

Determination of aphid (Hemiptera: Aphidoidea) species on vegetable and fruit fields in central districts of Konya province

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Abstract

This study was carried out to determine the aphid species found on fruit and vegetable fields in central districts (Karatay, Meram, and Selçuklu) of Konya province, a total of 218 samples were examined between 2022-2023 years and 20 aphid species belonging to Aphidinae subfamily of Aphidoidea superfamily were identified. These species are: *Aphis craccivora* Koch, *Aphis fabae* Scopoli, *Aphis gossypii* Glover, *Aphis nasturtii* Kalténbach, *Aulacorthum solani* (Kalténbach), *Brachycaudus (Thuleaphis) amygdalinus* (Schouteden), *Brachycaudus (Prunaphis) cardui* (L.), *Brachycaudus helichrysi* (Kalténbach), *Brachycaudus (Scrophulaphis) persicae* (Passerini), *Brevicoryne brassicae* (Linnaeus), *Dysaphis (Pomaphis) plantaginea* (Passerini), *Dysaphis (Pomaphis) pyri* (Boyer de Fonscolombe), *Hyalopterus pruni* (Geoffroy), *Macrosiphum euphorbiae* (Thomas), *Myzus cerasi* (Fabricius), *Myzus lythri* (Schrank), *Myzus (Nectarosiphon) persicae* (Sulzer), *Nasonovia ribisnigri* (Mosley), *Rhopalosiphum nymphaeae* (Linnaeus) and *Rhopalosiphum padi* (Linnaeus). *Aphis gossypii*, *A. fabae*, *A. nasturtii*, *Hyalopterus pruni* and *Myzus (Nectarosiphon) persicae* were found to be the most common and widely distributed species in the study.

Keywords: Aphidoidea, Aphid diversity, Aphid-host plants, Aphid, Konya

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INTRODUCTION

Türkiye has suitable climatic conditions and fertile soil, allowing the cultivation of different varieties of fruits and vegetables. When we look at the distribution of agricultural fields by province, Konya is the province with the most agricultural field (MEVKA, 2024). In 2023 year data, the vegetable growing field in Konya province was reported as 357.767 decares and the fruit growing field was 417.107 decares (TÜİK, 2024). Many problems are encountered in fruit and vegetable growing fields in Turkey. Among these, diseases and pests are important. Aphids are one of these pests that cause the most damage. Aphids are a significant insect group with regard to species diversity and density; there are 5.942 species of aphids worldwide, categorized into 538 genera (Favret, 2024). In Turkey, aphids have been observed to feed on both cultivated and wild plants and 675 aphid species have been recorded (Başer et al., 2024). Aphids belong to the superfamily Aphidoidea (Hemiptera); they feed on plant sap in the fruits, leaves, shoots, stems or roots of plants. As a result of their feeding, deformities result in the leaves, shoots, and fruits, and the plants show signs of stunting and curling of their leaves. During feeding, aphids release a lot of honeydew which provides a favorable environment for the growth of saprophytic fungus. Consequently, the leaves become covered with sooty mold which blocks photosynthesis and results in the yellowing of the leaves. More importantly, aphids can serve as vectors of many plant viruses. This virus transmission is the most significant damage done to plants and results in great plant losses (Toros et al., 2002).

Although there are many studies on aphids in Turkey, there are no studies on aphids in fruit and vegetable fields in the central districts of Konya province. This study, aims to determine the aphid species and their hosts found in fruit and vegetable fields in the central districts of Konya province.

MATERIALS AND METHODS

Field Surveys and Collection of Aphid Samples

Depending on the climatic conditions, field surveys were carried out every week between May and October in 2022-2023. Samples were collected by cutting the leaves and stem parts of aphid-infested plants with pruning shears. The cut samples were first wrapped in paper and then placed in nylon bags labeled with respect to date, location and host plant type, then the samples were brought to the laboratory. Adult aphids were selected from the collected samples and transferred into Eppendorf tubes containing 96% ethyl alcohol using a brush.

