

MESOSTIGMATA (ACARI) OF BULACEOUS ORNAMENTAL PLANTS IN TURKEY

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BULBACEOUS PLANTS
MESOSTIGMATA
TURKEY
LASIOSEIUS
DENDROLAELAPS
MACROCHELES
PACHYLAELAPS
VEIGAIA
HYPOASPIS

SUMMARY: The aim of this study was to determine mite fauna of bulbaceous ornamental plants in Turkey. The samples were collected during 2000-2002 mainly in Ankara-Turkey. Mesostigmata samples are evaluated in this paper. Host plants, frequency and occurrence rates are included. In total 30 mesostigmatid species belonging to 17 genera and 11 family were identified during the survey. *Lasioseius berlesei*, *Dendrolaelaps zweelferi*, *Macrocheles robustulus*, *Pachylaelaps vexillifer*, *Veigaia planicola*, *Hypoaspis angusta*, *H. brevipilis* and *H. subterranea* are new records to Turkey. *Hypoaspis aculeifer* is more abundant species on bulbs. *Canna indica* and *Dahlia hybrida* were the most prefered and populated bulbaceous host plants by mesostigmatid mites.

RÉSUMÉ : L'étude porte sur la faune dominante des plantes bulbeuses ornementales de Turquie. Les récoltes ont été effectuées en 2000-2002 principalement dans la région d'Ankara (Turquie). Les collections de Mésostigmates sont ici commentées. L'hôte, la prévalence et l'occurrence sont notées. Trente espèces appartenant à 17 genres et 11 familles ont été identifiées: *Lasioseius berlesei*, *Dendrolaelaps zweelferi*, *Macrocheles robustulus*, *Pachylaelaps vexillifer*, *Veigaia planicola*, *Hypoaspis angusta*, *H. brevipilis* et *H. subterranea* sont nouvelles pour la Turquie. *Hypoaspis aculeifer* est le plus abondant. *Canna indica* et *Dahlia hybrida* sont les plantes préférées et où les populations de mésostigmates sont les mieux développées.

INTRODUCTION

The mite fauna of bulbaceous plants was surveyed mainly in Ankara during 2000-2002. Mite specimens were collected from 42 different species belonging to 11 families. The present paper reports mesostigmatid mites of these plants. Astigmata and Prostigmata species were considered and under preparation. The aim of the study was 1] to provide a list of mite species occurring on bulbaceous

plants and quantitative assessment and 2] to detect predatory species for use in future biological control programs.

MATERIAL AND METHODS

Samples of bulbaceous plants were taken from natural areas, parks and nurseries in mainly Ankara-Turkey (2000-2002). The sampling of bulbs and roots

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of 42 bulbous plant species, including their surroundings were carried out at weekly intervals. Mites were extracted from the samples by using BERLESE funnels and preserved in 70% ethanol. They were clarified in lactophenol solution and mounted in Hoyer's fluid. The slides were dried (2-4 weeks) at 35 °C. All the mites were considered and identified. Species from previous collections were also taken into account. The mite samples are deposited as part of the second author's collection, at the University of Ankara, Agricultural Faculty, Plant Protection Department, Ankara-Turkey.

Identification: original descriptions and identification keys were used (HUGHES (1976), HIRSCHMANN (1982) and KARG (1971, 1994). Plant identification were done by Dr. Reşit İLARSLAN (University of Ankara, Faculty of Science, Biology Department, Ankara-Turkey).

Abbreviations: ♀ = female, ♂ = male, N = Nymph; U.A. = University of Ankara, Plant Protection Department, Ankara/Turkey

