The ecological control of pests at cabbage using Artistolochia Clematitis plants from spontaneous flora

Pandia, Olimpia and Saracin, Ion and Bogza, Ion

University of Agricultural Sciences and Veterinary Medicine Bucharest, Romania, University of Craiova, Faculty of Agriculture, Romania, University of Agricultural Sciences and Veterinary Medicine Bucharest, Romania

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THE ECOLOGICAL CONTROL OF PESTS AT CABBAGE USING ARTISTOLOCHIA CLEMATITIS PLANTS FROM SPONTANEOUS FLORA

OLIMPIA PANDIA[1], ION SĂRĂCIN[2], ION BOZGĂ[1]

Abstract: *In the modern society of today, consuming natural products is not a hobby anymore and it is a necessity for us regarding health. The first factors of disease are owed to unhealthy food and we cannot have a healthy food and a healthy organism if we do not remove from our food system the negative effects possessed by unhealthy food, even if it is not the cheapest option. From the products consumed by people, a very important role for producing the necessary energy for the organism is given to vegetables. Thus, we aimed the study of using decoctions obtained from the Aristolochia Clematitis plants which can be found in the spontaneous flora of Romania, unpretentious regarding the soil and which can combat one of the most frequent pests met in cabbage cultures: cabbage aphis (Brevicoryne brassicae L.), cabbage fly (Delia brassicae), cabbage butterfly (Pieris brassicae). The elimination of contact insecticides and chemical substances and obtaining healthier products are several purposes by using these methods. The obtained decoctions were made by combining three types of plant mixes in order to identify which component part is richer in aristolochic acid and which decoction gives better results for the combat of insects and to make a better comparison between them related to obtained results. There were taken soil samples from the six cultivars between planting cabbage seedlings for a better documentation. After the observations made on the whole period, the best results were obtained at cultivars 1, 3, 5, 6 where cabbage plants were treated with decoction obtained from the roots and where the whole plant combined with soap solution was used, followed by cultivars 2 and 4 where there was not used Aristolochia Clematitis plants. Because the results obtained were satisfied without using contact insecticides, a larger investigation of these decoctions follows using only Aristolochia Clematitis plants or in combinations with other plants which have very good results for ecological control of diseases and pests from vegetable cultures.*

Keywords: *physiological balance, ecological products, decoction, aristolochic acid*

INTRODUCTION

There are cultivated approximately 250.000 species of vegetables worldwide and over 60 species in Romania. Even if these cultures cover relatively limited areas (approximately 2% from the arable land) and the made production workflow exceeds 10% from the vegetable production, vegetable growing represents an important segment of national wealth which must be kept and continually extended. The cultivated range shows that, in 2000, the first places in matter of production are occupied by tomatoes (100, 8 mil. t), cabbage (52,3 mil. t), followed by onion and carrots (information from FAO) [6, 7].

By vegetable protection we can understand the attainment of healthy superior-quality products using more and more ecological technologies. All the plants whose physiological balance is disturbed are affected by various modifications when biological phenomena develop, producing various changes, so we have an "ill" cultures.

Every plant disease has a determined aspect with pathogen clear symptoms which can manifest different related to the soil, weather, water and age.

The qualitative and quantitative increase of vegetable production is conditioned by phytosanitary protection measurement.

The insufficient knowledge of vegetables lifestyle, especially those from the cabbage group, of pathogen agents, of diseases and pests which can provoke considerable damages, leads to damages in production. It is very important to mention that every plant in this class has a different sensibility which is treated differently.

Aristolochia Clematitis is one of the very disputed plants in the past and in the future because of the beneficial effects that can have on the organism in treating various diseases, but

[1]Sl.univ.dr.ing. Olimpia Pandia: University of Agricultural Sciences and Veterinary Medicine Bucharest, Romania, e-mail: olimpia_pandia@yahoo.com; [1]Conf.univ.dr. Ion Bozgă: e-mail Ion Bozgă: veterinar_serv@yahoo.com,
[2]Prof.univ.dr.ing. Ion Sărăcin: University of Craiova, Faculty of Agriculture, Romania, e-mail: ion_saracin@yahoo.com

being very toxic because of the high content of aristolochic acid which is toxic possibly leading to death. [5].

