Influence of Jasmine Thrips, *Thrips orientalis*, Infestation on the Physical Characteristics of Jasmine Oil

Samah E. M. Nosier [*(1)], Ayat I. El-Kholy [(1)], and Ashraf Salah [(1)]

(1). Plant Protection Research Institute, Agricultural Research Center, Dokki, Giza, Egypt.
(*Corresponding author: dr.ashrafsalah@yahoo.com).

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Abstract

The present study aimed to determine the influence of infestation by Jasmine Thrips, *Thrips orientalis* (Bagnall), on the physical characteristics of jasmine oil extracted from flowers of Jasminum grandiflorum. Experiments were conducted during the 2026 season at two locations representing two governorates: the greenhouses of the Agricultural Research Center, Dokki, Giza Governorate, and a private field in Tokh City, Qaliobya Governorate, under greenhouse conditions. The population density of T. orientalis was monitored weekly on jasmine leaves and flowers throughout the study period. The results showed that the mean population density of T. orientalis increased gradually during the growing season and reached one peak during the spring season (March–May). Laboratory analyses were conducted on jasmine flowers collected from infested and non-infested plants at both locations to determine the effect of thrips infestation on the physical characteristics of the extracted jasmine oil. The physical characteristics evaluated included color, odor, texture, volatilization, relative density, solubility in alcohol, specific gravity, freezing point, refractive index, optical rotation, and oil yield per kilogram of fresh jasmine flowers. The results showed that three characteristics—color, odor, and texture—were not affected by *T. orientalis* infestation. In contrast, infestation resulted in significant differences in the other evaluated characteristics at the examined locations. The results indicate that infestation by *T. orientalis* may negatively affect both the physical properties and yield of jasmine oil.

Key words: *jasmine flowers, Thrips orientalis, jasmine oil, greenhouses, physiological characteristics*

1-Introduction:

Jasmine, Jasminum grandiflorum (Family: Oleaceae), is one of the most widely cultivated ornamental and aromatic plants. It is grown both in open fields and under greenhouse conditions and is valued for its attractive flowers and aromatic properties (Islam et al., 2025). Jasmine species are widely cultivated for ornamental and commercial purposes, while their flowers are an important source of essential oil used in the perfume and cosmetic industries (Mohammad and Aliyu, 2023). In addition, J. grandiflorum is considered an economically important ornamental crop that provides a recurrent source of income for farmers (Pirithiraj et al., 2023).

Jasmine is attacked by several insect pests, among which Jasmine Thrips, *Thrips orientalis* (Bagnall) (Thysanoptera: Thripidae), is an important pest associated with jasmine plants. Ashrith and Jayalaxmi (2020) reported the occurrence of several insect pests on jasmine, including T. orientalis. Pirithiraj and Soundararajan (2023) also reported the infestation of jasmine plants by several insect pests, including Jasmine Thrips, which may cause damage to flowers and other plant parts.

Lima et al. (2018) investigated species identification within the thrips genus-group in Brazil and reported the occurrence of thrips species associated with jasmine plants. Infestation by *T. orientalis* may occur on both leaves and flowers and, under high infestation levels, may result in deformation and damage to young buds, leaves, and flowers.

Seasonal population fluctuations of *T. orientalis* have been reported in association with jasmine production. Shyam et al. (2019) studied the seasonal incidence of *T. orientalis* on flowers of Jasminum multiflorum and reported an increase in thrips population during the spring season, particularly from March to May. Neelima (2005) also reported an increase in the population of Jasmine Thrips during the spring months, with associated damage to young buds, leaves, and flowers.

The occurrence of insect infestation may affect not only flower production but also the quality and quantity of products obtained from aromatic plants. Jasmine essential oil is a high-value product, and its quality can be influenced by several biological and environmental factors (Mohammad and Aliyu, 2023). Previous studies have mainly focused on the population dynamics, seasonal incidence, and damage caused by Jasmine Thrips to jasmine plants and flowers. However, comparatively limited attention has been given to the possible influence of *T. orientalis* infestation on the physical characteristics and yield of jasmine oil.

Therefore, the present study aimed to investigate the influence of *T. orientalis* infestation on the physical characteristics and yield of jasmine oil extracted from J. grandiflorum flowers under greenhouse conditions at two locations in Egypt.

