



EFFICACY OF ETHANOLIC EXTRACT OF *SCHANGINIA AEGYPTIACA* AND *ARTEMISIA HERBA-ALBA* AGAINST APHID *APHIS GOSSYPII* GLOVER ON OKRA

SAJJAD ALAA HASSAN AL KAMIL^{1*}, HADI ABDULJALIL NAAS¹ AND ISRAA ABEDALI HASSAN ALHAWANI¹

¹Biological Control Technologies Department, Al -Mussaib Technical College,
Al-Furat Al-Awsat Technical University, Babylon, Iraq

*Email: sajjad.alaa.tcm.169@student.atu.edu.iq (corresponding author): ORCID ID 0000-0002-0154-252

ABSTRACT

Aphis gossypii Glover is an important pest of okra. This study evaluates the effect of alcohol extract of *Schanginia aegyptiaca* and *Artemisia herba-alba* on the mortality of nymphs under laboratory conditions. The results showed that the *S. aegyptiaca* was superior to the *A. herba-alba* plant extract in producing aphid mortality. Rate of nymphal mortality on plants treated with a concentration of 20 mg/ ml of *S. aegyptiaca* extract reached 73.32, 81.32, and 92.00% at the periods 24, 48, and 72 hr, respectively.

Key words: Okra, *Artemisia herba-alba*, *Aphis gossypii*, biopesticides, mortality, nymphs, plant extract, *Schanginia aegyptiaca*, bioassay, mortality, efficacy

Aphis gossypii Glover (Hemiptera: Aphididae) is one of the most common insect pests of okra (Chandio et al., 2017; Carletto et al., 2010; Hullé et al., 2020; Rashed, 2020). Besides secreting honeydew, which encourages the growth of sooty mold fungi, it also has indirect damage by the transmission of viruses (Afloukou et al., 2021). The continued use of insecticides to raises concerns about their negative impact on human and animal health. This has led to the use of botanical pesticides as alternatives. *Schanginia aegyptiaca* is an annual weed plant belonging to the Amaranthaceae family (Angiosperm Phylogeny Group, 2009; Dhole et al., 2011). The leaves and stems of this plant are used medicinally to treat gum and tooth diseases, and as a treatment when inhaled for headaches, nausea, hysteria, dizziness, and nervousness. It also helps improve poor eyesight and calm the nervous system (Ghazanfar, 1994). This plant has also been used as an insecticide against mosquitoes (Tuwaij et al., 2009). *Artemisia herba-alba* (Asteraceae) also is known to the Arabs as Shih. It is used in alternative medicine to treat diabetes and high blood pressure, as an analgesic, to stop bleeding, and as an antibacterial (Aziz et al., 2012). The study aims to evaluate the efficiency of plant pesticides on the nymphs of *A. gossypii* on okra.

MATERIALS AND METHODS

The experiments were conducted in the General Insect Laboratory for Postgraduate Studies, Department of Biological Control, at Al - Mussaib Technical College (2023-2024); *A. gossypii* were collected from

fields spread in the Babylon Governorate from okra. The infected of which the leaves were used for mass rearing in plastic pots inside a small plastic house built inside Al-Mussaib Technical College. While in cages 3 x 1.5 x 1.5m. Sample of *S. aegyptiaca* were collected from the gardens of the Mussaib Technical College *A. herba-alba* plant was obtained from local markets. These were dried and preferred for preparation of alcohol as suggested by Harborne (1998). From these standard solutions were prepared (5, 10, 20) mg/ ml, while the control treatment was (5) ml of ethyl alcohol, and the volume was completed to 100 ml of distilled water. The assay was conducted under laboratory conditions in an experimental isolation box on whole plants grown in pots. Okra plants free of any infection were selected, previously planted in plastic pots were provided @ 25 nymphs on each plant, for three replicates for each concentration, besides control treatment. The treated pots with the specified concentrations were transferred to the (experimental isolation box), which was designed to an ensure that aphids do not transfer between nine treatmentsa three replications.

The results were analyzed statistically using the GenStat Release 2009 V12.1 program in a completely randomized design (CRD)by LSD (p=0.05) after corrections by Abbott's formula (Abbott., 1987).