Aristolochia Clematitis contains a complex acid, especially aristolochic acid which, if used with a correct concentration stimulates the activity of white cells in the blood, while helping to heal wounds. It is safe to use this plant externally. (A. Hostage, M. Staiger, K. Haag, W. Gerok, Klin Wochenschr ”concentrations have been suggested in order to provide a simple guide to the level of severity in an illness”) [4].

These plants can assure their own defence against diseases and pests because of the bio-synthesis of active ingredients (volatile oils, flavonoids) contained and the sharp odour sensed from the distance. The treatments or the preparations from these plants (decoctions or macera) lead to combat of insects [1, 2, 3].

MATERIAL AND METHOD

The reaction of cabbage cultures at applying different decoction mixes and the reaction of soil type (cambic chernozem) is looked up regarding the quantity and quality of obtained production, the reminisce in the soil and the impact on the environment.

The researches were made in Ianca Village from Olt County in a private household in 2013 and biological material from local populations was used. Six cultivars with cabbage was used, every cultivar with 30 cabbage seedlings using randomized blocks method. The cabbage seedlings have 46-48 days, 12-14 cm height and 5-6 formed leaves before planting. There were planted Aristolochia Clematitis plants around them. Care operations, gaps filling, manual breeding and differentiate treatments with Aristolochia Clematitis were made to obtain better results.

The next characters were looked up:

- the physical-chemical proprieties of the cabbage culture;
- the biometric data of the cabbage culture;
- the occurrence of pests in these cultivars;
- the phased application of treatments with Aristolochia Clematitis;
- the quality and the quantity of the obtained production at cabbage culture.

RESULTS AND DISCUSSIONS

The soil where the cultivars were made is a cambic chernozem and the soil samples were taken from a deepness of 0-20 cm in order to make the agrochemical analyses.

Table 1

Determining chemical properties of cambic cernoziom harvested from the vineyard 20 cm deep

No sample.	pH	Nt	P_2O5	K_2O	Ah	SB	Hummus
1.	7,5	0,235	4,2	14,9	2,82	19,3	2,23
2.	7,35	0,226	5,5	15,5	2,81	18,6	2,18
3.	7,67	0,242	5,3	14,9	2,90	19,8	2,35
4.	7,6	0,240	4,3	16,9	2,88	19,9	2,32
5.	7,8	0,248	3,9	18,6	2,98	19,9	2,41
6.	7,71	0,241	5,6	21,7	2,92	19,7	2,38

The seedlings were planted in the six cultivars at 3rd and 4th of April 2013 when the soil temperature was 8°C. In the following period (the grip period) the gaps appeared at cultivation were looked up and filled from the same seedlings used at cultivars establishment.

Table 2

Plantation and completion of gaps from the cabbage cultivars

Cabbage cultivar	Time of plantation	Dried plants after 5 days from plantation	Gaps filling
1	03-04-2013	5	5
2	08-04-2013	1	1
3	06-04-2013	2	2
4	04-04-2013	4	4
5	05-04-2013	3	3
6	07-04-2013	2	2

Biometric determinations regarding plant grow and development, the moment of terminal bud apparition, cabbages formation and determination of cabbage diameter after harvesting were made during vegetation period. Different support methods were applied during observation period: three manual hoes, the maintenance of humidity at an optimum level at all the six cultivars, weed hoeing, treatments based on decoction from Aristolochia Clematitis plants, as well as the reduction of chemical and ecological treatments in order to recommend these for usage in production.

Because all the chemical treatments were eliminated, Aristolochia Clematitis seedlings were planted around cultivars 1, 3, 5 and 6 and the cultivars 2 and 4 were not enclosed by these plants for protection.