2. Materials and Methods

2.1. Experimental Sites and Plant Material

The study was conducted during the 2026 growing season on jasmine plants, Jasminum grandiflorum, at two locations representing two governorates in Egypt: the greenhouses of the Agricultural Research Center, Dokki, Giza Governorate, and a private garden in Tokh City, Qaliobya Governorate.

Jasmine seedlings were planted in mid-January 2026 at both locations. At each location, one plastic greenhouse measuring 20 × 25 m was used. Each greenhouse was divided into two equal sections. One section was maintained as a non-infested control, whereas the other section was artificially infested with Jasmine Thrips, *Thrips orientalis*.

The two sections within each greenhouse were separated using polyethylene plastic netting with small openings (0.5 mm) to minimize movement of the insects between the two treatments. Each section was further divided into five plots, each measuring 5 × 7 m, which were considered replicates..

2.2. Population Fluctuation of Jasmine Thrips

An artificial infestation of *T. orientalis* was established in the designated infested section of each greenhouse, whereas the other section was maintained free from infestation and served as the control.

Observations and counts of *T. orientalis* were conducted weekly throughout the study period. Sampling was initiated on 1 February 2026 and continued until 21 June 2026.

Ten jasmine leaves and ten jasmine flowers were randomly collected from five jasmine plants in each plot during each sampling date. The number of *T. orientalis* individuals was recorded, and the mean population density was calculated for leaves and flowers. The population recorded on the plant was obtained from the corresponding leaf and flower observations.

2.3. Collection of Jasmine Flowers for Oil Analysis

At the end of the growing season, jasmine flowers were collected separately from infested and non-infested plants at each experimental location. The collected flowers were placed in clean paper bags and transferred to the Plant Physiology Laboratory, Faculty of Science, Ain Shams University, for laboratory analysis.

For each treatment, 1.0 kg of fresh jasmine flowers was used for determination of the characteristics and yield of jasmine oil.

2.4. Determination of Jasmine Oil Characteristics

Jasmine oil was obtained from 1.0 kg of fresh jasmine flowers collected from infested and non-infested plants. The extracted oil was collected and maintained under suitable conditions until determination of its physical characteristics.

The evaluated characteristics included color, odor, texture, volatilization (%), relative density, solubility in alcohol (%), specific gravity, freezing point (°C), refractive index (n), optical rotation, and oil yield expressed as g kg^{-1} fresh jasmine flowers.

The physical characteristics of the jasmine oil obtained from flowers collected from T. orientalis-infested plants were compared with those of oil obtained from non-infested plants (control).

2.5. Statistical Analysis

The recorded data were statistically analyzed using analysis of variance (ANOVA). Mean comparisons were performed using the Least Significant Difference (LSD) test at the 0.05 probability level using SAS statistical software (SAS Institute, 1988).

The laboratory determinations were repeated for the jasmine flower samples collected from the experimental treatments at the two locations, and the resulting measurements were used for comparison of the evaluated characteristics.

3. Results and Discussion

3.1. Population fluctuations of Jasmine Thrips, *Thrips orientalis* infesting jasmine plants:

The results presented in Table 1 show the population fluctuation of Jasmine Thrips, *Thrips orientalis*, on jasmine plants at Giza and Qaliobya Governorates during the 2026 growing season.

At Giza Governorate, the mean population densities of *T. orientalis* were 16.5 individuals per leaf, 9.6 individuals per flower, and 26.1 individuals per plant, respectively. At Qaliobya Governorate, the corresponding mean population densities were 20.5 individuals per leaf, 10.3 individuals per flower, and 30.8 individuals per plant, respectively.

The results indicate that the population density of *T. orientalis* was generally higher at Qaliobya than at Giza. The population increased progressively during the spring period and reached its highest levels during March–May, followed by a gradual decline toward the end of the observation period in June.

The statistical analysis showed significant differences among the successive population counts of T. orientalis. At Giza Governorate, the F-values were 327.21, 341.25, and 375.21, whereas the corresponding LSD values were 1.024, 1.035, and 1.032 for leaves, flowers, and plants, respectively. At Qaliobya Governorate, the F-values were 235.72, 262.37, and 325.76, with corresponding LSD values of 1.046, 1.043, and 1.085 for leaves, flowers, and plants, respectively.

The observed increase in *T. orientalis* population during spring is consistent with the findings of Shyam et al. (2019), who reported an increase in the population of *T. orientalis* on Jasminum multiflorum flowers, with higher population levels during the spring months from March to May. Neelima (2005) similarly reported that populations of Jasmine Thrips increased during spring and were associated with damage to young buds, leaves, and flowers.