Abbreviations: 1] host plants : 1-*Orchis coriophora* L. (Orchidaceae); 2-39-*Ornithogalum oligophyllum* E.D. Clarke (Liliaceae); 3-19-*Gagea villosa* (Bieb.) Duby var. *villosa* (Liliaceae); 4-20-23-*Muscari longipes* Boiss (Liliaceae); 5-17-*Crocus biflorus* Miller Subsp. *pulchricolar* (Herbert) Mathew (Iridaceae); 6-*Tulipa cf. sylvestris* L. (Liliaceae); 7-*Muscari tenuiflorum* Tausch. (Liliaceae); 8-*Ranunculus damascenus* Boiss and Gaill (Ranunculaceae); 9-*Colchicum triphyllum* G. Kunze (Liliaceae); 10- *Amaryllis* sp. (Amaryllidaceae); 11-*Hyacinthus orientalis* L. (Liliaceae); 12-*Allium cepa* L. (Liliaceae); 13-Orchidaceae (unidentified samples from mentioned family); 14-*Orchis* sp. (Orchidaceae); 15-*Cyclamen* sp. (Primulaceae); 16-*Crocus ancyrensis* (Herbert) Maw (Iridaceae); 18-*Aster* sp. (Asteraceae); 21-36-*Hemerocallis hybrida* (Liliaceae); 22-26-33-*Canna indica* L. (Cannaceae); 25-37-*Dahlia hybrida* (Asteraceae: Compositae); 27-*Galanthus elwesii* Hooker (Amaryllidaceae); 28-*Muscari neglectum* Guss (Liliaceae); 29-*Eranthis hiemalis* Salisb. (Ranunculaceae); 30-*Anemone coronaria* L. (Ranunculaceae); 31-34-*Iris* sp. (Iridaceae); 32-*Paeonia officinalis* Foemina L. (Paeoniaceae); 35-*Narcissus pseudonarcissus* L. (Amaryllidaceae); 38-*Tulipa hybrida* (Liliaceae); 40-*Scilla bifolia* L. (Liliaceae); 44-*Typha latifolia* L.

(Typhaceae); 45-*Schoenoplectus locustris* (L.) Palla (Cyperaceae); 46-unidentified plants.

RESULTS

268 specimens were obtained. Thirty mesostigmatid mite species belonging to 17 genera and 11 family were identified. Eight species are newly recorded for Turkey: *Lasioseius berlesei*, *Dendrolaelaps zweelferi*, *Macrocheles robustulus*, *Pachylaelaps vexillifer*, *Viegaia planicola*, *Hypoaspis angusta*, *H. brevipilis*, and *H. subterranea*.

Occurrence (TABLE 1) refers to the presence of the mesostigmatid mite species or genera, TABLE (2) indicates the infestation intensity and the host range of the mite species., *Hypoaspis aculeifer*, *Rhodacarus* sp. and *Parasitus* sp. are the most abundant. Mesostigmatid mite species were collected on 42 plant species. The mite species found on these plants are listed in TABLE (2). *Canna indica* and *Dahlia hybrida* were the most prefered and populated bulbaceous host plants by mesostigmatid mite species.

Ascidae:

Gamasellodes Athias Henriot, 1961

Gamasellodes bicolor Berlese, 1918. Material examined: Ankara, 07.05.2000 (5) (4♀); 30.04.2000 (16) (1♀); 03.05.2000 (26) (3♀, 1N); 07.04.2000 (32, 33, 34) (2♀; 1♀; 6♀); 07.06.2000 (45) (1♀).

Comments: Dorsal shiled of this species divided in two parts and reticulated caudally and ondulin shaped. Ventrianal plate is large. *G. bicolor* has been reported from all over the European countries from cultivated plants and forest soil (KARG, 1971). It was previously reported from wild mushroom in Turkey (ÇOBANOĞLU, 2001a).

Arctoseius Sig Thor, 1930

Arcoteseius species are predator on Collembola and other small arthropods.

Arctoseius semiscissus (Berlese, 1892) Material examined: Ankara, 07.05.2000 (5, 8) (1♀, 1♂; 2♀); 07.04.2000 (22, 31, 35) (1♀; 2♀; 1♀); 03.05.2000 (26) (1♀).

