Parlatoria Cinerea Hadden 1909, and the Plants which it Parazitises

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The following material deals with the role of one of the parasites of citrus and ornamental plants, that of Parlatoria cinerea Hadden 1909. Among the representatives of the U/Order Coccinea, Order Hemiptera, Class Insecta, P. cinerea Hadd. 1909 is presented to us as one of the most widespread pests among all representatives of the genus Parlatoria analyzed in our study. Thus, without dwelling too much on the determining characteristics of this parasitic species, the material deals with its distribution throughout the territory kept under control. We have studied this group of parasites precisely in the Region of South-Western Albania.

The paper, in addition to the spread of the specie in question, also identifies the entire variety of vegetation that she frequents in this habitat. There are given data on the plant organs where the insect prefers to parasitize and also on the frequency of plant liking by it. The material also deals with data on the damage caused by it and the negative impacts on the contaminated vegetation.

Thus, on the basis of a chronological work over 5 yearsin the field, we have also reached a number of valuable conclusions for citrus growers and equally for park specialists who cultivate and breed decorative ornamental plants in parks of relaxation and in the courtyards of our homes.

Keywords: parlatoria cinerea hadden 1909, plant, pest, parasite, pygid.

Classification: DDC Code: 591.65 LCC Code: QL757

Language: English

London Journals Press

LJP Copyright ID: 925655
Print ISSN: 2631-8490
Online ISSN: 2631-8504

London Journal of Research in Science: Natural and Formal

Volume 22 | Issue 11 | Compilation 1.0

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Author: Department of Biology, University "Eqrem Çabej" Gjirokastër, Albania.

I. INTRODUCTION

Parlatoria cinerea Hadd. is a species that belongs to a very specific group of insects that damage citrus fruits, fruit trees and ornamental plants. Parlatoria cinerea is a polyphagous species. It has been recorded in hosts belonging to 9 plant families (Borchsenius, 1966; Williams and Watson, 1988). Citrus plants are their favorite "hosts". But among these "hosts" are also species of: Annona muricata, Bougainvillea, Citrus spp., Cupressus, Gardenia, Jasminum, Malus sylvestris, Mangifera indica, Rosa, Viburnum and Vitis vinifera, (Lit. no. 4,9,24) .

Our studies on U/Order Coccoinea and on this species itself are the first and only for our country. The morphological characteristics of its waxy cover are almost similar as for the entire of the parlatoria genus representatives. It comes oval, convex with little height, with its apical area very acentric. Two larval integuments are usually distinguished; the first, the oldest, transparent and colorless, and the second with a very light shade of yellow. The female animal itself has a light yellow color. Shes size (with the entire cover), in our samples, varies from 0.7 - 1.2 mm (Lit. no.14,20), while from the data in Lit. no. 24 she is can reach up to 2 mm. Parlatoria cinerea is a tropicopolitane species that has been described from Tahiti, but is probably not native there.

Shes place of origin is still uncertain (Williams and Watson, 1988). She is not present in the USA (Miller, 1996) and is not well documented from Australia, New Zealand, most of Africa or and from most of Europe. She is very present in Italy (Danzig and Pellizzari, 1998) and in Spain but with an incompletely known distribution (Amparo

Blay Golcoechea, 1993). Parlatoria cinerea has been recorded as a citrus pest in some countries of the South Pacific region (Williams and Watson, 1988) as well as in Europe (Lit. no.13,16-17). Severe and combined infection of citrus by P. cinerea and P. pergandii is associated with scratching, damage and cracking of the bark, causing the entire branch to dry up and sometimes killing the whole plant (Walker and Deitz, 1979). P. cinerea causes significant damage in citrus plantations, especially in Brazil (Sao Paulo) and Argentina (Claps et al., 2001). The affected stages of the plants start from the stages of vegetative growth, to flowering, to fruiting and even after harvest. Gravena et al., 1993, cultivated P. cinerea in the laboratory at 24°C, 65% relative humidity and in a light-dark regime of 12:12 hours. They found that, on average, egg incubation lasted 6.15 days; creep phase, 5.63 hours; first nymphal age, 6.87 days; second nymphal age 18.97 days; and each female laid up on average to 32.68 eggs, (Lit. no. 24).