Laurence (2005) reported the occurrence of *T. orientalis* in association with jasmine and indicated its importance as a pest of jasmine flowers. Bhatti (1980) also reported the association of *T. orientalis* with jasmine and other ornamental plants and described seasonal increases in its population during the warmer months.

The differences observed between the two experimental locations may be associated with differences in local environmental conditions and other factors affecting thrips population development. Nevertheless, the consistent seasonal increase observed at both locations suggests that spring represents an important period for monitoring and management of *T. orientalis* in jasmine plantations.

Table (1): Population Fluctuations of Jasmine Thrips, *Thrips orientalis*, Infesting Jasmine Plants at Giza and Qaliobya Governorates During the 2026 Growing Season

Date	Giza			Qaliobya		
	leaf	flower	plant	leaf	flower	plant
1/2/2026	7	-	7	9	-	9
8/2/2026	10	-	10	13	-	13
15/2/2026	12	-	12	16	-	16
22/2/2026	14	7	21	18	6	24
1/3/2026	15	8	23	20	7	27
8/3/2026	17	10	27	22	9	31
15/3/2026	19	11	30	24	12	36
22/3/2026	18	10	28	25	10	35
29/3/2026	20	12	32	27	13	40
5/4/2026	21	15	36	28	17	45
12/4/2026	23	17	40	30	19	49
19/4/2026	25	18	43	32	20	52
26/4/2026	24	16	40	29	17	46
3/5/2026	22	13	35	25	15	40
10/5/2026	20	12	32	23	13	36
17/5/2026	18	12	30	20	12	32
24/5/2026	16	10	26	17	11	28
31/5/2026	15	9	24	16	10	26
7/6/2026	12	8	20	14	9	23
14/6/2026	10	7	17	12	8	20
21/6/2026	9	6	15	10	7	17
Total	**347**	**201**	**548**	**430**	**217**	**647**
Mean	**16.5**	**9.6**	**26.1**	**20.5**	**10.3**	**30.8**
F-value	**327.21**	**341.25**	**375.21**	**235.72**	**262.37**	**325.76**
LSD (0.05)	**1.024**	**1.035**	**1.032**	**1.046**	**1.043**	**1.085**

Means within columns bearing different subscripts are significantly different (P< 0.05)

3.2. Influence of *Thrips orientalis* Infestation on the Physical Characteristics of Jasmine Oil

The results presented in Table 2 and Figures 1 and 2 demonstrate the influence of *T. orientalis* infestation on the evaluated physical characteristics of jasmine oil obtained from jasmine flowers.

Three characteristics of the jasmine oil—color, odor, and texture—did not differ among the control and infested treatments at the examined locations. These characteristics were therefore considered unaffected by *T. orientalis* infestation under the conditions of the present study.

In contrast, the remaining evaluated characteristics showed significant differences among the treatments. Volatilization decreased from 98% in the control to 96% and 93% in the Giza and Qaliobya treatments, respectively. The freezing point decreased from 17°C in the control to 15°C and 13°C in the Giza and Qaliobya treatments, respectively.

Relative density decreased from 1.9 in the control to 1.7 and 1.5 in the Giza and Qaliobya treatments, respectively. Similarly, specific gravity decreased from 0.9 in the control to 0.7 and 0.5, respectively.

Solubility in alcohol decreased from 97% in the control to 95% and 93% in the Giza and Qaliobya treatments, respectively.

The refractive index decreased from 1.37 in the control to 1.20 and 1.05 in the Giza and Qaliobya treatments, respectively. Optical rotation decreased from 1.25 in the control to 1.12 and 1.07, respectively. In addition, jasmine oil yield decreased from 3.0 g kg^{-1} fresh flowers in the control to 2.4 and 2.0 g kg^{-1} in the Giza and Qaliobya treatments, respectively.

The results indicate that infestation by *T. orientalis* was associated with changes in several physical characteristics of jasmine oil and with a reduction in oil yield. The greater reductions observed in samples collected from Qaliobya corresponded with the higher thrips population recorded at that location.

The present findings are generally consistent with previous reports indicating that insect infestation may adversely affect jasmine flower quality and the production and characteristics of jasmine-derived products. Shambhu et al. (2022) reported that *T. orientalis* is an important pest of jasmine and may cause damage to flowers and affect their quality. Mohammad and Aliyu (2023) emphasized the economic importance of jasmine essential oil and noted that its yield and quality can be affected by different factors, including pest infestation.