| | | |
|---|--|---|
| Amaryllidaceae | <i>Amaryllus sp.</i> | <i>Macrocheles robustulus</i> (10) <i>Lasioseius thermophilus</i> (1) 4.10 |
| | <i>Galanthus elwesii</i> Hooker | <i>Parasitus</i> sp.(1), <i>Hypoaspis brevipilis</i> (2), <i>Hypoaspis aculeifer</i> (6), <i>Dendrolaelaps zweelferi</i> (1) 3.73 |
| | <i>Narcissus pseudonarcissus</i> L. | <i>Macrocheles robustulus</i> (2), <i>Arctoseius semiscissus</i> (1), <i>Parasitus</i> sp.(3), <i>Hypoaspis brevipilis</i> (1), <i>Rhodacarus</i> sp. (1) 2.99 |
| Asteraceae: Compositae | <i>Aster</i> sp. | 0 |
| | <i>Dahlia hybrida</i> | <i>Kleemania plumosus</i> (2) 14.55, <i>Parasitus</i> sp.(3), <i>Parasitus fimetorum</i> (2), <i>Proctolaelaps rotundus</i> (2), <i>Lasioseius thermophilus</i> (3), <i>Veigaia nemorensis</i> (1), <i>Hypoaspis brevipilis</i> (3), <i>Hypoaspis aculeifer</i> (18), <i>Hypoaspis miles</i> (1), <i>Hypoaspis subterranea</i> (2), <i>Rhodacarus</i> sp.(2) |
| Cannaceae | <i>Canna indica</i> L. | <i>Macrocheles robustulus</i> (8), <i>Gamaselloides bicolor</i> (5), <i>Arctoseius semiscissus</i> (2), <i>Parasitus</i> sp.(13), <i>Parasitus fimetorum</i> (5), <i>Lasioseius thermophilus</i> (10), <i>Lasioseius berlesei</i> (1), <i>Veigaia nemorensis</i> (1), <i>Veigaia planicola</i> (4), <i>Hypoaspis aculeifer</i> (13), <i>Dendrolaelaps zweelferi</i> (11), <i>Rhodacarus</i> sp.(8) 30.22 |
| Cyperaceae | <i>Schoenoplectus locustris</i> (L.) Palla | <i>Gamaselloides bicolor</i> (1), <i>Parasitus</i> sp.(1), <i>Lasioseius thermophilus</i> (2) 1.49 |
| Liliaceae | <i>Ornithogalum oligophyllum</i> E.D. Clarke | <i>Rhodacarus</i> sp.(1) 0.37 |
| | <i>Gagea villosa</i> (Bieb) Duby var <i>villosa</i> | <i>Macrocheles robustulus</i> (1), <i>Veigaia planicola</i> (1), <i>Asca bicornis</i> (1) 1.12 |
| | <i>Muscat longipes</i> Boiss | <i>Amblyseius obtusus</i> (1), <i>Veigaia nemorensis</i> .(1), <i>Veigaia planicola</i> (2), <i>Hypoaspis aculeifer</i> (4), <i>Rhodacaridae</i> (8) 5.97 |
| | <i>Tulipa cf. sylvestris</i> L. | <i>Macrocheles robustulus</i> (1), <i>Hypoaspis aculeifer</i> (1) 0.75 |
| | <i>Muscat tenuiflorum</i> Tausch. | 0 |
| | <i>Colchicum triphyllum</i> G. Kunze | <i>Hypoaspis aculeifer</i> (1) 0.37 |
| | <i>Hemerocallis hybrida</i> | <i>Parasitus</i> sp.(2), <i>Dendrolaelaps zweelferi</i> (2), <i>Rhodacarus</i> sp.(4) 2.99 |
| | <i>Hyacinthus orientalis</i> L. | <i>Amblyseius obtusus</i> (1), <i>Blattisocius tarsalis</i> (1), <i>Hypoaspis aculeifer</i> (5) 2.61 |
| | <i>Allium cepa</i> L. | <i>Hypoaspis angusta</i> (1), <i>Hypoaspis aculeifer</i> (4) 1.87 |
| | <i>Muscat neglectum</i> Guss | 0 |
| Iridaceae | <i>Tulipa hybrida</i> | <i>Parasitus fimetorum</i> (1), <i>Hypoaspis aculeifer</i> (1) 0.75 |
| | <i>Scilla bifolia</i> L. | 0 |
| | <i>Crocus ancyrensis</i> (Herbert) Maw. | <i>Gamaselloides bicolor</i> (1), <i>Lasioseius</i> sp. (1), <i>Hypoaspis aculeifer</i> (2), <i>Rhodacarus</i> sp.(2) 2.24 |
| | <i>Crocus biflorus</i> Miller subsp. <i>pulchricolour</i> (Herbert) Mathew | <i>Gamaselloides bicolor</i> (4), 3.36 , <i>Arctoseius semiscissus</i> (2), <i>Rhodacarus</i> sp.(3) |
| | <i>Iris</i> sp. | <i>Macrocheles robustulus</i> (2), <i>Gamaselloides bicolor</i> (6), <i>Arctoseius semiscissus</i> (2), <i>Amblyseius obtusus</i> (1), <i>Parasitus</i> sp. (2), <i>Veigaia planicola</i> (2), <i>Hypoaspis aculeifer</i> (6), <i>Hypoaspis miles</i> (2), <i>Hypoaspis lubrica</i> (1), <i>Digamasellus presepum</i> (1) 9.33 |
| Orchidaceae | <i>Orchis coriophora</i> L. | <i>Parasitus</i> sp. (1), <i>Veigaia planicola</i> (2), <i>Hypoaspis aculeifer</i> (1) 1.49 |
| | <i>Orchis</i> sp. | <i>Parasitus</i> sp.(1) 0.37 |
| | Unidentified Orchidaceae | <i>Hypoaspis aculeifer</i> (1), <i>Rhodacarus</i> sp.(1) 0.75 |
| Primulaceae | <i>Cyclamen</i> sp. | <i>Parasitus</i> sp.(1) 0.36 |
| Peoniaceae | <i>Paeonia officinalis</i> Foemina L. | <i>Gamaselloides bicolor</i> (2), <i>Dendrolaelaps zweelferi</i> (1), <i>Rhodacarus</i> sp.(2) 1.79 |
| Ranunculaceae | <i>Eranthis hyemalis</i> Salisb. | <i>Pachylaelaps vexillifer</i> (1), <i>Rhodacarus</i> sp.(1) 1.07 |
| | <i>Anemone coronaria</i> L. | <i>Hypoaspis angusta</i> (1), <i>Rhodacarus</i> sp.(3) 1.43 |
| | <i>Ranunculus damascenus</i> Boiss & Gaill | <i>Arctoseius semiscissus</i> (2), <i>Proctolaelaps pomorum</i> (2) 1.79 |
| Typhaceae | <i>Typha latifolia</i> L. | <i>Eugamasus butleri</i> (1) 0.37 |
| Unidentified plants | — | <i>Hypoaspis aculeifer</i> (2), <i>Rhodacarus</i> sp.(4) 2.24 |
| total plants | | 268 |