She enters in : The Kingdom - Animalia
Type - Arthropoda
U/Type - Mandibulata
Class - Insects (Hexapoda)
U/Class - Pterygota
O/Order - Hemipteroides
Order - Homoptera
U/Order - Coccoinea
O/ Family - Paleococcoida
Family - Diaspididae
Genus - Parlatoria Targini - Tozzetti, 1868
Species - Parlatoria cinerea Hadden, 1909

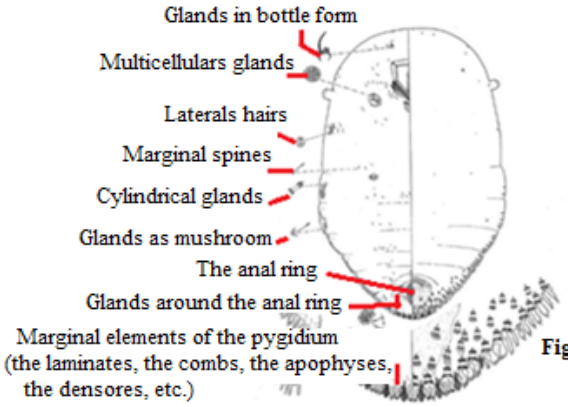


Fig.no.1 - Body and pygidial elements importants in determining the type (Lit.no.1)

Fig.no. 2 - The view of P. cinerea Hadden 1909

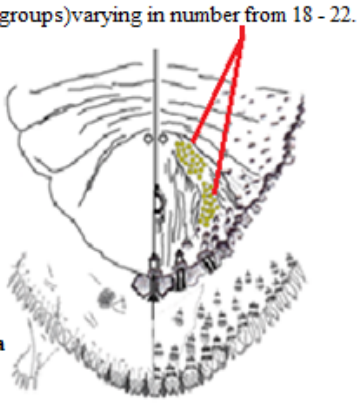


Fig.no. 3 - The view of the pygid of P. cinerea sketchet under binoculars; from us (above) and acording to the literature (below)

II. MATERIALI DHE METODAT

1. Determining the area where I will conduct the study - South-Western Albania.
2. Setting up permanent checkpoints which were visited by us at least four times per year (at least once per season).
3. Study of the climatic conditions of the region in question, Lit. no. 23.
4. Collecting the material in the field, storing them in test tubes in 75° alcohol and keeping relevant records.
5. Processing of the material in the laboratory until the preparation of permanent micro preparations ready for determination. This process was carried out in the zoology laboratory near the Department of Biology of the Faculty of Science of the "Eqrem Çabej" University, Gjirokastër. For this, based on the methods consulted by Lit. no. 2,3,8 and 18, we chose this course of ours:

a. Insects preserved in 75° alcohol, to strip them of their the waxen cover, we take them out of there and enter them to test tubes with 8-10% NaOH, leaving them there for about 24 hours. Then we heat them in the Mari bath (without boiling its).
b. They are then taken out of the Mari bath and rinsed in distilled water, leaving them in the water for 24 hours and changing the water several times during this time.
c. Then the material is removed from the water and put in 70° - 90° alcohol, leaving it there for 10 -15 minutes.
d. The samples are then extracted from the alcohol and placed to be colored in fuchsin solution for 24 hours (basic fuchsin).
e. Fix the color by removing the material from the fuchsia and treating it with an alcohol solution that gradually increases the concentration (in alcohol 70° - 90° - 96° or absolute alcohol for 15 - 20 minutes for each concentration).
f. To turn the insects into permanent microscopic preparations, after they are extracted from the alcohol, they are placed in eugenol (clove oil) for 30 - 60 minutes and then in pure carbol-xylene solution for 15 - 30 minutes.
g. They are further fixed on the slide (lama), spread well on it under the binoculars, drip the Canadian balsam onto material and cover with a coverslip (lamella).
h. The preparation is then dried under the thermal effect of several electric lamps, (Fig. no. 4.) and further the sides of the lamella, with the help of a fine brush, are insulated with melted paraffin.
i. These permanent micro preparations is recently passed to be observed under a binocular (microscope) for species determination according to the keys given in Lit. no. 5-7, 10-11, 15, 19, 21-22. For this we rely on the variety of glands, spines, hairs, anal ring, plates, densoria, apophyses, combs, etc. as well as their topography.

