

Fam. Lenaniidae (Coccidae) - Representative of the Gender Coccus L., Pest of Citrus, Fruit Trees and Ornamental Plants

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Abstract: Fam. Lenaniidae (Coccidae) belongs to a very specific group of representatives of the class Hexapoda, of the order Homoptera, U / Order Coccoinea. This group of insects is represented by species with very damaging effects in terms of plants on which they parasitize. From our research on the vegetation of the region of Southern Albania for a period of five years among the representatives of the genus Coccus of this family have met only two species: *Coccus hesperidum* L. dhe *Coccus pseudomagnoliarum* Kuw.. In the paper in question it's given a general morphological plan of these two species with taxonomic data on each species; is given the variety of plants affected by them and also the negative effects (damages) they cause to vegetation. As presented in this paper, these plant parasites are found in all three plant groups that we have included in the study as: In different citrus, in different fruit trees and also in a considerable variety of ornamental plants. The paper presents a series of data related to the spread of these parasites in different points of the study region as well as a series of other bioecological data.

Keywords: Genus Coccus, parasites, contamination, pests, spreads.

INTRODUCTION

All insects of the S/ Family Paleococcidae of the U/ Order Coccinea, Order Homoptera, in terms of lifestyle and their living conditions, represent significant pests in terms of the vegetation they frequent and the economic importance for which these the latter are cultivated by us. [Baçi, M, 154; Çeloalij, Q, 1987; Nishani, T, 1980].

For this reason we have undertaken this study which we have extended over a period of five years in all 6 districts of the area in question as shown in Harten no.1. It should be noted that the adult females of these insects have an oval body shape and the wax cover that covers it comes in the form of a dome (raised more in the center).

The size of the adult creature varies from about 3 to 5 mm in length and from about 2 to 3 mm in width [Çiça, A, 1963; Kessing, J.L.M. *et al.*, 2007]. They are often found in groups and in any case they preserve the legs and antennae throughout their lives. Their cuticular coating produces an amount of wax from which the covering scales are formed. The color of the cover varies from that of honey to pale brown, yellow or spotted brown (irregular brown) [Arhangelskaja, A. D, 1974; Borhksenius, N. S, 1949]. With age, their wax cover darkens (Fig. No. 1) [Kessing, J.L.M. *et al.*, 2007; <https://Coccus hesperidum>].



Fig. no. 1 - Exterior view of the genus Coccus

In the field we encountered egg states, larvae of the first stage (which are distinguished to be mobile and still without waxy cover), larvae of the second stage (which have fully formed cover, are not very mobile and no contain in their body eggs) and imago (which are fixed and have the body filled with eggs) [Borhksenius, N. S, 1949].