TABLE I. — Mesostigmatic mites. Host plants and prevalence (Ankara-Turkey).

| Families | Genus | Mesostigmatic mites | Host plants | Number of specimen | (%) |
|-----------------|----------------------|------------------------|--|--------------------|------------|
| Ascidae | <i>Gamaselloides</i> | <i>G. bicolor</i> | 5,16,26,32,33,34,45 | 19 | 7.09 |
| | <i>Arcoteseius</i> | <i>A. semiscissus</i> | 5,8,22,26,31,35 | 9 | 3.36 |
| | <i>Proctolaelaps</i> | <i>P. rotundus</i> | 25,37 | 2 | 0.75 |
| | | <i>P. pomorum</i> | 8 | 2 | 0.75 |
| | <i>Lasioseius</i> | <i>Lasioseius sp.</i> | 16 | 1 | 0.37 |
| | | <i>L. thermophilus</i> | 10,22,37,45 | 16 | 5.97 |
| | | <i>L. berlesei*</i> | 22 | 1 | 0.37 |
| | <i>Asca</i> | <i>A. bicornis</i> | 3 | 1 | 0.37 |
| | <i>Blattisocius</i> | <i>B. tarsalis</i> | 11 | 1 | 0.37 |
| Phytoseiidae | <i>Amblyseius</i> | <i>A. obtusus</i> | 11,20,31 | 3 | 1.12 |
| Rhodacaridae | <i>Rhodacarus</i> | <i>Rhodacarus sp.</i> | 2,4,5,13,16,17,20,21,23,26,29,30,32,33, 35,36,37,46 | 40 | 14.93 |
| | <i>Dendrolaelaps</i> | <i>D. zweelferti*</i> | 21,26,27,32 | 15 | 5.60 |
| Macrochelidae | <i>Macrocheles</i> | <i>M. robustulus*</i> | 3,6,10,22,26,31,35 | 24 | 8.96 |
| Pachylaelapidae | <i>Pachylaelaps</i> | <i>P. vexillifer*</i> | 29 | 1 | 0.37 |
| Ameroseiidae | <i>Kleemannia</i> | <i>K. plumosus</i> | 25,37 | 2 | 0.75 |
| Digamasellidae | <i>Digamasellus</i> | <i>D. presepum</i> | 31 | 1 | 0.37 |
| Parasitidae | <i>Parasitus</i> | <i>Parasitus sp</i> | 1,14,15,21,22,25,26,27,31,33,35,36,37,45 | 28 | 10.45 |
| | | <i>P. fimetorum</i> | 22,25,26,33,38 | 8 | 2.99 |
| Veigaiidae | <i>Veigai</i> | <i>V. nemorensis</i> | 23,25,33 | 3 | 1.12 |
| | | <i>V. planicola*</i> | 1,19,20,23,26,31,33 | 11 | 4.10 |
| Eugamasidae | <i>Eugamasusus</i> | <i>E. butleri</i> | 44 | 1 | 0.37 |
| Dermanyssidae | <i>Hypoaspis</i> | <i>H. angusta*</i> | 12,30 | 2 | 0.75 |
| | | <i>H. brevipilis*</i> | 27, 35, 37 | 6 | 2.24 |
| | | <i>H. aculeifer</i> | 1,6,9,11,12,13,16,20,22,23,25,26,27,31, 33,34,38,46 | 65 | 24.25 |
| | | <i>H. miles</i> | 25,31 | 3 | 1.12 |
| | | <i>H. lubrica</i> | 31 | 1 | 0.37 |
| | | <i>H. subterranea*</i> | 37 | 2 | 0.75 |
| Total | | | | 268 | 100 |