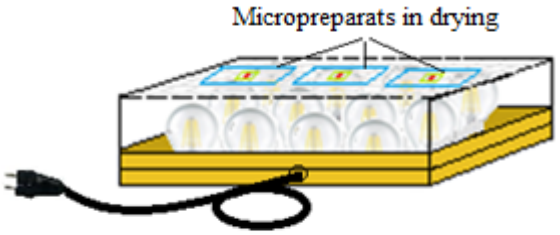


Fig.no. 4 - The mechanism built with elektric lamps for drying micropreparats

III. RESULTS AND DISCUSSIONS

For a period of over 5 years, we have regularly collected material for each season at each of the checkpoints seen on Map. no.1. Based on this, we have not met this species at all ours point controls. It has been met in only 7 of our checkpoints such as: Orikum and Sevaster [Vlora], Memaliaj and Beçisht [Tepelën], Pandelejmon and Komat [Saranda] and "Asim Zeneli" [Gjirokastër], (Map. no. 2.). After preparing the permanent micro preparations, observing them under binoculars, we carried out the determination of the type. During this process we also made a series of sketches of the identifying elements of the species, (Fig. no. 3 (Up)).

Map.no. 1 - Checkpoints set up and controlled by us in the region in question

Map.no. 2 - Site - gatherings of the material under study

The size of the species (with a waxen cover), as we have mentioned above, while in our samples it reaches up to 1.2 mm, in the data of Lit. no. 24 it is cited that it reaches up to 2 mm. From our side, P. cinerea Hadde has been found in these types of plants: plum, laurel, almond, olive, peach, apple, rose and pear, (Lit. no. 1,12); (Tab. no. 2); (Graph. no. 3). In the field, we found not few plants almost completely degraded by the presence of parasites of this group of insects. The material collected and analyzed, during this period, mainly belongs to the months of December, January, February, March, and May, always for two consecutive years (one by one). This sheet for the presence of the two basic stages in their biological cycle, that of wintering, as adults with cover and eggs deposited under it - December, January, February - as well as for imagos of the next stage when the eggs begin to hatch with the arrival of spring - March, April, May. These insects give several generations a year; mainly up to three generations. We have presented this in the table through the axes of the annual cycle, (Tab. no. 1).

Tab. no. 1: Periods of collection of imago individuals (winterging adults and adults that hatch eggs) [+] and periods of their non-collection as a result of their mobil larves (as first and second instar larves) [-].

No	Species name	The months of years in studies during which the species in question was encountered											
1.	Parlatoria cinerea Hadden. 1909	March	April	May	June	July	August	September	October	November	December	January	Febrary
2.	Shapes met												
3.	The collection	+	+	+	-	-	-	-	-	-	+	+	+
4.	The stages of its life cycle	Imago with hatching eggs			Young larves, age I			... and adults, age II			Wintering imago with eggs		
a.	The axis of the annual cycle. Generation I												
b.	The axis of the annual cycle. Generation II												
c.	The axis of the annual cycle. Generation III												

Legend:  - (Imago with eggs);  - (Imago with hatching eggs);  - (Larval stage I);  - (Larval stage II).

The territories where the vegetation found to be contaminated by this parasite is located are located at altitudes from 10 m above sea level to 400 m above sea level, (Graph. no. 4.). In terms of the climatic zones of the region, living things are found starting from the coastal climatic zones to the deep (continental) climatic zones, from the lowland mediterranean climatic zone to the hilly mediterranean climatic zone to the pre-mountainous one. The most favorable for P.cinerea Hadden 1909 is the coastal climatic zone.