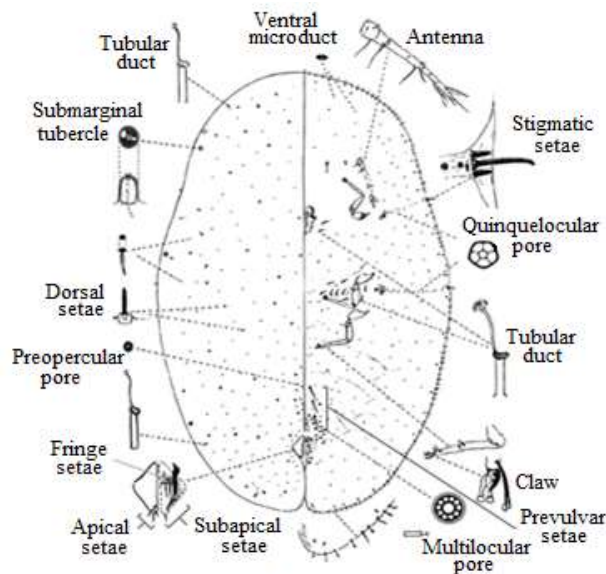


Fig. no. 2 - Determining elements for the species of the genus - Coccus

The determinant characteristics for these two species are presented in Figs. no.2. [Hasani, N. L, 1997; Hasani, N. L, 1999]. By sucking the lymph of the plant where they parasitize they weaken the normal functioning of biological processes in the plant thus leading to its complete drying. During the act of feeding they can transmit to the plant organism a number of viral pathogens. In such cases both the quantity and the quality of the product fall, in the case of fruit trees and citrus, and the vegetation gradually goes towards complete degradation [Baçi, M, 1954; Borhksenius, N. S, 1973; Rubcov, I. A, 1954]. Ornamental plants are also destroyed and the value of our parks and relaxing environments decreases, indirectly affecting our quality of life [Rubcov, I. A, 1954].

MATERIAL AND METHODS

For the realization of the study, checkpoints were set up in all six districts of the region in question (Map no. 1) where a series of chronological expeditions were carried out (at least once for each season in each checkpoint). Checkpoints are distributed in different climatic zones. Mobile larvae (still uncovered) did not accumulate. Only fixed animals were collected (second stage larvae as well as adults). The material collected in the field was preserved in test tubes (8 x 1 cm), in alcohol 70° which were labeled with all the necessary databases. The material was then processed in the laboratory to be freed from the wax coating, to be stained in a fuchsia solution, and finally to be turned into permanent microscopic micropreparations according to the techniques given in the lit. [Borhksenius, N. S,

1950; Borhksenius, N. S, 1950; Kosta, C. *et al.*, 1981]. After extracting from the literature used for this purpose all the morpho-anatomical features with determining values for each species, we started determining the species on the basis of micropreparations prepared with them [Akademia Nauka, SSSR, 1964; Borhksenius, N. S, 1964; Borhksenius, N. S, 1950; Borhksenius, N. S, 1937; Borhksenius, N. S, 1973; Kaltani, T. *et al.*, 1973]. During the field observations we kept detailed records regarding the situation under surveillance such as: the mass of individuals, their active or passive state, the stage of development where they were located, the plant organ where they were located, the type of vegetation where they met, etc.

Egg and larval stage finding (first and second stage larvae) as well as adults were determined according to the criteria described in the entry above.

RESULTS AND DISCUSSIONS

A - Morphological description

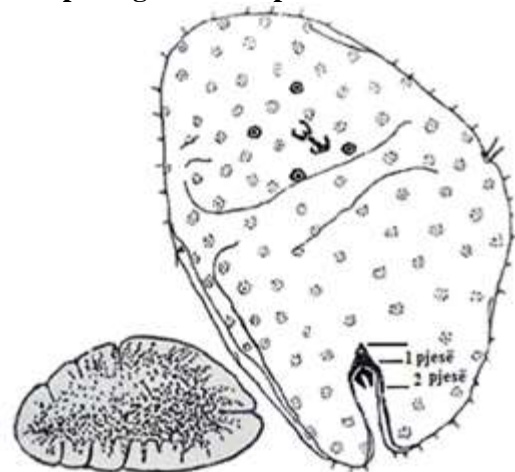


Fig. nr. 3 - Coccus hesperidum L.
(View below binoculars (Zo. 3.2 x 10))

C. hesperidum is also known as *Leucanium hesperidum* L. From our observations this species is clearly distinguished from *C. pseudomagnoliarum* Kuw. from the oval and asymmetrical covering where on one side it presents a protruding abdomen. The adult female is pressed in the dorso-ventral plane, almost flat in the form of scales. In the middle, on the dorsal side, the cover comes slightly swollen. The cover is light yellow to brown but often it also takes on a green color from the chlorophyll it absorbs along with the nutrient fluid from the plant. The size of the animal, in our cases, varies from 2 - 4.5 mm in length and from 1.5 - 3 mm in width. However these dimensions are highly variable. The wax coating has a meshings structure. On the side of