TABLE 2. — Mesostigmatic mites. Number of individuals (numbers of mites per host).

Comments: There are lateral incisions on the dorsal shield. This species was previously found on mushroom compost in Turkey (ÇOBANOĞLU, 2001a). It is distributed all over the European countries (KARG, 1994).

Proctolaelaps Berlese, 1923

Dorsal shield is entire and posterior marginal setae arising on the posterior region of dorsal shield.

Proctolaelaps rotundus (Hirchmann, 1963) Material examined: Ankara, 03.05.2000(25) (1♀); 07.04.2000 (37) (1♀). Comments: Dorsal shiled of this species entire. Fixed digit of the chelicera with a mem-

branous lobe in place of pilus dentilis. It was previously found on rose plants (ÇOBANOĞLU, 2001a).

It is distributed Middle European countries (KARG, 1994).

Proctolaelaps pomorum (Oudemans, 1929) Material examined: Ankara, 07.05.2000 (8) (2♀). Comments: It was previously found on mushrooms (ÇOBANOĞLU & BAYRAM, 1998). This species is distributed in Europe and Australia (KARG, 1994).

Lasioseius Berlese, 1916

Dorsal shield is entire and some of the dorsal setae may be tricarinate. The humeral setae always arises

on the dorsal shield. Genital shield truncate at posterior.

Lasioseius sp. Material examined: Ankara, 30.04.2000(16) (1N). Comments: This species is found on *Crocus ancyrensis* (Herbert) Maw which is an endemic plant.

Lasioseius thermophilus (Willmann, 1942) Material examined: Ankara, 07.05.2000 (10) (1♀); 07.04.2000 (22, 37) (8♀, 2♂; 3♂); 7.06.2000 (45) (2♀). Comments: This free living predator, was previously reported from hazelnut orchards in Turkey (ÇOBANOĞLU & ÖZMAN, 2002).

Lasioseius berlesei (Oudemans, 1938) Material examined: Ankara, 07.04.2000 (22) (1♀). Comments: *L. berlesei* is new record for Turkey. It is distributed Europe, North America and Asia (KARG, 1994).

Lasioseius penicilliger Berlese, 1916 *L. penicilliger* has tricarinate setae on dorsal scutum. Material examined: This species was previously obtained from *Gladiolus* bulbs, Izmir (1983) (from our collection of U.A). Comments: This species was feeding on molds, and reported from England, Germany and U.S.A. (HUGHES, 1976).

Asca Wilmann, 1939

Asca bicornis (Canestrini & Fanzago, 1877) Material examined: Ankara, 07.05.2000 (3) (1♀). Comments: This species has two caudal tubercles. It was previously found on mushroom in Turkey (ÇOBANOĞLU, 2001a). It is distributed all over the European countries and prefer humid areas (KARG, 1971).

Blattisocius Keegan, 1944

In this genus fixed digit of chelicera has setiform pilus dentilis. Dorsal shield entire and female with ventroanal shield with two to six ventrianal setae.

Blattisocius tarsalis (Berlese, 1918) This is a very common predatory species in storage. They are elongated mites, characterised by a relatively short peritreme, it is reaching about posterior maring of Coxa II. Fixed digit of the chelicera short without teeth.

Material examined: Ankara, 03.05.2000 (11) (1♀). Comments: *B. tarsalis* is a very common predatory species on small insects and their eggs in storage

(ÖZER et al., 1989; ÇOBANOĞLU, 1996). This species was reported from Italy, England, Sweden, Holland, North Africa, Australia and U.S.A (HUGHES, 1976).