Manal (2026) also emphasized the economic importance of jasmine cultivation in Egypt and reported the negative effects associated with Jasmine Thrips infestation on jasmine flower production and the quality of jasmine products. Muhammad and Ali (2016) discussed the importance of jasmine and other aromatic flowers in medicinal and related industries and indicated that insect attack can influence the properties of floral oils.

Laurence and Masami (2005) documented the diversity and importance of thrips associated with ornamental plants, including species capable of causing substantial injury to host plants. Meenatchi et al. (2011) also reported negative effects of insect pests, including T. orientalis, on jasmine plants and flowers.

Overall, the present results suggest that maintaining jasmine plants free from *T. orientalis* infestation may contribute to preserving the physical characteristics and yield of jasmine oil. The observed seasonal increase in thrips population during spring further emphasizes the importance of monitoring and appropriate pest-management practices during this period.

Table (2): Influence of *Thrips orientalis* Infestation on the Physical Characteristics of Jasmine Oil

Characteristic	Control	Giza	Qaliobya	F-value	LSD (0.05)
Color	Normal	Normal	Normal	ns	ns
Odor	Normal	Normal	Normal	ns	ns
Texture	Normal	Normal	Normal	ns	ns
Volatilization %	98 ^{a}	96 ^{b}	93 ^{c}	13.07***	1.075
Freezing point (°C)	17 ^{a}	15 ^{b}	13 ^{c}	14.34**	1.023
Relative density	1.9 ^{a}	1.7 ^{b}	1.5 ^{c}	12.35***	1.045
Specific Gravity kn/m^{3}	0.9 ^{a}	0.7 ^{b}	0.5 ^{c}	14.33**	1.021
Solubility in alcohol (%)	97 ^{a}	95 ^{b}	93 ^{c}	13.25**	1.027
Refractive index	1.37 ^{a}	1.20 ^{b}	1.05 ^{c}	10.15*	1.053
Optical Rotation (nano)	1.25 ^{a}	1.12 ^{b}	1.07 ^{c}	11.05*	1.024
Oil yield (g kg^{-1} fresh flowers)	3.0 ^{a}	2.4 ^{b}	2.0 ^{c}	12.17***	1.083

Different letters within the same row indicate significant differences according to the LSD test at the 5% probability level.