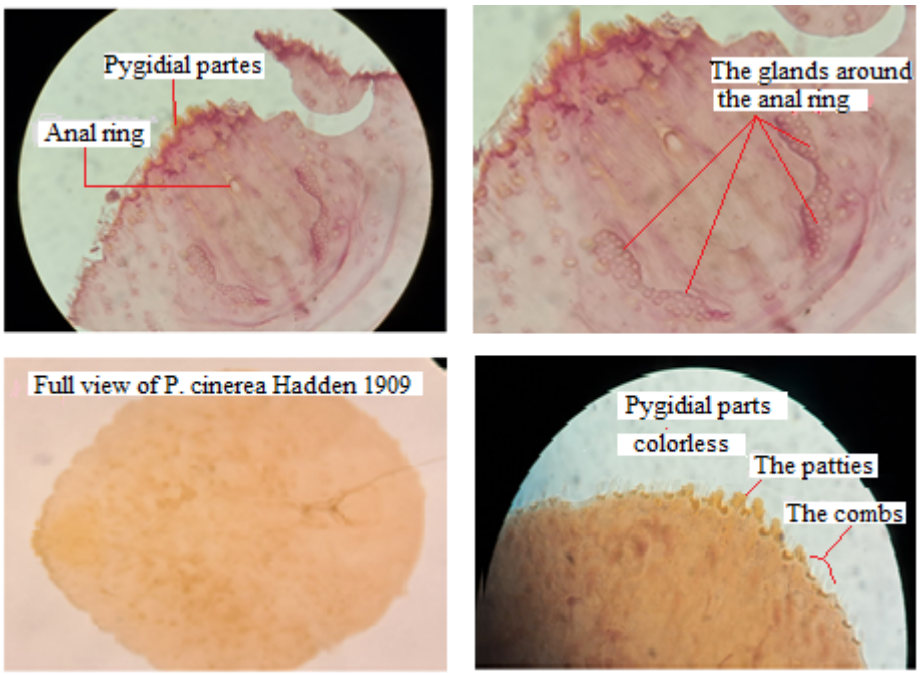
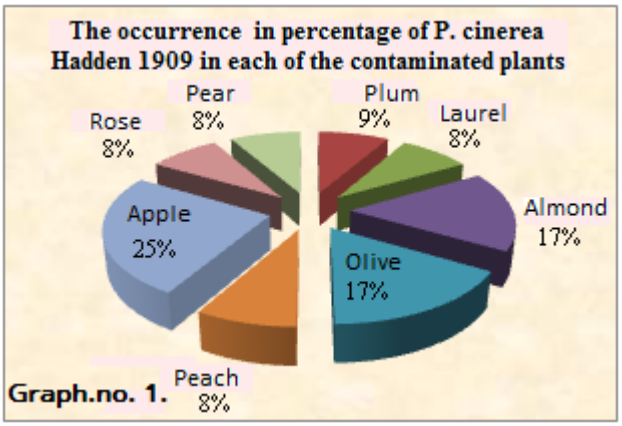
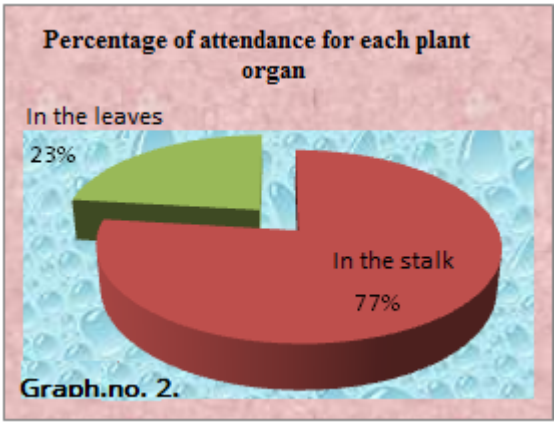


Fig. no. 5: Under-binocular view of the micro preparations prepared by us.

From the genus Parlatoria, associated with the species in question, we also found P. oleae Colv. (Orikum, Vlorë; Delvinë; Tepelënë, Beçisht;), P. pergandii Comst. (Saranda, city) and P. thea Ckll. (Vlora, city). Thus, from the genus Parlatoria, in our research region, we have identified only four species: P. cinerea Hadde., P. oleae Colv., P. thea Ckll. and P. pergandii Comst, (Tab. no. 2).