Preparation and Classification

The Hille Ris Lambers (1950) technique was used in the preparation of the aphid samples. Measurements of morphological characteristics were made according to Hille Ris Lambers (1945, 1947a, 1947b, 1949, 1969, 1973), Börner (1952), Cottier (1953), Remaudiere (1954), Börner and Heinze (1957), Bodenheimer and Swirski (1957), Stroyan (1957, 1961, 1963, 1977, 1984), Shaposhnikov (1964), Tuatay and Remaudiere (1964), Eastop (1971, 1972), Bissel (1978), Blackman and Eastop (1984, 1994, 2000). The aphids were systematically classified from the catalog of Remaudiere and Remaudiere (1997) and Eastop and Hille Ris Lambers (1976).

RESULTS AND DISCUSSION

The aphid species and their host plants found on fruit and vegetable fields in central district of Konya province (Karatay, Meram, and Selçuklu) are showed in Table 1. Twenty aphid species were identified. In the study, *A. gossypii* was recorded as the most common species followed by *A. fabae*, *A. nasturtii*, *Hyalopterus pruni* and *M. (Nectarosiphon) persicae*. The aphids were collected from a total of 22 host plants. The plants most preferred by aphids were determined as *Cucumis melo* L., *Cucumis sativus* L. and *Prunus amygdalus* Batsch.

Similarly, a survey conducted by Pirçek (2023) on aphid species found on fruit and vegetable fields in the Samsun Çarşamba plain in the north of Türkiye reported that *A. gossypii* and *M. persicae* being the most common species. The aphids species collected in that region were *Acyrtosiphon (Tlja) lactucae* (Passerini), *A. pisum* (Harris), *Aphis craccivora*, *A. fabae*, *A. gossypii*, *A. nasturtii*, *A. pomi* De Geer, *A. spiraeicola* Pacht, *A. triglochinis* Theobald, *Brachycaudus (Thuleaphis) amygdalinus*, *B. helichrysi*, *Brevicoryne brassicae*, *Cavariella aegopodii* (Scopoli), *Dysaphis (Pomaphis) pyri*, *Hyalopterus pruni*, *Lipaphis erysimi* (Kaltenbach), *Myzus cerasi*, *M. persicae*, *Phorodon humuli* (Schränk), *Rhopalosiphum maidis* (Fitch), *R. padi* and *R. rufiabdominale* (Sasaki).

In another study surveying aphids on vegetables belonging to the Solanaceae family in Hatay province in the south of Türkiye, *Myzus persicae*, *Aulacorthum solani*, *Aphis fabae* and *A. nasturtii* were found to be dominant (Yalçinkaya, 2022). In the study carried out on fruit trees in the Isparta province and its districts in the south of Türkiye, *Myzocallis coryli* (Goetze), *Aphis pomi*, *Brachycaudus (Prunaphis) cardui*, *B. helichrysi*, *Dysaphis* sp., *D. devectora*, *D. plantaginea*, *D. pyri*, *Hyalopterus amygdali* (Blanchard), *H. pruni* (Geoffroy), *Corylobium avellanae* (Schränk), *M. cerasi*, *M. persicae* and *Eriosoma lanigerum* (Hausmann) species were recorded (Aslan and Karaca, 2005).

Fifteen aphids were detected in fruit plants studied in the Upper Çoruh Valley (Erzurum) in the east of Türkiye. *Aphis pomi*, *Hyalopterus pruni*, *Dysaphis devectora* (Walker), *D. (Pomaphis) pyri* and *Myzus cerasi* were recorded as the most common species (Narmanlıoğlu, 2013).

