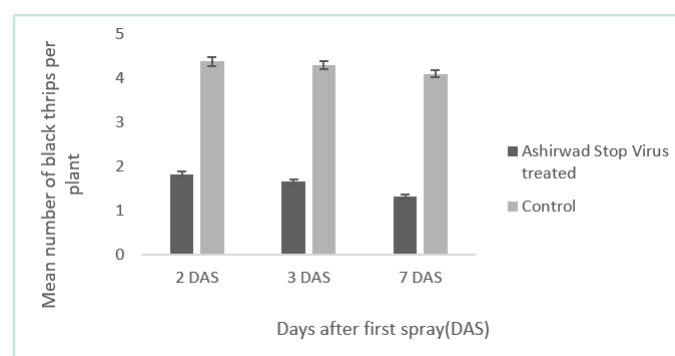


Fig. 3: Mean population of black thrips on chilli plants after the second application of Ashirwad Stop Virus, recorded at 2, 3 and 7 days after spraying (DAS).

3.4. Effect of third spray of Ashirwad Stop Virus on black thrips population

The third spray produced the strongest suppression effect. The thrips count in treated plots declined further to 0.92 ± 0.04 (2 DAS), 0.58 ± 0.03 (3 DAS), and ultimately to 0.45 ± 0.03 at 7 DAS. In comparison, the control plots still showed high pest numbers, recording 3.98 ± 0.07 (2 DAS), 3.28 ± 0.06 (3 DAS), and 3.05 ± 0.06 at 7 DAS as indicated in figure 4. A similar reduction pattern has also been documented in vermiwash-based botanical formulations, where T_1 (vermiwash), T_4 (vermiwash + neem extract) and T_6 (vermiwash + cow urine) achieved damage scores of 2.40, 2.32, and 2.37, respectively, all substantially lower than the untreated control (Chandukishore et al., 2023).

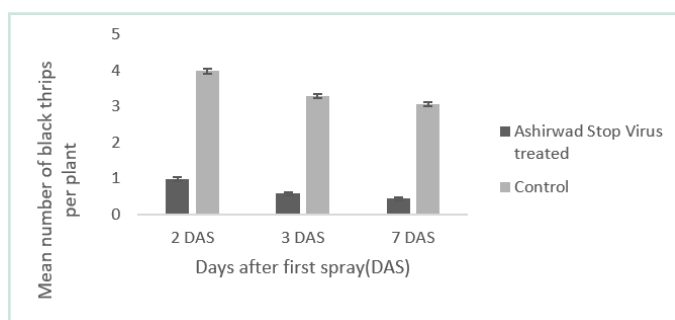


Fig. 4: Mean population of black thrips on chilli plants after the third application of Ashirwad Stop Virus, recorded at 2, 3 and 7 days after spraying (DAS).

Across all three spray intervals, the herbal biopesticide combination demonstrated a consistent and cumulative reduction in thrips population, while the untreated control maintained moderate to high infestation levels. The progressive decline observed after each successive spray indicates that repeated applications enhanced the effectiveness of the treatment, resulting in the lowest pest population by the end of the study period.

4. CONCLUSION

The present study confirmed that Ashirwad Stop Virus significantly suppressed black thrips populations in chilli, with a clear and progressive reduction after each spray. By the third application, thrips counts were reduced to minimal levels, whereas control plots continued to experience high infestation. These results align with reports that botanical formulations possess strong repellent and insecticidal activity against sucking pests, yet the magnitude of cumulative suppression observed here demonstrates enhanced performance of a multi-herbal combination under field conditions. While the results substantiate the potential of Ashirwad Stop Virus as an eco-friendly pest management tool, the study was limited to one season and a single location. Future research could assess its performance across varying agro climatic regions, doses, and integrated pest management modules. Overall, the study provides new field evidence that repeated applications of a herbal biopesticide combination can offer reliable thrips suppression, supporting its adoption as a residue-free alternative for sustainable chilli cultivation.

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