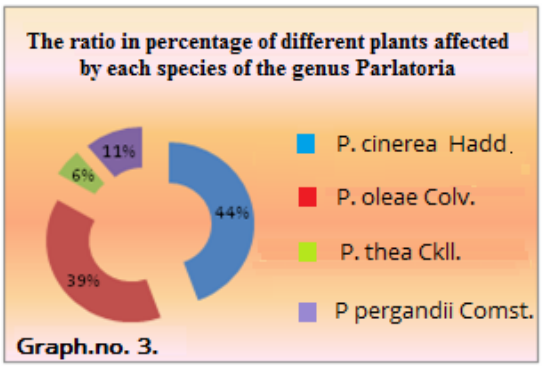




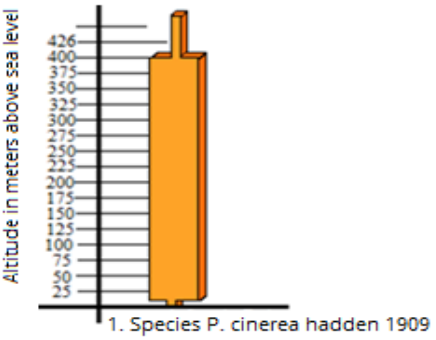
Plant organs contaminated by P. cinerea Hadde are presented as follows:
In Plum (s), in Laurel (l), in Almond (s), in Olive (s, l), in Peach (s), in Apple (s), in Trendafil (s) and in Pear (s). [Vo: (s) = stem), (l) = leaf]. The tangibility of plant species from each of the species of the genus Parlatoria (Targini - Tozzetti, 1868) is given in Table no. 2.

Tab. no. 2: Vegetation contaminated by each species of the genus Parlatoria.

No. Ordinal	The namoe of The parasite	The variety of plants frequented by them											
		Plum	Laurel	Almond	Olive	Peach	Apple	Rose	Pear	Nespull	Persim mon	Orange	Tangerines
1.	P.cinerea Hadde.	+	+	+	+	+	+	+	+	-	-	-	-
2.	P. eleae Colv.	+	+	+	-	-	-	+	+	+	+	-	-
3.	P. thea Ckll.	-	-	-	-	-	-	-	-	+	-	-	-
4.	P.pergandii Comst.	-	-	-	-	-	-	-	-	-	-	+	+



Graph.no. 3.



Graph.no. 4 - Spreade in height above sea level

IV. INFERENCES AND CONCLUSIONS

1. Based on the Map. no. 1 and no. 2, it is immediately noticeable that P. cinerea Hadden 1909 was not found in all our checkpoints. However, she inhabits habitats of either coastal or continental climate zones, extending its habitat from coastal Mediterranean climate zones to lowland, hilly and pre-mountainous Mediterranean climate zones; from a height of 10 m above sea level to a height of 400 m above this level, (Graph. no. 4). Worldwide, this species is found almost everywhere *(in Japan, Mozambique, India, Indonesia, Israel, Italy,Jjamaica, New Caledonia, Montserrat, Netherlands Antilles, Hong Kong, Colombia, Mexico, Haiti, Guyana, Guam, Grenada French Polynesia, Dominica, Cook Islands, China, Brazil, Bahamas, Argentina, Pakistan, Cuba, Trinidad and Tobago, Northern Mariana Islands, Western Samoa, Vietnam, United States of America, Thailand, Taiwan, Suriname, Panama, Vanuatu (= New Hebrides), Niue, Spain, Philippines, Pitcairn Island, Puerto Rico & Vieques Island, Saint Lucia, South Africa* - Lit. no. 25.) as well as in Europe and in our region under analysis. Thus, the economies of any country can be at risk from the effects of this parasite.
2. In geographical regions with a milder climate, the animal can reach a body size (together with the waxen cover) up to 2 mm in diameter (Lit. no. 24), from the 1.2 mm that we found in our samples.
3. Looking at the data of Tab. no. 1, it is clear that the collection of material on the ground is favored precisely by the wintering imago forms (December, January, February) that have already maximally formed their waxen covering, as well as by the wintering imagos that begin to hatch their eggs (March, April, May). In the other stages, newly hatched or second-instar larvae, it becomes difficult to collect them due to the impossibility of observation and identification.
4. Also, since this group of living things gives several generations a year (depending on the climate), we see how, in our case with three generations, they replace one by one each other, (Tab. no. 1).
5. Based on what we presented in the first paragraph (Introduction) - (Lit. no. 24) and the data in Tab. no. 2 we see that the range of