The first apparitions of *Brevicoryne brassicae* infestations appeared immediately cultivars 2 and 4, where *Brevicoryne brassicae* started to attack cabbage roots. *Delia brassicae* also starts to appear.

The preparation of the three decoctions:

To reduce the pest attacks the first decoction started to be prepared and it was formed from: Aristolochia Clematitis fresh roots which were washed before being grinded and mixed with hot water for 30 minutes. After cooling, this preparation was pulverized on the infested cultivars.

The second preparation was made from Aristolochia Clematitis stems which were boiled for 30 minutes after grinding and let in order to cool.

The third preparation was made by mixing all parts of the plant (roots, leaves and stems) which were mixed with soft soap after boiling and cooling to obtain an immediate effect for sucking and soft-skinned insects. This solution can be pulverized or spread over the plant in a concentration of 1 liter at 10 liters of water.

The fast growing of Aristolochia Clematitis plants as well as their flowering slowed the apparition of cabbage butterfly (*Pieris brassicae*) which did not produced damages in these cabbage cultivars because of the strong odour released by these plants, obtaining a biological rejection of it.

Figure 1. Harvesting and preparation of the three decoctions from Aristolochia Clematitis plants

Table 3

The decoction appliance at the apparition of *Brevicoryne brassicae L* (cabbage aphis)

Observations	Cabbage cultivar I	Cabbage cultivar II	Cabbage cultivar III	Cabbage cultivar IV	Cabbage cultivar V	Cabbage cultivar VI
The fisrt decoction applied at:	14.04.2013 Low infestation. 10 attacked plants	18.04.2013 The first signs of ill plants appear. 20 attacked plants.	16.04.2013 Low infestation. 9 attacked plants.	14.04.2013 The first signs of ill plants appear. 18 attacked plants.	15.04.2013 Low infestation. 11 attacked plants.	17.04.2013 Low infestation. 8 attacked plants
The second decoction applied at:	28.04.2013 5 attacked plants	27.04.2013 16 attacked plants	26.04.2013 6 attacked plants	29.04.2013 14 attacked plants	26.04.2013 7 attacked plants	30.04.2013 4 attacked plants
The third decoction applied at:	10.05.2013 2 attacked plants	15.05.2013 8 attacked plants	17.05.2013 3 attacked plants	11.05.2013 6 attacked plants	13.05.2013 3 attacked plants	14.05.2013 2 attacked plants

Table 5

The decoction appliance at the apparition of *Pieris brassicae* (cabbage butterfly)

Observations	Cabbage cultivar I	Cabbage cultivar II	Cabbage cultivar III	Cabbage cultivar IV	Cabbage cultivar V	Cabbage cultivar VI
The fisrt decoction applied at:	-	28.05.2013	-	27.05.2013	-	-
The second decoction applied at:	-	05.06.2013	-	06.06.2013	-	-
The third decoction applied at:	-	-	-	-	-	-

CONCLUSIONS AND RECOMMENDATIONS

We can affirm that the decoction 3 had the best results on the three pests.

The cabbage cultivars behaved different, thus the cultivars 1, 3, 5 and 6 which were enclosed with Aristolochia Clematitis plants too behaved very well, obtaining very good results at infestation with *Pieris brassicae*, which avoided these cultivars because of the strong odour released by Aristolochia Clematitis plants.

The cultivars 2 and 4 were the most hard to be maintained healthy because the pest attack was not eliminated totally with these decoctions.

The manual maintain work was important because we obtained cultures with good productivity and good results regarding quality.

Each plant disease has a determined aspect with pathogen clear symptoms which can manifest different related to the soil, weather, water and age.

Each plant from this class has a different sensibility and is treated differently.

The decoctions 1 and 3 gave the best results after the researches and they are in view for recommendation for usage in production for vegetable obtaining.

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