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The Species Composition of Scales and of Armored Scales (Hemiptera, Coccoidea) in Azerbaijan

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Abstract

The article presents faunistical research data on both scales and armored scales that are wide spread in Azerbaijan. Among the whole number of those identified, 52 species of Coccoidea including 11 species of scales (Coccoidea, Diaspididae) and 8 species of armored scales (Coccoidea, Lecaniidae) were found for the first time in Azerbaijan's fauna.

Keywords: pest, scales, armored scales, fauna, species composition, new species

Introduction

The representatives of the order Hemiptera (Homoptera) have a special place among the pests of agricultural crops and of decorative plantings. Both scales and armored scales (Coccoidea), which are members of that order, make big damages to agricultural crops and to decorative plants. They suck out juices from the plant there by causing desiccation, atrophy and abscission of leaves, dry down of branches, distortion of leaves, fruits and offshoots, and reduction of the annual amount of growth in plants.

They seriously aggravate condition of agricultural crops, as well as greatly reduce both quality and quantity of the harvest sometimes even leading to its complete loss. The decorative and forest-park culture saffected by the mentioned invaders lose their beauty, and when a mass infestation comes, they dry out completely. The mentioned pests reproduce with significant speed causing great damage to plants and leading to their death on occasions. Many of those species are polyphagous with high fertility rate and with ecological plasticity, which allow them to spread out widely and to cause much harm to the plants.

There were very little studies done on the fauna of scales and armored scales of Azerbaijan. The original information came from the research of E.S. Arutyunova and V. Kh. Rusanova [1, 17]. A. Imamkuliyeve reported some data on scales and armored scales affecting fruit trees and subtropical cultures in the Lankaran area of Azerbaijan [5, 6]. R.A. Beybutov presented information about parasites of brown soft scale wide spread in Azerbaijan [2, 3]. L.M. Rzayeva mentions in her monograph some species of scales and armored scales common in Azerbaijan [18, 19]. G.A. Mustafayeva in her publications writes about scales and armored scales as hosts of some species of Aphelinidae [7-10]. Same author reports about certain biological peculiarities of both Japanese wax scale and globose scale, as well as about scales of decorative crops [11-13]. The works of G. A. Mustafayeva, V. P. Kamarli, G. M. Aslanova, B.A. Ahmedov, D.V. Mustafayev, N.A. Hasanov, and S.B. Ahmedov specify data related to fauna of armored scales and scales of Guba-Khachmaz area in Azerbaijan [14, 15]. G. A. Mustafayeva, I. Karaca, G.J. Statas, M.S. Ozgekce and P.J. Skouras discuss the fauna of scales harming park and decorative cultures in Azerbaijan, Turkey and Greece [16].

Material and methods

The entomological material has been collected from natural and cultural biocoenoses using common methodology (Borchsenius, 1950; Shapiro, Tryapitsyn, Shepetilnikova, 1982) [4, 20]. The pests have been collected during individual and complex faunistical expeditions and research trips. The preparation and development of entomological material has been done in the Institute of Zoology of Azerbaijan National Academy of Sciences, namely in the Laboratory of Introduction of Useful Insects and Principles of Biological Control. Both scales

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and armored scales have been stored with excised parts of the plants. In order to determine the plant species along with the pest, there were prepared herbaria from different types of plants, after which the specific Latin name of each plant was identified.

Results and Discussion

As a result of the number of years of faunistic research in Azerbaijan, there have been detected 33 species of scales belonging to 21 families [7-9]. That number has included 11 species found in Azerbaijani fauna for the first time:

Lepidosaphes granati (Koroneos), *Aulacaspis rosae* (Bouche), *Pseudaulacaspis pentagona* (Targioni-Tozzetti), *Carulaspis visci* (Schrank.), *Carulaspis minima* (Targioni-Tozzetti), *Adiscodiaspis tamaricicola* Malenotti, *Diaspidiotus caucasicus* (Borchsenius), *Tecaspis prunorum* (Borchsenius), *Tecaspis asiatica* Balachowsky, *Aonidia lauri* Bouche., *Lopholeucaspis yaponica* Cock [10, 11].