RESULTS AND DISCUSSION

The effect of ethyl alcohol extract of *S. aegyptiaca* on *A. gossypii* nymphs (Table 1) extract of *S. aegyptiaca*

Table 1. Efficacy of plant extract on mortality of *A. gossypii* nymphs

Concentrations mg/ ml	Mortality/ hr			Concentration rate
	24	48	72	
Control	0.00	0.00	0.00	0.00
5	41.32	52.44	66.68	52.44
10	53.32	68.44	82.68	68.44
20	73.32	82.21	92.00	82.21
Mean	41.99	49.99	60.34	
LSD (p<0.05) concentrations = 2.9	for periods = 2.512			interaction = 5.024
Control	0.00	0.00	0.00	0.00
5	18.68	29.32	37.32	28.44
10	25.32	38.68	53.32	39.10
20	41.32	49.32	74.68	55.10
Average period	21.33	29.33	41.33	
LSD (p<0.05) concentrations = 4.352	for periods = 3.768			interaction = 7.536

showed superior effectiveness with high mortality of *A. gossypii* nymphs. Mortality increased with concentration of the extract and time. Highest mortality was recorded at the treatment (20) mg/ ml giving mortality and of 73.32, 81.32, 92.00% at the time periods of 24, 48, 72 hr, respectively. Least mortality was recorded with a concentration of (5) mg/ ml. These results agree with Mohamed. (2019) that the highest concentration of *Isaria fumosorosea* plant extract (20) mg/ ml caused maximum mortality. The cause of the mortality of *A. gossypii* nymphs may be because *S. aegyptiaca* contains alkaloids, saponins, and tannins (Ahmed et al., 2023). Alkaloids, along with saponins and tannins, act as potent insecticides that repel and harm insect pests. (Eich., 2008; Adeyemi., 2010). Present results are agree with those of Rathi. (2013) on ethyl extract of *S. aegyptiaca* on the citrus whitefly, *Dialerodus citri*.

The effect of ethyl alcohol extract of *A. herba-alba* on *A. gossypii* nymphs given in Table 1 reveal that ethyl alcohol extract showed effectiveness in mortality *A. gossypii* nymphs. Significant differences appeared between the concentrations and mortality increased with concentration. As the period increased, the results showed that the highest levels of mortality were recorded when treated at a concentration of (20) mg/ ml (41.32, 49.32, 74.68%) at 24, 48 and 72 hr respectively. Phytochemical analysis data revealed a strong presence of phenolic compounds, flavonoids, alkaloids, proteins, saponins, tannins, carbohydrates, terpanoids, and glycosides in the ethanolic extract of *A. herba-alba*

(Benmeziane et al., 2023), in addition, several reports advisable that the main components present in *A. herba-alba* plants are the primary agents responsible for their insecticidal effects on a variety of insect pests. The cause of the mortality of *A. gossypii* nymphs may be because of phenolic compounds, which are toxic compounds that are insecticidal (Ogbonna et al., 2016). This study agrees with (Bekiri et al., 2023). *Thymus vulgaris* and *A. herba-alba* had a very significant effect on *Ectomyeloides ceratoniae* (Bekiri et al., 2023). Other treatments such as polygonum plant extracts, *Spilanthes*, tobacco extracts, neem pesticides, and garlic extracts were also found effective against aphids (Ghosh, 2017). Thus, botanical pesticides possess a variety of mechanisms of action on target pests, including repellency, toxicity, growth restriction, and phenotypic change, making them viable alternatives for application in agricultural pest management (Kushram et al., 2017; Rattan, 2010). The current study proved that there is a direct effect between the concentrations and the period of the effect of the alcoholic extract of *S. aegyptiaca* and *A. herba-alba*.

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AUTHOR CONTRIBUTION STATEMENT

ASA, NHA and AIA conceived of the original idea. ASA, NHA and AIA developed the theoretical and performed the statistical analysis for experimental data. ASA and AIA verified the analytical methods. NHA and AIA worked for lab analysis and supervises the project. ASA, NHA and AIA discussed the results and contributed to write the manuscript.

CONFLICT OF INTEREST

No conflict of interest.

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