



## EFFECT OF SOWING DATES IN CUCUMBER ON INCIDENCE OF *THRIPS TABACI* (LINDEMAN)

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### ABSTRACT

Experiments were conducted in Fayoum Governorate, Egypt to evaluate the impact of sowing dates on onion thrips *Thrips tabaci* (Lindeman) that attack cucumber (*Cucumis sativus* L.). The study spanned two consecutive years (2018 and 2019) and involved three planting dates: March, August, and October. Weekly thrips counts were recorded and compared across the different planting dates. According to the results, *T. tabaci* nymphs recorded maximum incidence in March sowing date and amounted to  $118.5 \pm 19.79$  and  $79.6 \pm 18.99$  individuals/sample. While cucumber crop in October sowing date hosted the lowest number of *T. tabaci* nymphs amounted to  $34.1 \pm 7.38$  and  $29.5 \pm 7.57$  individuals/sample. Temperature and population of *T. tabaci* nymphs correlated significantly in August and October cucumber plantations.

**Key words:** *Thrips tabaci*, incidence, spread, population abundance, IPM, Egypt, vegetable crops, seasonal incidence, pests, infection, climate change, population dynamics, temperature

Thrips feeding on immature cucumber fruit can have detrimental effects, leading to silvery scarring and potential malformation of the fruit. This damage can significantly impact the quality and appearance of the fruit, ultimately resulting in downgraded produce and reduced market prices (Rosenheim et al., 1990). The feeding injury inflicted by thrips on leaves can have negative consequences, impacting leaf size and photosynthesis, which ultimately leads to significant yield loss (Welter et al., 1990; Shipp et al., 1998a). Thrips target various parts of plants, such as buds, leaves, and flowers. When there is a high infestation of these pests, it can severely diminish the quality of agricultural products, sometimes by as much as 50% (El-Sheikh et al., 2021). It occurs *tabaci* (Lindeman) is a widespread insect pest with a broad diet, making it polyphagous. It has a global presence and has been documented on over 300 plant species. As a key pest, it poses a significant threat to onion cultivation and various other crops. Effective control measures against *T. tabaci* are crucial for ensuring successful crop production and maintaining profitability (Woldemelak, 2020). It occurs in a broad range of regions, including tropical, subtropical, and temperate areas (Pourian et al., 2009).

The examination of the spatial distribution pattern of insects is considered an essential step in studying their populations. It offers fundamental insights that help in designing effective and economical sampling strategies

for estimating population size and implementing pest management measures. (Kuno, 1991; Pedigo and Buntin, 1993; Esfandiari and Mossadegh, 2007; Southwood and Henderson, 2009). *Thrips tabaci* hold significant economic importance as pests of onion. This is primarily due to their rapid reproduction rate, short generation time, and their ability to cause damage to onion plants throughout the growth season (Salem and Noeman, 2019). Planting dates in onion effect population of thrips (Dwivedi et al., 2022). In a field study, they monitored thrips aggregations in cucumber fields over multiple growing seasons and observed fluctuations in thrips abundance throughout the crop cycle, with peak aggregations occurring during certain phases, such as flowering or fruiting (Smith et al., 2018). This study aims to understand the relationship between planting dates and pest fluctuations. The results will enable farmers to select the optimal planting dates that minimizes the risk of pest damage while maximizing crop growth and yield potential.

### MATERIALS AND METHODS

The experiment was conducted in the Fayoum Governorate - Ibshway Center - Abu Kassa Village. The area of 200 m<sup>2</sup> was planted with cucumber Heyal hybrid. This area was divided into 4 equal sections; each of 42 m<sup>2</sup> was replicate. The planting was three different dates, the first week of March, the third week of August and the first week of October in the two

consecutive years (2018 and 2019) all agricultural practices used were followed with the exclusion of the use of pesticides in control. Samples were taken two weeks after the start of cultivation until the end of the crop. A sample was taken randomly chosen weekly, it was 25 leaves from each replicate (A total of 100 leaves) at 8:30 am, and they were placed a piece of cotton saturated with ether was placed to anesthetize the thrips. The samples were transferred to the laboratory on the same day and examined under a stereiozoom microscope, and the results were recorded. The results were analyzed by one-way ANOVA and means were separated by Duncan's Multiple Range Test (Duncan 1955). Analysis was conducted using CoStata software programme.