Blattisocius mali (Oudemans, 1929) Peritreme is well developed in this species and peritremal shield joins the exopodal shield in the region of the coxae IV. Ventrianal shield large, well developed and bears three pairs ventrianal setae. Material examined: This species were found previously from *Gladiolus* bulbs, Ankara (1983) (from our collection in U:A).

Comments: *B. mali* previously reported as an important natural enemies on the pests of stored products in Turkey. It is also very common in the dried fruit storages (ÖZER et al., 1989). *B. mali*, is a predator of acarid mite eggs. It has been found associated with *Carpoglyphus lactis* (L.), *Tyrophagus putrescentia* (Schrank) and *Acarus siro* L. This species has been reported in England, Holland and India (HUGHES, 1976).

Family Phytoseiidae

The members of this family are very common and relatively well known in Turkey (ÇOBANOĞLU, 1992; 1997).

Amblyseius Berlese, 1915

Phytoseiids and especially *Amblyseius* species are commonly found from on agricultural crops in Turkey (ÇOBANOĞLU, 1992; 1997).

Amblyseius obtusus (Koch, 1839) Material examined: Ankara, 03.05.2000 (11) (1N); 07.04.2000 (31) (1♀); 30.04.2000 (20) (1♀).

Comments: This species has two long caudal setae. It was previously found on apple orchards from Ankara (DÜZGÜNĘŞ & KILIÇ, 1983). This species collected from grass in Algeria (ATHIAS-HENRIOT, 1957). It is distributed all over the European countries (KARG, 1971).

Rhodacaridae

Rhodacarus Oudemans, 1902

Rhodacarus sp. Material examined: Ankara, 07.04.2000 (32, 33, 35, 36, 37) (2♀; 1♀; 1♀; 3♀; 2♀);

07.05.2000 (2, 4, 5, 46) (1♀; 1♀; 2♀; 4♀); 01.05.2000(13) (1♀); 03.04.2000 (29,30) (1♀ ; 3♀); 30.04.2000 (16, 20) (1♀,1♂; 2♀); 02.04.2000 (17) (1♀); 03.05.2000 (21,26) (1♀; 6♀,1♂); 14.04.2000 (23) (4♀,1♂). Comments: This is common species but not identified as species level.

Dendrolaelaps Halbert,1915

Dendrolaelaps zweelferi Hirschmann,1960. Material examined: Ankara, 03.05.2000 (21, 26) (2♀; 11♀); 03.04.2000 (27) (1♀); 07.04.2000 (32) (1♀). Comments: *Dendrolaelaps* are mostly associated with bark beetles and these two groups may be mutualistic life cycle (KINN, 1982). *D. zweelferi* was reported from Middle European countries (KARG, 1994). *D. zweelferi* is a new record for Turkey.

Macrochelidae

This family is presented commonly by *Geholaspis mandibularis* (Berlese) and *Macrocheles punctatissimus* Berlese on mushrooms in Turkey (COBANOGLU & BAYRAM, 1998). The member of this family are known to be associated with dung beetles (KRANTZ, 1982; COBANOĞLU & KIRGİZ, 2001).

Macrocheles Latreille,1829

Macrocheles robustulus (Berlese, 1904). Material examined: Ankara, 07.05.2000 (3, 6, 10) (1♂; 1♀; 8♀, 2♂); 07.04.2000 (22, 31, 35) (2♀; 2♀; 2♀); 03.05.2000 (26) (6♀). Comments: Some of the *Macrocheles* species collected on Scarabaeidae beetles in Turkey (COBANOĞLU & KIRGİZ, 2001). Many Macrochelids are phoretic. *M. robustulus* is a new record for Turkey. This species was reported from Europe and common in compost and humus (KARG, 1971).

Pachylaelapidae
Pachylaelaps Berlese,1886

Pachylaelaps vexillifer Wilmann, 1956. Material examined: Ankara, 03.04.2000 (29) (1♀). Comments: *P. vexillifer* is new record for Turkey. It is common in Middle Europe (KARG, 1971). Some of the members

of this family are found phoretic associations on Scarabaeidae beetles (KRANTZ, 1982).

Ameroseiidae
Kleemannia Oudemans, 1930

Kleemannia plumosus (Oudemans, 1902). Material examined: Ankara, 03.05.2000(25) (1♀); 07.04.2000 (37) (1♀). Comments: All the dorsal setae are leaf shaped with a thickened rib. *K. plumosus* is previously reported from hazelnut orchards in Turkey (COBANOĞLU & ÖZMAN, 2002). *K. plumosus* is associated with fungus cultures and decaying vegetables. The moulds supporting a large population of this species (HUGHES, 1976).