the body there are disc cells with conical spines in groups of three, it is on center the largest, two on the sides are equal. These clusters coincide with three latero-anterior symmetrical deepening on both sides. On the posterior side the cover comes with a deep slit. The cover has many clearly visible spots in the form of sparks (fireworks) and four spots differentiated in relation to the others and placed around the mouth apparatus. The asymmetrical parts on the front of the body are clearly distinguished. The insect, without the waxy cover, has an asymmetrical oval shape with one side swollen and the other more extended. Cylindrical glands with anal plates stand in the ratio; the anterior part (glands) is shorter than the posterior (plates), ($G_j < P$). At the two medial points of the side lips there are 1-3 pieces of thorns; one large and two smaller around it. On the entire surface of the body the animal is covered with spots like black dots on a small translucent surrounding background. The entire lateral edge of her body has small hairs like hairs. The entire lateral edge of her body has small thorns like hairs.

B - Bioecological Data

Likes the bark of the new boughs and that of the leaves, next to their veins. The insect reproduces with parthenogenesis. Males are not known at all. It overwinters as a second stage larva or as an imago. Gives about three generations a year. This is in function of the annual temperatures. Has met in Saranda, Delvina, Gjirokastra, Krahastepelena (Tepelena), Lukova (Saranda), Xara (Saranda), Përmet, Memaliaj (Tepelena), Vlora, Sevaster (Vlora), Babica (Vlora), Grapsh (Gjirokastra), Sopik (Gjirokastra), (Map. No.1). The altitude above sea level of the above territories varies from 4 m in the city of Saranda to 950 m in Sopik of Gjirokastra. Among the plant organs where the parasite is found we have: in leaves in about 47.6% of cases, in twigs in about 28.5% of cases and at the same time in both; twigs and leaves in about 23.8% of cases.

A - Morphological Description

C. pseudomagnoliarum Kuw. it is very distinct and evident from the first sight. This is clearly distinguished from the above type as its waxy coating presents a complete bilateral symmetry. Its female retains some of the characteristics of *C. hesperidum* L. but they are very little pronounced (it comes to the anterior grooves and reticular bands of the cover).

The terminal crack of the wax cover from the inside comes with the edges separated from each

other. The body is oval with equal width at both extremities. Near the anal fissure is a rather differentiated thorn. The wax cover, unlike that of the above type, has no radial spots but short streaks, not straight and irregular in placement. It coexists with *C. hesperidum* L. and has the same colors. There are thorns and hairs on the sides of the body. The body size is significantly larger than that of *C. hesperidum* L. It varies from 5 - 7 mm in length and from 2 - 4.5 mm in width (it is always about imago females). The scaly shape of the body comes slightly swollen from the spine except for the marginal area. Even naked from the waxy coverings the animal resembles the above type with the presence in the latter of bilateral symmetry as both sides of the body are equally concave. Also the lateral edge of the body, on both sides, at two points almost equidistant from the anterior and posterior edges, creates two insertions that determine the location of the three thorns; one large of center and on both sides two much smaller. On the surface of the body structural uniformity is observed. Cylindrical glands and anal plates as length are equal ($G_j = P$). Not infrequently a long thorn is seen near the beginning of the cylindrical glands. Here, too, the entire lateral edge of the body is hairy.

B - Bioecological Data

They are widespread and meet in association with the above type. In terms of damage, lifestyle and habitat the species in question presents the same values as *C. hesperidum* L. The animal breeds with eggs. This species, in the region under consideration, we have found to yield only one generation per year. It overwinters as an adult larva. Has met in Gjirokastra, Saranda, Cold Water (Vlora), Memaliaj (Tepelena), Përmet, Radhimë (Vlora), Himara (Vlora), Livadhja (Saranda), Pandelejmon (Saranda), Sevaster (Vlora), Sopik (Gjirokastra), "A.Zenel" (Gjirokastra), Grapsh (Gjirokastra), Jergucat (Gjirokastra), Cerkovica (Saranda) (Map no. 1). The altitude above sea level, of the above territories, varies from 4 m in the city of Saranda to 950 m in Sopik of Gjirokastra. Among the plant organs where the parasite was encountered we have: in leaves in about 29.1% of cases, in twigs in about 37.5% of cases, at the same time in both; twigs and leaves in about 29.1% of cases and, both in leaves and in fruit, in about 4.1% of cases.

