



FEATURES OF GROWING NEW CULTURES CHUFA AND SWEET POTATOES IN POLY CULTURE BY ORGANIC TECHNOLOGY

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Results sweet potatoes

Relevance. The introduction of organic farming and polyculture involves expanding the range of cultivated plants, especially through species with valuable dietary and nutritional properties and versatility of use. Such plants include chufa and sweet potatoes. There is no data in the scientific literature on the peculiarities of their cultivation in the soil and climatic conditions of Transcarpathia, and in general, they are rare in Ukraine and temperate climate zone of Europe.

The purpose of our research was to investigate the agroecological prerequisites, features of growth and crop formation of chufa and sweet potato when grown by organic technology in the lowlands of Transcarpathia.

The main objectives of the research:

- 1) to study the ecological features of chufa and sweet potato;
- 2) to study the features of agricultural cultivation technology of chufa and sweet potato;
- 3) to investigate the peculiarities of growth and crop formation of chufa and sweet potato when grown by organic technology in the lowlands of Transcarpathia;
- 4) to find out the economic efficiency of growing chufa and sweet potatoes by organic technology;
- 5) to study the compatibility of sweet potatoes with other cultivated plants and the possibility of growing in the Rozum beds;
- 6) develop a project of energy-efficient greenhouse for growing sweet potato seedlings.

This will allow:

1. reduce the combustion of fuel to deliver food to the consumer due to the fact that the cultivation is carried out near the consumer;
2. grow environmentally friendly, healthy products;
3. contribute to the increase of biodiversity;
4. to avoid the phenomenon of soil fatigue, which annually reduces the world harvest by 25% due to multiculture;
5. use organic waste to increase yields in Rozum beds and mulching;
6. reduce pollution by agrochemicals of products, soil, water and air due to the replacement of fertilizers of chemical origin with organic ones and the abandonment of chemical plant protection products due to polyculture;
7. when growing sweet potato seedlings in an energy-efficient greenhouse, use only renewable energy sources.

All of these goals are consistent with its Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by all United Nations Member States in 2015 as a universal call to action to end poverty, protect the planet.

The objects of study were the chufa of the Pharaoh variety and sweet potatoes of the Georgia Red, Gocha, Porto Amarello and Domov Bay varieties.

The subject of research: agroecological prerequisites, features of growth and crop formation of chufa and sweet potato when grown by organic technology and in polyculture in the lowlands of Transcarpathia.

Research methods: field; statistical. The experiments were performed five times. The size of the accounting area is 10 m².