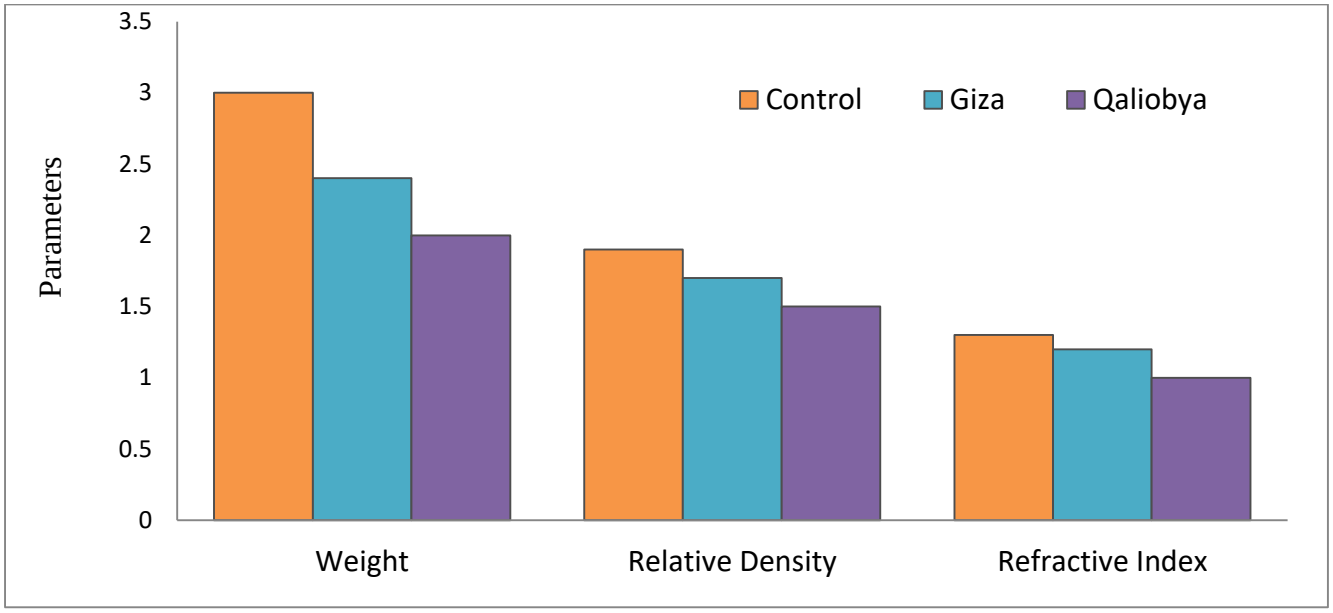

Fig. (1): Influence of *Thrips orientalis* infestation on selected physical characteristics of jasmine oil.

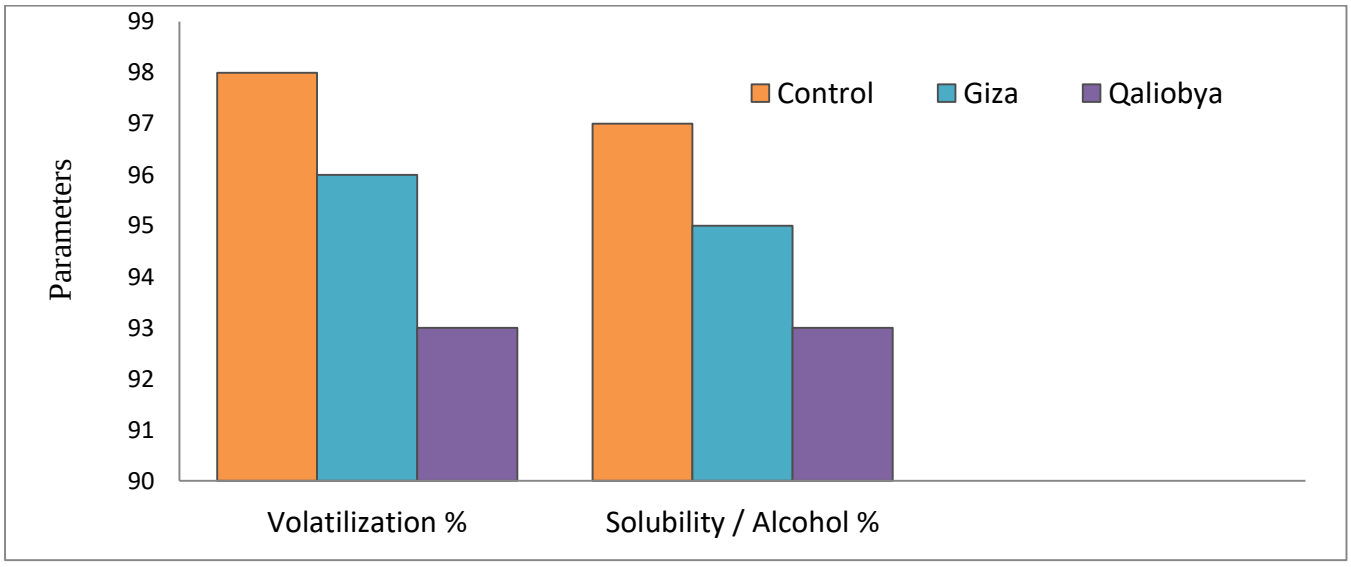

Fig. (2): Influence of *Thrips orientalis* infestation on jasmine oil yield and other evaluated physical characteristics

5. Conclusion

The present study investigated the influence of Jasmine Thrips, *Thrips orientalis*, infestation on the population dynamics of the pest and on selected physical characteristics and yield of jasmine oil obtained from Jasminum grandiflorum flowers.

The population density of *T. orientalis* increased gradually during the growing season and reached its highest levels during the spring period (March–May) at both experimental locations. The population was generally higher at Qaliobya than at Giza.

The evaluation of jasmine oil showed that color, odor, and texture were not affected by *T. orientalis* infestation. In contrast, significant differences were observed in volatilization, freezing point, relative density, specific gravity, solubility in alcohol, refractive index, optical rotation, and oil yield. The results also showed a reduction in jasmine oil yield associated with infestation.

These findings indicate that *T. orientalis* infestation may adversely affect the physical characteristics and yield of jasmine oil. Therefore, regular monitoring of Jasmine Thrips, particularly during the spring season, is recommended as an important component of jasmine pest-management programs.

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