The percentage frequency of the encounter of these two types by months is presented according to these percentages: $\sum = 48$ dates. January 13/48 (27%), February 10/48 (20.8%), March 8/48

(16.6%), April 4/48 (8.3%), May 9/48 (18.7%), June 0, July 0, August 0, September 0, October 2/48 (4.1%), November 0, December 2/48 (4.1%).

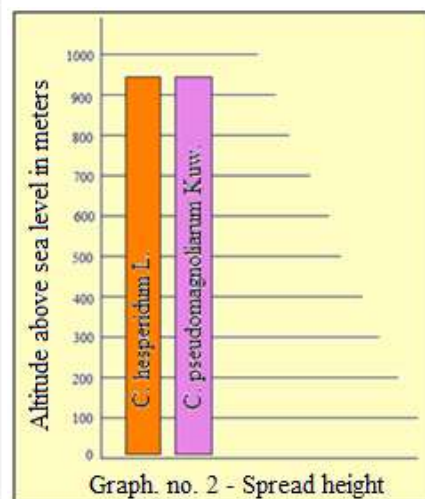
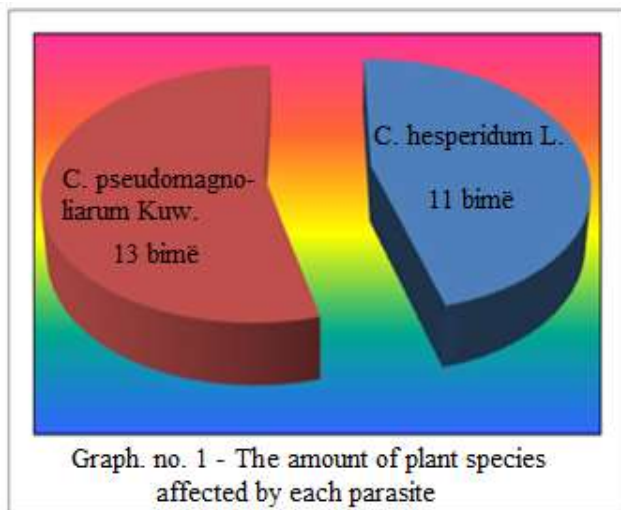
RESULTS AND CONCLUSIONS

Based to reproduce by parthenogenesis, male forms, of these species, do not exist. We support this idea on the basis of the fact that we have not been able to identify male forms. However, there are authors who confirm that they have also met male forms of these species. According to them, male insects with soft waxy cover in brown are found very rarely [Kessing, J.L.M. et al., 2007; <https://Coccus hesperidum>].

Plant variety and quantity of plants affected by these two parasites are reflected respectively in table no. 1. and in graph no. 1. The table shows that the plant variety affected by *C. pseudomagnoliarum* Kuw. is greater than that affected by *C. hesperidum* L.

The height of their place-distribution above sea level for both species starts from that 4 m and reaches up to 950 m (Graph. No.2). This indicates that both species live together and require more or less the same bio-ecological parameters.