"host" plants of this species, in relation to others, is greater.

6. There are plants where this parasitic species has been found both by foreign authors and by us, but there are also many other plants where it has been found only by foreign authors (Lit. no. 24), or the opposite even only by us, (Tab.no. 2).
7. Among the species of the genus Parlatoria, found in the region studied by us, we note that the widest range of infection of the plant varietys is possessed by this particular species, (Tab. no. 2; Graph. no. 3) .
8. During feeding, as a result of absorbing the plant's lymph, it weakens the plant, reduces the quantity and quality of production and can also convey to them a series of viral diseases that lead to their complete drying.
9. What is given in Lit. no. 24 that *(... mixed infections of P. cinerea and P. pergandii in citrus fruits cause scratching and peeling of the bark (Walker and Deitz, 1979); Infections in the bark are mainly from P. cinerea (94% of all infections and in 60% of those in the stalk...)* is also confirmed by our results. But this species, in the region in question, has a wider association with the other species P. oleae Colv. which therefore, in this region, comes second (after it) in terms of the range of plant species infected by it, (Tab. no. 2; Graph. no. 3).
10. Among the plant species contaminated by P.cinerea Hadden 1909, in our case, the first place is occupied by apple with 25% of cases, almond and olive with 17% of cases, plum with 9% of cases and with other queues, (Graph. no. 1). This also speaks of the polyphagy of this species.
11. Regarding the preferred plant organ to settle (this parasite), unlike many other species, it appears that it prefers the stem of the plant, especially its cavities and young buds, (Graph. nr. As can be seen in this graph, in 77% of cases it was found to be located on the stems of plants.
12. This species also represents a parasite with a wide spectrum of parasitism as it is found in many types of plant groups. We find it in citrus fruits, fruit trees and also in decorative plants, (Tab. no. 2; Graph. no. 3).
13. Our identification of the species in question, as a pest in plum culture, is also supported by other researchers in the country, (Lit. no. 1,12).
14. The absence of this species in other parts of this region (especially when it is found in parts close to them in this region), may have to do not only with its real non-spreading in these areas but also with the probability of cases in search or even with the massiveness and diversity of the vegetation in them.

V. RECOMMENDATIONS

1. P. cinerea Hadden 1909, in the region in question (and of course even more widely in our country), represents a pest with a wide range that reduces the quality and quantity of production, weakens and even leads to the elimination of plant as a result of absorption of her lymph. During feeding, it can convey to the plant a number of viral diseases that lead to the drying of the latter. For this reason, it should be taken into consideration by growers and breeders of all types of these plant groups.
2. It is of particular importance to take into consideration, on the part of managers (arrangers of recreational parks in urban areas), the fact of polyphagy of this species with the inclusion of ornamental plants in it as well.
3. Based on the damage to citrus and fruit trees, growers should take into consideration the period of treatment of the vegetation with chemical disinfectants in the periods when it is found as newly hatched mobile larvae (new larvae of the first age) and adult larvae (of the second age). Mainly starting there from April - May until the end of August, (Tab. no. 1).
4. Based on the considerations of point 3 (above), it is the duty of growers to keep records, since the determination of fixed imagos already in the winter of the previous year will make us attentive to follow their new biological cycle that starts in the spring of the following year.
5. Weather with high temperatures increases the annual generations that this specific group of organisms achieves. Thus, depending on this fact, it should be possible to identify this parasite and increase or decrease the

frequency of treating the vegetation with chemicals against it.

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