Digamasellidae
Digamasellus Berlese,1905

Digamasellus presepum Berlese, 1918. Material examined: Ankara, 07.04.2000 (31) (1♀). Comments: *D. presepum* was previously reported associated with Tetranychidae and Tenuipalpidae species from ornamental plants in Ankara (COBANOĞLU *et al.*, 2003). Two dorsal shields are present in adults and nymphs. It was reported from manure and litter. It was also reported from the edges of ceiling boards of a ship (HUGHES, 1976).

Parasitidae

In this family apothele of the palp tarsus has three prongs. Male of this group has spermatodactyl on the movable digit of the chelicera, its distal end is fused with the digit. Parasitid species are common predators in soil. The species of this family can be found stored food products (GERSON & SMILEY, 1990). They are often dispersed by various insects especially beetles and flies (WISE *et al.*, 1988).

Parasitus Latreille, 1795

Parasitus sp.. Material examined: Ankara, 14.05.2000(1) (1♀); 07.04.2000(14, 15, 22, 31, 33, 35, 36, 37) (1N; 1N; 4♂; 1♂, 1N; 1N; 1♀, 1♂, 1N; 1N;

1♂); 03.05.2000 (21, 25, 26) (1♂; 2N; 3♀, 4♂, 1N); 03.04.2000 (27) (1♂); 07.06.2000 (45) (1♀). Comments: Fixed digit of the chelicera with a membranous lobe in place of pilus dentilis.

Parasitus fimetorum (Berlese, 1903). This species has three pronged tectum. Metasternal shield large and flanking anterior part of the genital shield. Material examined: Ankara, 07.04.2000 (22, 33) (1♀; 1N); 03.05.2000 (26, 25, 38) (1♀; 2N; 1♀, 1♂; 1♂). Comments: *P. fimetorum* is a large species with dorsal surface strongly sclerotised and divided in two parts. It was previously reported from *Gladiolus* bulbs from Thrace region of Turkey (ÇOBANOĞLU, 2001 b). It is distributed all over the European countries and found on forest trees, compost and decaying matter. It is prefer humid areas (KARG, 1971; 1994).

Veigaiaidae

Dorsal shield divided in two parts and tectum is three pronged. The members of this family prey on the other acarina species and small arthropods and distributed Europe, North America and Australia (SMILEY & KNUTSON, 1982).

Veigaia Oudemans, 1905

Veigaia nemorensis (Koch, 1839). Material examined: Ankara, 14.04.2000(23) (1N); 03.05.2000(25) (1N); 07.04.2000(33) (1N). Comments: This species previously obtained on *Dahlia* sp. and Tulip bulbs, from Thrace part of Turkey (ÇOBANOĞLU 2001 b.) *V. nemorensis* is distributed Europe and Asia (KARG, 1994).

Veigaia planicola Berlese 1892. Material examined: Ankara, 14.05.2000(1) (2♀); 30.04.2000(19, 20) (1N; 1♀); 14.04.2000(23) (1♀); 03.05.2000 (26) (2♀); 07.04.2000(31, 33) (2♀; 2♀). Comments: This is a new record for Turkey, is distributed Europe and Asia (KARG, 1994).

Eugamasidae

Eugamasus Berlese, 1892

Eugamasus butleri Hughes, 1948. Material examined: Ankara, 07.06.2000(44) (1N). Comments: This

species were obtained previously from *Gladiolus* bulbs, Izmir (1983) (from our collection U. A.). *E. butleri* was reported from storage products (ÖZER et al., 1989). In the male the spermatodactyl distally fused with the movable digit. The second pair of legs is thickened, its ventral surface bear a number of irregular protuberances. The femur of the leg (I) bears a large conical process. The fixed digit bears a small tooth and an insignificant pilus dentilis. *E. butleri*, was found in the dust and floor sievings. This species was reported England, Northern Ireland, Scotland (HUGHES, 1976).

Dermanyssidae

This family members are include important predatory species. Some of them are important for storage.

Hypoaspis Canestrini, 1884

Sternal shield of female usually longer than wide and genital shield enlarged and flask shaped in the member of this genus.

Hypoaspis angutsa KARG, 1962. Material examined: Ankara, 04.05.2000(12) (1♀); 3.04.2000(30) (1♀).

Comments: *H. angutsa* is a new record for the Turkish acaro-fauna. It was also extracted from soil in Europa (KARG, 1994).