N	Designation	Citrus		Fruit trees								Ornamental plants							
		Orange (Citrus aurantium)	Lemon (Citrus limonum Risso)	Apple (Malus domestica)	Walnut (Juglans regia L.)	Olive (Olelea europaea)	Pear (Pyrus communis L.)	Plum (Prunus domestica L.)	Dates (Diospyros lotus L.)	Mulberry (Morus nigra&alba L.)	Peach (Prunus persicae L.)	Castor (Ricinus communis L.)	Oleandër (Nerium oleander L.)	Laurel (Laurus nobilis L.)	Abutilone (G. Abutilon)	Pilea (G. Pilea)	Hederae (G. Hederae)	Arale (G. Aralia)	Aloes (G.Aloe)
1	<i>C. hesperidum</i> L.	+	+			+	+	+				+		+	+	+	+	+	
2	<i>C. pseudomagnolia</i> rum Kuw.	+	+	+	+	+			+	+	+	+	+				+	+	+



In the region in question of 6 districts we have met the above types in 19 checkpoints as shown in map no. 1. In this map clearly shows that in the coastal regions and in those of the early continental

lowlands their spread is higher than in the inland continental areas. This is conditioned by the different climatic values of these regions. Also on this map it stands out that the spread of *C.*

pseudomagnoliarum Kuw. extends to continental areas even deeper than those of the other type.

Parasitism according to the plant organs of plants is presented for each species as in Graph. no.3. & 4. below. As seen in these two graphs *C. hesperidum* L. prefers fixation on leaves (48% of cases encountered), unlike *C. pseudomagnoliarum* Kuw. which prefers fixation on the twigs (38% of cases).



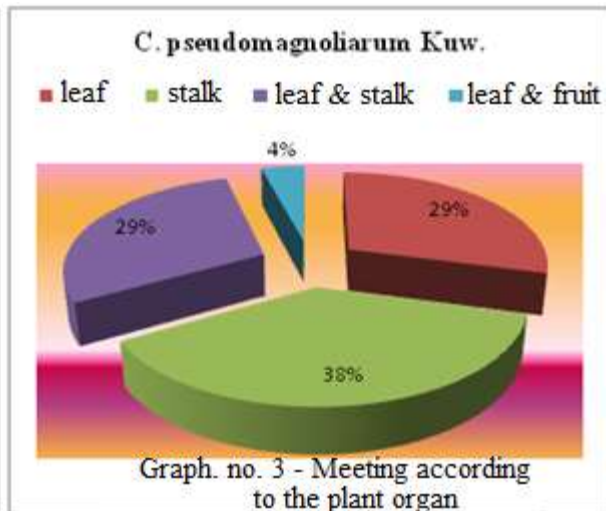
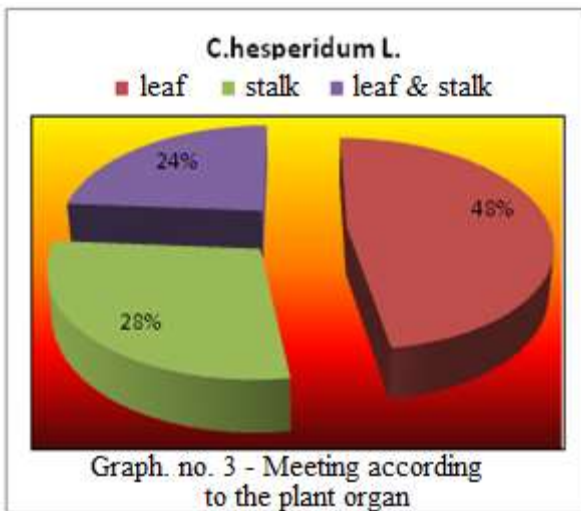
Map no. 1 - Meeting points of both types in this region

This is probably due to several factors such as: Specialization of their oral apparatus.

For this *C. hesperidum* L. thus requires softer plant tissues (such as leaf veins).

The composition of plant lymph is probably richer in nutrients in the leaf veins and this probably represents one of the preferences of *C. hesperidum* L. and

This probably also comes from the fact that the plant variety affected by *C. pseudomagnoliarum* Kuw., as seen in tab. no. 1, is larger than that of the other type, and this probably modifies the result slightly, (although the latter, in our view, is not very defining). Meeting of *C. pseudomagnoliarum* Kuw. even in fruit (only in one case), we think it is merely a coincidence and not some specific characteristic of the species.