### RESULTS AND DISCUSSION

The results in Fig. 1 show the population density of *T. tabaci* nymphs on cucumber in various sowing dates during 2018 and 2019 in Fayoum Governorate. In 2018, March sowing date *T. tabaci* nymphs had the

largest peak in the third week of April (27.0°C and 28.6 RH%) with 217 individuals/ sample. In August sowing date, it recorded the largest peak of the fourth week of September (27.2°C and 44.0 RH%) with 151 individuals/sample. In October sowing date, it peaked in the first week of November (22.1 °C and 41.8 RH%) with 74 individuals/ sample. (Abd EL-Wahab et al., 2012). Maximum counts of *T. tabaci* were recorded in August plantations of cucumber (923 individuals/ 25 leaves). During 2019, in March sowing, *T. tabaci* nymphs had the greatest peak in the second week of April (17.2°C and 43.4 RH%) with 192 individuals/ sample; August sowing date, with peak in the fourth week of September (27.4°C and 43.7 RH%- 124 individuals/ sample); in October sowing date peak was the second week of November (23.1°C and 48.1 RH%- 67 individuals/sample). The results revealed that October sowing date recorded the least incidence of 15.2- 17.6%. When both years were considered together March sowing date led to maximum of 52.8% to 47.6%. Awadalla et al. (2018) found that the numbers of *T. tabaci* that attack squash plants in 2014 and 2015 seasons were the highest in March plantation followed by June and August plantations. Saleh et al. (2017) observed that *T. tabaci* was less in autumn plantation. It can be noticed that, cucumber crop in March sowing date hosted the largest number of *T. tabaci* nymphs (118.5± 19.79 and 79.6± 18.99 individuals/ sample). In October sowing date it was the east 34.1± 7.38 to 29.5± 7.57 individuals/ sample. Medshikar et al. (2023) found that during summer 2022, the peak population of thrips was observed during the final week of March (17th standard meteorological week) with an average count of 15.22 thrips/ plant. Statistical analysis revealed that highly significant differences were obtained for *T. tabaci* in relation to the various sowing dates during the two years in Fayoum governorate. The correlation relationships between temperature and incidence of *T. tabaci* nymphs were significant in August and October plantations of cucumber during the first and second year. However, the relation between nymphs of *T. tabaci* and relative humidity was only significant in October and August plantations in the first and second year.

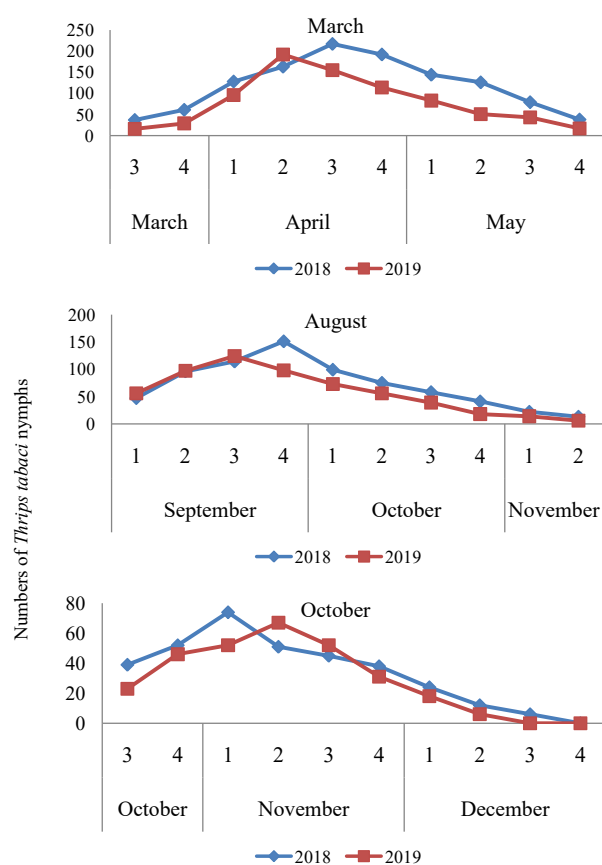


Fig. 1. The population density of *Thrips tabaci* nymphs at different cucumber sowing dates (March, August, and October-2018 and 2019)

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**AUTHOR CONTRIBUTION STATEMENT**

Wahsh conducted the experiments and wrote the paper. Awadalla, El-Serafi and El-Hariry discuss the results and review the writing of the paper.