Both systematic list and species composition of scale insects is given in Table 1 below. The new species of scales for Azerbaijan are marked with an asterisk (*).

Table 1: Generic and species composition of scales (Hemiptera, Diaspididae) in Azerbaijan

Generes of scales	Species of scales
1. <i>Parlatoria</i> Targioni – Tozzetti, 1868	<i>Parlatoria oleae</i> (Colvee, 1880) <i>Parlatoria ziziphi</i> (Lucas, 1853)
2. <i>Leucaspis</i> Targioni – Tozzetti, 1868	<i>Leucaspis pusilla</i> Low., 1883
3. <i>Lepidosaphes</i> Shimer L., 1868	<i>Lepidosaphes ulmi</i> (Linnaeus, 1758) <i>Lepidosaphes gloverii</i> (Packard, 1869) <i>Lepidosaphes ficus</i> Sign., 1870 <i>Lepidosaphes granati</i> (Koroneos, 1934)*
4. <i>Cornuaspis</i> Mac Gillivray, 1921.	<i>Cornuaspis beckii</i> (Newman, 1869)
5. <i>Unaspis</i> Mac Gillivray, 1921.	<i>Unaspis evonymi</i> (Comstok, 1881)
6. <i>Aulacaspis</i> Cockerell, 1893.	<i>Aulacaspis rosae</i> (Bouche, 1833) *
7. <i>Pseudaulacaspis</i> Mac Gillivray, 1921.	<i>Pseudaulacaspis pentagona</i> (Targioni-Tozzetti, 1885) *
8. <i>Carulaspis</i> Mac Gillivray, 1921.	<i>Carulaspis visci</i> (Schrank., 1781) * <i>Carulaspis minima</i> (Targioni-Tozzetti, 1868) *
9. <i>Adiscodiaspis</i> Marchal, 1909.	<i>Adiscodiaspis tamaricicola</i> Malenotti, 1916*
10. <i>Chrysomphalus</i> Ashmead, 1880.	<i>Chrysomphalus dictyospermi</i> (Morqan, 1889)
11. <i>Kuwanaspis</i> Mac Gillivray, 1921.	<i>Kuwanaspis hovardi</i> (Cooley, 1898)
12. <i>Aonidiella</i> Berlese et Leonardi, 1895	<i>Aonidiella citrine</i> (Coquillett, 1891)
13. <i>Aspidiotus</i> Bouche, 1833.	<i>Aspidiotus nerii</i> Bouche, 1937
14. <i>Temnaspidotus</i> (Signoret, 1869)	<i>Temnaspidotus destructor</i> (Signoret, 1869)
15. <i>Epidiaspis</i> Cockerill, 1899	<i>Epidiaspis leperii</i> Signoret, 1869)
16. <i>Tecaspis</i> Hall., 1929.	<i>Tecaspis prunorum</i> (Borchsenius, 1939) * <i>Tecaspis asiatica</i> Balachowsky, 1954*
17. <i>Diaspidiotus</i> Berlet Leon, 1895.	<i>Diaspidiotus slavonicus</i> (Qrenn., 1934) <i>Diaspidiotus pyri</i> (Lichtenstein, 1881) <i>Diaspidiotus gigas</i> (Theim and Gerneck., 1934) <i>Diaspidiotus ostreaformis</i> (Curtis, 1843) <i>Diaspidiotus caucasicus</i> (Borchsenius, 1935)* <i>Diaspidiotus perniciosus</i> (Comstok, 1881) <i>Diaspidiotus prunorum</i> (Laing., 1931)
18. <i>Salicicola</i> Lindinger, 1905.	<i>Salicicola kermanensis</i> (Lindinger, 1905.)
19. <i>Diaspis</i> Costa, 1828.	<i>Diaspis echinocacti</i> (Bouche, 1933)
20. <i>Lopholeucaspis</i> Cockerell, 1897	<i>Lopholeucaspis yaponica</i> Balach., 1953*
21. <i>Aonidia</i> Targioni-Tozzetti, 1868.	<i>Aonidia lauri</i> (Bouche, 1833)*

Based on the number of years of research of Azerbaijani fauna, there have been also detected 19 species of armored scales belonging to nine families [7, 8]. Of that number, eight species have been discovered in Azerbaijan's fauna for the first time: *Eulecanium rufulum* Ckll., *Eulecanium rugulosum* (Arc.), *Pulvinaria aurantii*, Ckll., *Pulvinaria artemisiae* Sign.,

Pulvinaria pistaciae Bod., *Saissetia oleae* (Bern.), *Ceroplastes sinensis* Guer., *Physokermes piceae* (Sch.). Those species are marked with two asterisks (**).