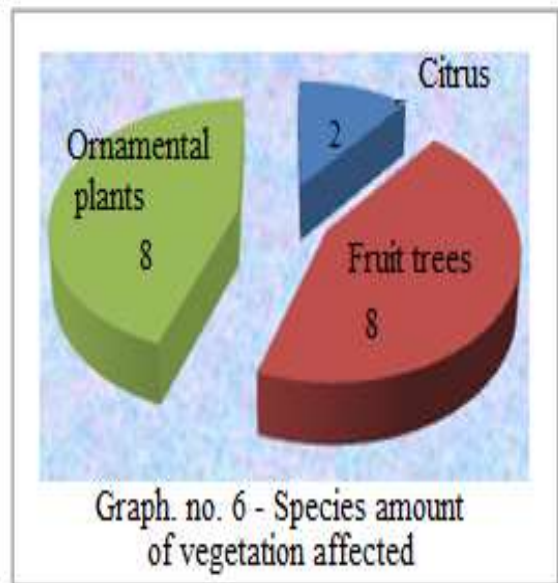
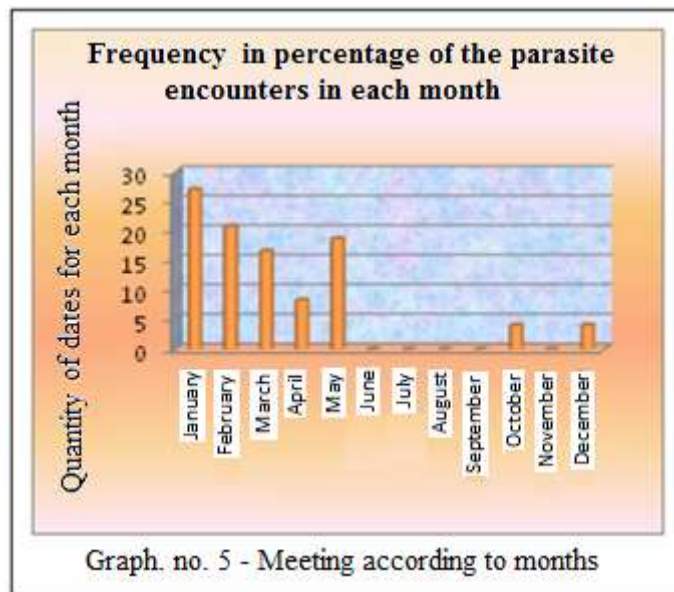


During a period of five years of conducting field checks both types in question have met with a monthly frequency of percentages shown in the Graph. nr 5. This tells us best that the frequency of their encounter is highest in January and then regressively in February, March and April. In May month we have an increase in meeting. We have shortages in the following months and a reappearance but not pronounced in late autumn (October). Contact with them resumes in December. From what we see in the graph we

conclude that they overwinter as second instar larvae and as imago. This has enabled us, from the months of December that they are fixed and until March to meet them more often. In the months of May we have another increase in meetings. This comes from the opening of the eggs kept by the wintering Imagos right from the beginning of spring, which enhances the meeting of these individuals; already in the second stage. In other summer months they are not collected as they are found as first age mobile larvae of new generations

or even as a result of their non-meeting due to the effect of using chemical spraying on citrus plantations or fruit trees. Not without negative

effect in this regard are the high temperatures of the summer season, especially for the larvae, mainly in specific years of this period.



The fact that in their entirety, these two species, to a greater extent attend fruit trees and ornamental plants (Graph. No. 6), may have to do with either the greater plant diversity of these two groups in relation to the citrus (and this we think is more plausible) or like them for the very characteristics of their lymph.

RECOMMENDATIONS

Both species in question are powerful pests of fruit trees, citrus and ornamental plants therefore their knowledge and study is of economic and social importance.