Hypoaspis brevipilis Hirchmann, 1969. Material examined: Ankara, 03.04.2000(27) (2♀); 07.04.2000(35, 37) (1♀; 3♀). Comments: *H. brevipilis* is a new record for the Turkish acaro-fauna. It was also extracted from soil in Middle Europe (KARG, 1994).

Hypoaspis aculeifer (Canestrini, 1884). Material examined: Ankara, 07.05.2000(6) (1♀); 02.04.2000(9) (1♀); 03.05.2000(11, 25, 26, 38) (5♀; 10♀, 1♂, 7N; 5♀, 1♂, 3N; 1♀); 03.04.2000(27) (6♀); 04.05.2000(12) (2♀, 2♂); 30.04.2000(16, 20) (2♀, 1♀); 07.04.2000(22, 31, 33, 34) (1♀, 1♂, 1N; 4♀, 1♂; 1♀; 1♀); 14.04.2000(23) (3♀); 14.05.2000(1) (1♀); Trabzon, 07.05.2000(13, 46) (1♀; 2♀). Comments: *H. aculeifer* is very common predatory mite species in Turkey, and predator on other mites and small arthropods, small insects and nematods (GERSON & SMILEY, 1990). *H. aculeifer* is distributed Europe, South and North America, Asia, Russia, Eastern

Canada (KARG, 1971; HUGHES, 1976). *H. aculeifer* was previously reported on edible mushrooms and *Gladiolus* bulbs in Izmir and Ankara (ÇOBANOĞLU & BAYRAM, 1998 ; ÇOBANOĞLU 2001b). This species were collected from gladiolus bulbs heavily infected by *Rhizoglyphus robini* Claparède.

Hypoaspis sardoa (Berlese, 1911). This species has a stout blunt setae on femur, genu and tibia of legs (II). Material examined: This species previously were collected from *Gladiolus* bulbs, Seferihisar (Izmir) and Ankara (1983) (from our collection data). Comments: *H. sardoa* is occasionally found in the sweepings of warehouse floors and nests of small mammals from England, Holland, Italy, and Russia (HUGHES, 1976).

Hypoaspis miles (Berlese, 1892). Material examined: Ankara, 03.05.2000(25) (1♂); 07. 04.2000 (31) (2♀). Comments: *H. miles* is previously found from green house vegetable soils in Antalya-Turkey. It was also reported from European and Asian countries (KARG, 1994). This is very important species concerning the biological control. *H. miles* has been found on rodents and their nests and also was reported from wheat residues (HUGHES, 1976).

Hypoaspis lubrica Voigts et Oudemans, 1904. Material examined: Ankara, 07.04.2000 (31) (1♀). Comments: *H. lubrica* is previously reported from hazelnut orchards in Turkey (ÇOBANOĞLU & ÖZMAN 2002). It was found on various bees in Europe and North America (KARG, 1994). *H. lubrica* was found with acarid mites on grain debris, rotting oats and nests of smal mammals from England, Czech Republic, Northern Ireland, Russia, and U.S.A.(HUGHES, 1976).

Hypoaspis subterranea. Material examined: Ankara, 07.04.2000 (37) (2♀). Comments: *H. subterranea* is a new record for the fauna of Turkey.

DISCUSSION

The most abundant species are *Hypoaspis aculeifer* (24, 25 %); *Rhodacarus* sp. (14, 93 %); *Parasitus* sp. (10, 45 %); *M. robustulus* (8, 96); *G. bicolor* (7, 09 %); *D. zweelferi* (5, 60 %) and *V. planicola* (4, 10) (TABLE 1, 2). The most common species was *H. aculeifer* with 65 specimens. Some species were rare with one or two

specimen collected: *Lasioseius* sp, *L. berlesei*, *B. tar-salis*, *A. bicornis*, *P. vexillifer*, *D. presepum*, *E. butleri* and *H. lubrica*. *P. rotundus*, *P. pomorum*, *K. plumosus*, *H. angusta* and *H. subterranea*.

Hypoaspis aculeifer populates over 18 different bulbous plant species. The most favourable hosts were *C. indica* and *D. hybrida* (81 and 39 specimens, 12 and 11 species in respect) (TABLE 2). No Mesostigmatid mites were found on *Aster* sp., *Muscaria neglectum* and *Scilla bifolia*.

H. aculeifer, important predator, was the most abundant species, notably *Dahlia hybrida*. *H. aculeifer* must be considered for further biological control of bubaceous ornamentals.

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