STUDIES CONCERNING THE INTRODUCTION IN ECOLOGIC CULTURE OF SOME VEGETABLE SPECIES FROM WORLD ASSORTMENT, LESS KNOWN IN OUR COUNTRY

STUDII PRIVIND INTRODUCEREA ÎN CULTURA ECOLOGICĂ A UNOR SPECII DE LEGUME DIN SORTIMENTUL MONDIAL, MAI PUȚIN CUNOSCUTE LA NOI ÎN ȚARĂ

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Abstract: *The large amount of species, cultivated as vegetables, offers the possibility of selection from a large spectrum, able to adapt to the conditions from different agro-pedo-climatic areas. This represent an important step for the ecologic vegetable gardening, offering the possibility to diversify the production with vegetables that are more rustically and more adapted to some stress conditions, thus avoiding the intervention of the producer. At VRDS Bacau different experimentations were accomplished regarding the cultivation in tunnels, in the restrictive conditions of biologic agriculture of species of long squash - Lagenaria siceraria, chrysanthemum for salad – Crysanthemum garland, spiny cucumber (Kivano, metulon) – Cucumis metuliferus, bitter cucumber – Momordica charantia; in open field cultivation the following species were studied: physalis (păpălău) – Physalis peruvianum and Helianthus tuberosus.*

Rezumat: *Multitudinea speciilor cultivate în lume, ca legume, oferă posibilitatea alegerii unui spectru foarte larg, capabil să se adapteze condițiilor din diferite zone eco-pedo-climatice. Aceasta constituie un demers foarte important pentru legumicultura ecologică căreia i se oferă posibilitatea să-şi diversifice producții cu legume mai rustice sau mai bine adaptate unor condiții de stres, fapt ce nu mai necesită intervenții din partea producătorului. La SCDL Bacau s-au experimentat, în condițiile restricțiilor impuse de agricultura ecologică, in cultura de solar speciile dovlecelul lung – Lagenaria siceraria, crizantema de salată – Crysanthemum garland, castravetele țepos (Kivano, metulon) – Cucumis metuliferus, castravetele amar – Momordica charantia; in cultura de camp s-au studiat speciile physalis (păpălău) – Physalis peruvianum si topinambur – Helianthus tuberosus. Studiile s-au referit in special la adaptabilitatea lor in conditiile experimentale de la SCDL Bacau, caracteristicile fructelor si productiile obtinute.*

Key words: diversify, ecologic, vegetables, rustically

The diversity of species, its maintaining and promotion is one of the fundamental principles of ecologic agriculture. Vegetable gardening is maybe the agricultural branch in which the diversity at global level has no limits, the classical example being offered by China where more than 1400 botanical families are consumed as vegetable.

To the nutritive and tasty qualities are added also a great plasticity of some species that can easily adapt to the diversity of pedo-climatic conditions and that also

have resistance to the pests and diseases. The multitude of species cultivated in the world, as vegetables, offers the possibility of choosing from a large spectrum able to adapt to different eco-pedo-climatic areas. This constitute a very important step for ecological vegetable gardening by offering the possibility to diversify its production with vegetables that are more rustically and well adapt to stress condition, which doesn't require interventions from the producers.

Knowing the problems involved in ecological production of vegetables from our geographic area at VRDS Bacau, we aimed toward different experimentation for the introduction in cultivation system of new species less known, designed for diversify production phased all over the vegetation period.

MATERIAL AND METHODS

At VRDS Bacau six species of vegetables less known in our country were experimented in the restrictive conditions imposed by ecologic agriculture (Table 1)

Table 1.

Vegetable species less known, studied at VRDS Bacau

Nr. variant	Specie		Origin
	Romanian name	Botanical name	
1	Bottle gourd	*Lagenaria siceraria*	Italy - Sicily
2	Chrysanthemum for salads	*Chrysanthemum garland*	China
3	Spiny cucumber, Kivano	*Cucumis metuliferus*	New Zeeland
4	Bitter cucumber	*Momordica charantia*	China
5	Phyalis	*Physalis peruvianum*	SUA Seed Savers
6	Ierusalem Artichoke	*Helianthus tuberosus*	Germany

Through the experimental protocol, the crops were accomplished in open field and protected areas:

- in plastic house, the species:
  * Bottle gourd (*Lagenaria siceraria)*;
  * Chrysanthemum for salads (*Crysanthemum garland;*
  * Spiny cucumber, Kivano (*Cucumis metuliferus*);
  *Bitter cucumber – *Momordica charantia*;
- in open field, the species:
  * physalis – *Physalis peruvianum*
  * topinambur – *Helianthus tuberosus*.