**CONFLICT OF INTEREST**

No conflict of interest.

**REFERENCES**

- Abd El-Wahab A S, Salah S, Elnagar S, El-Sheikh M A K. 2012. First record in Egypt of two thrips species infesting cucumber crop. *Academic Journal of Entomology* 5(3): 164-168.
- Awadalla H S S, El-Kady H A, Eisa M M A. 2018. Effect of planting dates on the cotton mealybug *Phenacoccus solenopsis* (Tinsley) as a main insect pest attacking tomato plants in Damietta governorate. *Journal of Plant Protection and Pathology, Mansoura University* 9(3): 167-169.
- Dwivedi P K, Tripathi R A, Mishra S P, Tripathi S, Kumar M, Panday A K, Pandey M, Tiwari S K. 2022. Impact of planting dates on *Thrips tabaci* Lindeman infestation and yield in onion (*Allium cepa* L.) in central India. *The Journal of Phytopharmacology* 11(2): 97-100.
- El-Sheikh W E, Fadl H A A, El Kenway A H. 2021. Prey-predator interaction between *Orius albidipennis* (Hemiptera: Anthocoridae) and *Thrips tabaci* (Thysanoptera: Thripidae). *Journal of Applied Plant Protection* 10(1): 1-8.
- Esfandiari M, Mossadegh M S. 2007. Spatial distribution and sampling of *Icerya purchasi* Mask (Hom.: Margarodidae) on orange trees in southwest. *Journal of Biological Sciences* 7(7): 1239-1243.
- Kuno E. 1991. Sampling and analysis of insect populations. *Annual Review of Entomology* 36(1): 285-304.
- Medshikar R U, Aghav S T, Wayal C B, Chaudhari C S, Patil M R. 2023. Seasonal dynamics of thrips, *T. tabaci* and fruit flies, *B. cucurbitae* on cucumber. *The Pharma Innovation Journal* 12(1): 685-687.
- Pedigo L P, G D Buntin (eds.). 1993. Handbook of sampling methods for arthropods in agriculture. CRC press.
- Pourian H R, Mirab-balou M, Alizadeh M, Orosz S. 2009. Study on biology of onion thrips, *Thrips tabaci* Lindeman (Thysanoptera: Thripidae) on cucumber (var. Sultan) in laboratory conditions. *Journal of Plant Protection Research* 49(4): 390-394.
- Rosenheim J A, Welter S C, Johnson M W, Mau R F, Gusukuma-minuto L R. 1990. Direct feeding damage on cucumber by mix-species infestations of *Thrips palmi* and *Frankliniella occidentalis* (Thysanoptera: Thripidae). *Journal of Economic Entomology* 83: 1519-1525.
- Saleh A A A, El-Sharkawy H M, El-Santel F S, Abd El-Salam R A. 2017. Seasonal abundance of certain piercing sucking pests on cucumber plants in Egypt. *Egyptian Academic Journal of Biological Sciences* 10(7): 65-79.
- Salem H, Noeman A R E F. 2019. Integration between transplanting date and cultivar type in management population of onion thrips (thysanoptera: thripidae) attacking onion plants in the field conditions. *International Journal of Agriculture Forestry and Life Sciences* 3(1): 121-130.
- Shipp J L, Hao X, Papadopoulos A P, Binns M R. 1998a. Impact of western flower thrips (Thysanoptera: Thripidae) on growth, photosynthesis and productivity of greenhouse sweet pepper. *Scientia Horticulturae* 72: 87-102.
- Smith J, Johnson B, Anderson J. 2018. Population dynamics of *Thrips tabaci* (Thysanoptera: Thripidae) and their relationship to thrips-vectored tospoviruses in southwestern Virginia tobacco. *Journal of Economic Entomology* 111(3): 1054-1061.
- Southwood T R E, Henderson P A. 2009. Ecological methods. John Wiley & Sons.
- Welter S C, Rosenheim J A, Johnson M W, Mau R F L, Gusukuma-Minuto L R. 1990. Effects of *Thrips palmi* and western flower thrips (Thysanoptera: Thripidae) on yield, growth, and carbon allocation patterns in cucumbers. *Journal of Economic Entomology* 83: 2092-2101.
- Woldemelak W A. 2020. The major biological approaches in the integrated pest management of onion thrips, *Thrips tabaci* (Thysanoptera: Thripidae). *Journal of Horticultural Research* 28(1): 13-20.

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