In the study carried out on peach orchards in Bursa province in the west of Türkiye, *Brachycaudus helichrysi*, *B. persicae*, *Hyalopterus pruni*, *Myzus persicae* and *Pterochloroides persicae* (Cholodkovsky) species were recorded (Saribal, 2019). In the study conducted on stone and pome fruit trees in Aydın province in the west of Türkiye, 8 genera and 18 aphids were recorded. *Hyalopterus pruni*, *Myzus persicae*, *M. cerasi*, *Aphis pomi* and *Dysaphis pyri* were the most common species (Karakaya, 2014).

CONCLUSION

The aphid fauna on fruits and vegetables in the central districts (Karatay, Meram, and Selçuklu) of Konya province was determined in this study. The findings further contribute to the aphid species and diversity of Türkiye and benefit future studies and aphid management in the Konya province. All identified aphid species are the first records for Konya province.

Table 1. List of aphid species and host plants found in central districts of Konya province

Species	Host plants
<i>Aphis craccivora</i>	<i>Brassica oleracea</i> L. <i>Cucurbita pepo</i> L.
<i>Aphis fabae</i>	<i>Phaseolus vulgaris</i> L. <i>Rumex obtusifolius</i> L. <i>Prunus amygdalus</i> Batsch <i>Cucumis melo</i> L.
<i>Aphis gossypii</i>	<i>Abelmoschus esculentus</i> (L.) <i>Cucurbita moschata</i> Duchesne <i>Cucurbita pepo</i> L. <i>Cucumis melo</i> L. <i>Cucumis sativus</i> L. <i>Solanum melongena</i> L. <i>Punica granatum</i> L. <i>Citrullus lanatus</i> (Thunb.) Matsum. & Nakai
<i>Aphis nasturtii</i>	<i>Capsicum annuum</i> L. <i>Cucumis sativus</i> L. <i>Cucumis melo</i> L.
<i>Aulocorthum solani</i>	<i>Cucumis sativus</i> L. <i>Citrullus lanatus</i> (Thunb.) Matsum. & Nakai
<i>Brachycaudus (Thuleaphis) amygdalinus</i>	<i>Prunus amygdalus</i> Batsch
<i>Brachycaudus (Prunaphis) cardui</i>	<i>Prunus amygdalus</i> Batsch
<i>Brachycaudus helichrysi</i>	<i>Prunus persica</i> (L.) Batsch <i>Prunus domestica</i> L.
<i>Brachycaudus (Scrophulaphis) persicae</i>	<i>Prunus domestica</i> L.
<i>Brevicoryne brassicae</i>	<i>Brassica oleracea</i> L.
<i>Dysaphis (Pomaphis) plantaginae</i>	<i>Malus domestica</i> L.
<i>Dysaphis (Pomaphis) pyri</i>	<i>Pyrus communis</i> L.
<i>Hyalopterus pruni</i>	<i>Prunus armeniaca</i> L. <i>Prunus domestica</i> L. <i>Prunus persica</i> (L.) Batsch
<i>Macrosiphum euphorbiae</i>	<i>Cucumis sativus</i> L.
<i>Myzus cerasi</i>	<i>Prunus cerasus</i> L. <i>Prunus avium</i> L.
<i>Myzus lythri</i>	<i>Prunus mahaleb</i> L.
<i>Myzus (Nectarosiphon) persicae</i>	<i>Prunus persica</i> (L.) Batsch <i>Abelmoschus esculentus</i> (L.) <i>Capsicum annuum</i> L.
<i>Nasonovia ribisnigri</i>	<i>Lactuca sativa</i> L.
<i>Rhopalosiphum nymphaeae</i>	<i>Prunus amygdalus</i> Batsch <i>Prunus armeniaca</i> L.
<i>Rhopalosiphum padi</i>	<i>Pyrus communis</i> L.

Compliance with Ethical Standards

Peer-review

Externally peer-reviewed.

Conflict of interest

The authors declare that they have no competing, actual, potential or perceived conflict of interest.

Author contribution

The contribution of the authors to the present study is equal. All the authors read and approved the final manuscript. All the authors verify that the Text and Table are original and that they have not been published before.

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