The studies focused especially toward theirs adaptability in the experimental conditions from VRDS Bacau, the characteristics of fruits and the obtaining productions in order to establish, based on the obtain results the possibility of obtaining efficient productions. The technology applied was specific for each specie, the cultivation was accomplished after the norms and principles of ecologic agriculture: without chemical amendments, insecto-fungicids and respecting the crop protection in the established asolament. For the characterization of the studied biologic material, phonological observation, quantitative determinations and biometrical measurements were accomplished.

RESULTS AND DISCUSSIONS

The presentation of each species, of requirements toward the environmental factors and the characteristics of cultivation shows real possibility of their introduction in vegetable ecological culture.

In the present paper, we aimed toward the presentation of three from the six species experimented, because the results are a synthesis for four years of ecological cultivation, the other three being cultivated for only 1-2 years.

1. ***Lagenaria siceraria*** **(Mol) Standl – Bottle gourd**

Names in different languages: English - Bottle gourd; French - Courge pélerine, Calebasse; German - Lagenaria; Italian - Lagenaria.

Origin and area cultivation. Bottle gourd is original from Equatorial Africa, from which spread in the entire world in temperate and tropical area. It is cultivated in China and in the South-East of Asia, in India, Tropical Africa and in the centre and South of America, as well as in the Mediterranean area, Italy, Sicily and South of France.

Biological particularities of plants - Bottle gourd is an annual, herby, monoic, crawler or voluble specie, with large leaves, five lobed with large, white male flowers, with a long peduncle. The female flowers are smaller and have a short peduncle. The fruits can have different forms, the edible form being often cylindrical-elongated.

Agro-pedo-climatic exigencies – The agro-climatic requests of this specie are very near with the one of cucumber reason for which these species can be cultivated in the south area in open field through seedling or direct sowing. The crops in open field must be established in the second half of May. Very good crops can be done in plastic houses – planting after April 15, at ground or palisade. The crops at ground allow larger densities, this type of crop being favorable for the obtaining of edible shoots. In "supported" system the densities are smaller, the plants have a luxuriant grow, occupies a larger surface, but the cylindrical fruits grow straight with a good commercial aspect.

Aptitudes in Biologic Agriculture: In the condition of our country, the bottle gourd is less affected by the specific diseases of Cucurbitaceae, thus can be easily adopted in biologic agriculture.

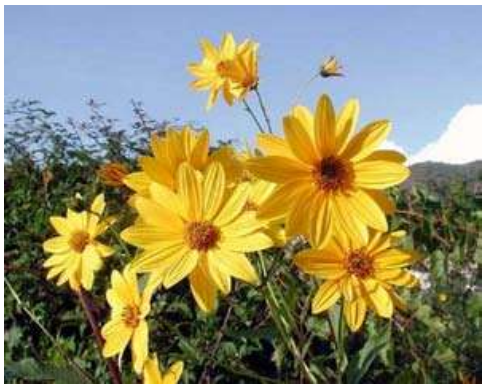
Attention! • Avoid compact, argyle soils that are exposed to sloppy;

• The densities in crops must be under the ones from conventional agriculture with 10-15%, thus obtaining a more airy crop less exposed to pest and diseases attack.

2. ***Helianthus tuberosus*** **L. -** Ierusalem Artichoke

Names in different languages: Enghlish - Ierusalem Artichoke; French - Artichaut du Canada, Topinambour; German - Knollen sonenblume, Juden Kartoffel; Italian - Tartufo bianco, Girasole artichoco.

Origin and area cultivation – The specie is original from North America, and was brought in Europe in the XVII-lea century (in our country in XVIII century). Initially, was brought as feed for animals, as a precedent for fodder potato. It is cultivated rarely in the temperate area, now a days there are preoccupations for the breeding of species and the cultivation techniques in order to extend its area of cultivation.



Biological particularities of plants. It is a perennial plant through its annual tubers (stems). The cane are strong, vigorous, slightly branched at the base, with a high of 1,50-2,00 m. The flowers are grouped in yellow capitols, smaller than sunflowers which look like. The flowers opens late (in August - September) thus they don't have time to produce seeds, in our area the multiplication being made exclusively vegetative. From the point of view of shape and color of tubers different botanical varieties can be distinguished. All the forms are edible, the distinguished between them from the point of view of their utilization in gastronomy, is given by the shape of tubers more or less regulate that allows a good cleaning of it. It is a very vigorous specie with an invasion tendency in its environment were it becomes a weed very difficult to control.

Agro-pedo-climatic exigencies – The Ierusalem Artichoke is very rustic plants, without highly elevated request for soil, and is very well adapted to temperate climate conditions. It exploits well all type of soil, even the poorest one. It is better to avoid the soils that are very humid. It resist very well to frozen during the winter, even when they are prolonged, as well it supports well excessive drought.