Both systematic list and species composition of scale insects is given in Table 2 below.

Table 2: Generic and species composition of armored scales (Hemiptera, Lecaniidae) in Azerbaijan

Generes of armored scales	Species of armored scales
1. <i>Coccus</i> L., 1758.	<i>Coccus hesperidum</i> L. 1758 <i>Coccus pseudomagnoliarum</i> (Kuw., 1914)
2. <i>Eulecanium</i> Ckll., 1896	<i>Eulecanium bituberculatum</i> Targ., 1869 <i>Eulecanium rufulum</i> Ckll., 1903** <i>Eulecanium rugulosum</i> (Arc, 1937)**
3. <i>Parthenolecanium</i> Sulc., 1908	<i>Parthenolecanium corni</i> (Bouche, 1844) <i>Parthenolecanium persicae</i> (Fabricius, 1776)
4. <i>Sphaerolecanium</i> Sulc., 1908	<i>Sphaerolecanium prunastri</i> Fonscolombe, 1873
5. <i>Rhodococcus</i> Borchs., 1953.	<i>Rhodococcus turanicus</i> (Arch., 1937)
6. <i>Pulvinaria</i> Targioni Tozzetti, 1869	<i>Pulvinaria betulae</i> (L. 1758) <i>Pulvinaria aurantii</i> Ckll., 1896 **

	<i>Pulvinaria floccifera</i> (Westw., 1870) <i>Pulvinaria artemisiae</i> Sign, 1873 ** <i>Pulvinaria pistaciae</i> Bod, 1926**
7. <i>Saissetia</i> Depl, 1865.	<i>Saissetia oleae</i> (Bern, 1782)** <i>Saissetia hemispaerica</i> (Targ., 1867)
8. <i>Ceroplastes</i> Gray, 1830.	<i>Ceroplastes yaponicus</i> Green, 1921. <i>Ceroplastes sinensis</i> Guer., 1900.**
9. <i>Physokermes</i> Targ., 1869.	<i>Physokermes piceae</i> (Sch., 1801)**

Conclusions

1. As a result of the unique and complex study of Hemiptera (Coccoidea) in Azerbaijan, there were detected 52 species of both scales and armored scales. 33 species among them were found to be scales (Coccoidea, Diaspididae) which belong to 21 genus. The remaining 19 species were found to be armored scales (Coccoidea, Lecaniidae) which belong to nine genera.

2. Among all of the 33 identified species of scale insects (Hemiptera, Diaspididae), 11 species were found in Azerbaijan's fauna for the first time. The genus *Diaspidiotus* is represented by seven species, and the genus *Lepidosaphes* is represented by four species. The genera *Parlatoria*, *Carulaspis* and *Tecaspis* are represented by two species in each of them respectively. Each of the 16 genera has only one species. Majority of species discovered were polyphagous, eight species were monophagous, and six species were oligophagous.

3. Among all of the 19 identified species of armored scales (Hemiptera, Lecaniidae) eight species were found in Azerbaijan's fauna for the first time. The genus *Pulvinaria* is represented by five species, the genus *Eulecanium* is represented by three species. The genera *Coccus*, *Parthenolecanium*, *Saissetia* and *Ceroplastes* are represented by two species in each of them respectively. Each of the genera *Rhodococcus* and *Physokermes* has only one species in them. Only *Pulvinaria pistaciae*, *Pulvinaria artemisiae* and *Physokermes piceae* species were monophagous while the remaining species were either oligophagous or polyphagous.

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