The most suitable period for chemical warfare against them would be that of late spring and summer because in these periods the animals are found in mass as first stage larvae (without cover) for each generation and as such the role of chemical weapons becomes more efficient.

In the family Lecaniidae or Coccidae from the literature are known about 24 main genera.

Of these in this paper we have identified only two representatives of only one genus of that Coccus L.. Based on this situation, we think that such a fact should be taken into account in future studies. So we think that in the region in question should be found representatives of other genders from this family.

REFERENCES

1. Akademia Nauka, SSSR. "Oprjedjelitjel nasjekomih evropjejskoj časti SSSR V pjati tomah I. Nizshije, drjevnjekrilije, s njepolnim prjevraščjenijem." Moskva (Leningrad) (1964).
2. Arhangel'skaja, A. D. "Koksidi arjednjej Azii Tashkjent." Moskva (Leningrad) (1974).
3. Baçi, M. "Dëmtuesit kryesor të kulturave të arave e atyre frutorë." Tiranë (1954).
4. Borhksenius, N. S., Fauna, SSSR. and Nasjekomij, H. "çjervjeçij i shçitovki (koksoidea) sjemjejtvo muçnistije çjervjeçi (Pseudokoksidae)." Moskva 7.9 (1949).
5. Borhksenius, N. S. "Çjervjeçi i shçitovki SSSR (koksoidea)." Moskva (1950).
6. Borhksenius, N. S. "Oprjedjelitjel nasjekomih evropjejskoj časti SSSR." 1 Moscow (1964).
7. Borhksenius, N. S. "Çjervjeçij i shçitovki SSSR (Koksoidea Oprjedjelitjeli po faunje SSSR, izdavajemije." Zoologičjeskim institutom Akadjemii Nauk SSSR, Moskva 32.1 (1950).
8. Borhksenius, N. S. "Oprjedjelitjel koksidi (koksidae) vrjedjashçik kulturnim rastjenijam i ljesu." Moskva 2 (1937).
9. Borhksenius, N. S. "Praktičjeskij oprjedjelitjel koksidi (Coccoidea) kulturnih rastjenij i ljesnih porod SSSR." Leningrad (1973).
10. Çelolaj, Q. "Speciet e breshkëzave të përhapura në agrume në zonën e Vlorës e Sarandës." Instituti i agrumeve dhe ullirit . Vlorë (1987).

11. Çiça, A. "Kultura e kumbullës." *Tiranë* (1963).
12. Hasani, N. L. "Koksidet." *Tiranë* (1997).
13. Hasani, N. L. "Insects definers. Çelës-Atlas." *Tiranë* (1999).
14. Kaltani, T. and Stani, A. "Sëmundjet dhe dëmtuesit e ullirit, agrumeve, fiqve kajsisë dhe nespullës." *Tiranë* (1973).
15. Kessing, J.L.M., Mau, R.F. and Diez, J. M. "[Soft brown scale: Coccus hesperidum \(Linnaeus\).](#)" *Crop Knowledge Master* (2007).
16. Kosta, C. and Benassy. "The work steps for the preparation of the entomologic micro preparations." *London. England* (1981).
17. Minihsterstvo Sjellskovo Horjajstva Sojuza Ssr, Otdjell Po Karantini Sjelskohozjajstbjennih Rastjenij, Çentralnaja Llaboratorija Po Karantini Sjelskohozjajstbjennih Rastjenij (1948) - Illjustrirovanij spravoçnik po vreditjeljam i boljeznjam vneshnjevo karatina. SSSR Moskva.
18. Nishani, T. "Flowers diseases." *Tiranë* (1980).
19. Rubcov, I. A. "Vrjeditjeli citrusovih i ih jestjestvjenije vrugi." *Moskva* (1954).
20. https://en.wikipedia.org/wiki/Coccus_hesperidum.

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