Aptitudes in Biologic Agriculture – It is a species highly favorable to biologic agriculture from our area being able to accomplish very good productions without any kind of special intervention.

Attention! The main causes that limit the extension of these species in cultivation system are:

- Very long vegetation period;
- It is hard to clean the tubers due to their irregularities.

The breeding and identification of some genotypes with uniform tubers, rounds or ovals, with smooth surface, easy to be cleaned, give a large perspective to these species especially in biologic agriculture, both as food and feed for biologic animals breed. The specie itself is less exigent to the soil fertility but it must be kept in mind that through large production (tubers and stems) is a "consumptive" plant. This is the reason way, after this crop, a very good agro-mineral fertilization must be done, and less exigence species must cultivated.

3. ***Physalis peruviana* L. -** Ground cherry

Names in different languages: English - Ground cherry; French - Coqueret du Peru; German - Juden Kirsche; Italian - Alchechengi giallo

Family: *Solanaceae*

The fruits of ground cherry can be consumed fresh, mixed with other vegetable and fruits, or in gems, stewed fruit or pickling.

The fruits, together with their scroll skin, dried per plant, become very ornamental and are utilized in floral arrangements.

Origin and area cultivation – The specie is original in Peruvian Ands. was extended in cultivation especially in The United States, South of America, India, China, Africa and Tropical Asia.

In Europe, is cultivated in the amateur gardens; in our country the plant find very good conditions of cultivation during the summer period.



Biological particularities of plants – Originally it is perennial specie, nut in the temperate area behave as an annual one.

The plant is hermaphrodite, herbaceous and can reach till 1,5 m height (in our conditions 50-70 cm). The port us similar with a very branched bush, sometime crawling.

The fruit is a spherical berry, with a diameter of 2-5 cm, covered with a membranous cover colored in green. At maturity it dries and this skin became beige or carroty yellow.

The fruit is yellow, shinny orange-yellow, juicy sometime aromatic and contains numerous small seeds. The fact that is surrounded by this membranous skin allows the maintaining of fruits for more than 3-4 months.

The seeds are small, one gram contain almost 1000 seeds that maintain their germinal capacity for 6-8 years.

Agro-pedo-climatic exigencies are similar with tomatoes and pepper. The plant cultivation does not require special conditions.

Aptitudes in Biologic Agriculture

Cultivated through seedlings this specie is very well adapted to the restrictions imposed by the biologic agriculture, our observations in the field showed that there are no pests and diseases that can economical affect the production.

**Attention! ***At harvesting a special attention must be paid because as soon as the fruits maturate must be harvested immediately.

*** Their place in crop rotation**

- Very good precursory - leguminous, cucurbitacee.
- Good precursory for – bulbous, root plants.
- Time until relapse: 4-5 years.

The synthetic description of the three species studied in our present paper and the preliminary production results obtained at VRDS Bacau in ecological cultivation system are presented in Table 2.

Table 2.

The description of species and the experimental results obtained at VRDS Bacau

N crt	Name	Origin	Edible organ	Obtained productions		
				UM	Cant	Observations
Species cultivates in open field - annual						
1	*Physalis peruvianum*	Peru	Fruit	Gr/m^2	30	Sweet vegetable can be consumed fresh or cooked.
Species cultivate in open field - perennial						
2	Ierusalem Artichoke (*Helianthus tuberosus)*	Canada	Tubers	t/ha	15 - 20	Vegetable dietetic. Is utilized in industry for the extraction of inuline.
Species cultivated in plastic houses.						
4	Bottle gourd (*Lagenaria siceraria*)	Asia, China, India	Fruits, growing apexes	Buc/m^2 Buc/m^2	2-3 7-8	Fruits can be consumed until they reach to a dimension of 40-60 cm.

CONCLUSIONS

In the first years of experimentation from VRDS Bacau very good results were obtained, all the cultivated species responded favorable to the cultivation conditions:

- Ierusalem Artichoke – perennial plant – a plantation 1000 m^2, was accomplished and it represents a source of seedling material. The production is sold at a price that is superior than the price of potatoes, and can be utilized in industry for the extraction of inuline (substitute of sugar at diabetics). Specie without pests and pathogen agents.

- Bottle gourd – Rustically species, very productive, both apex and the fruit at large dimension can be utilized. Specie without pests and pathogen agents can be cultivated in exterior during summer.

For all the other species, the experimentation must be continue in order to characterize them and to decide if they are recommended to be cultivated in the assortment of vegetables cultivated ecologically in our country.

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