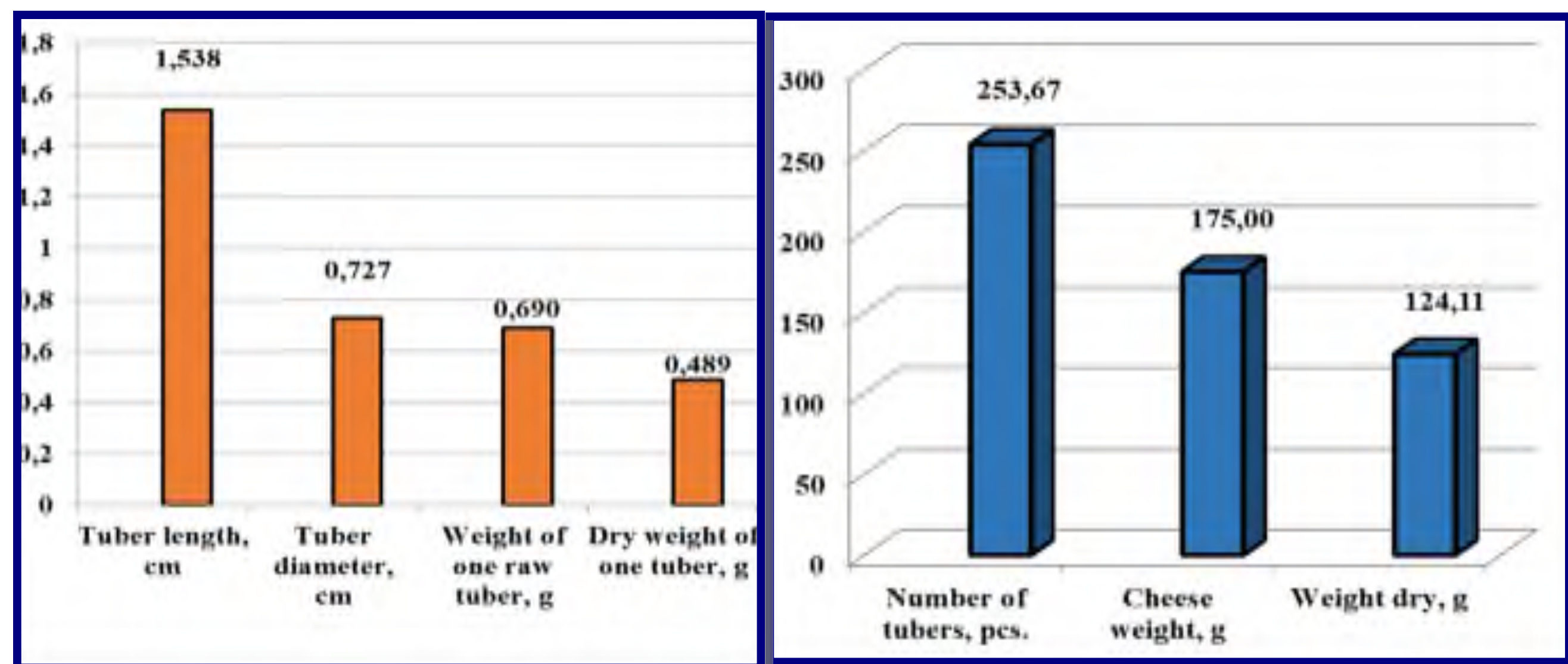
Soil sod-podzolic brown acidic superficially gleyed on alluvial loams. The humus content is 1.8%. Growing of chufa and sweet potato was held for four years by organic technology in multiculture and in Rozum beds.

Results Chufa

Knowing that the feeding area of one chufa plant in our experiment was 0.12 m², we calculated the number of plants per 1 hectare — 83333, with the yield of raw tubers was 14. 583 tons per hectare, and dry tubers — 10. 343 tons per hectare. Given the current market price for 1 kg of tubers 4.47 EUR, when selling a crop of 1 hectare you can get 46236.67 EUR. Of course, part of this money must be spent on growing this crop. But, in general, we can say that growing chufa can give a good profit.



Harvesting of chufa tubers



Average values of morphometric parameters of chufa tubers Pharaoh variety

The average yield of one plant is Chufa variety Pharaoh

Conclusions

Thus, the paper shows that in Transcarpathia it is environmentally sound and appropriate to grow chufa and sweet potatoes using organic technology. Both crops are very promising, because they have a high yield, high reproduction rate, high dietary properties. Unlike potatoes, are not affected in our conditions by pests and diseases, which allows to grow environmentally friendly products.

Have been developed recommendations for production and project of energy-efficient greenhouse for growing sweet potato seedlings.



Project of energy-efficient greenhouse for growing sweet potato seedlings

Sweet potato varieties Georgia Red and Gocha for four years of research, Porto Amarello and Domov-bay in 2019 have performed well in soil and climatic conditions of the lowland zone of Transcarpathia and, despite the fact that in the register of plant varieties of Ukraine for 2018 there is no variety of sweet potatoes, they can be recommended for cultivation in Transcarpathia and Ukraine.

The highest yield is Gocha - 660 c / ha. Compared to potatoes, this is quite high.

Economic efficiency of growing four varieties of sweet potatoes by organic technology in the lowland zone of Transcarpathia.

Variety	Indicator			
	The yield of tubers from the bush, kg	Yield, c/ha	Market price per kilogram, EUR	Market price of sweet potato harvest EUR / ha
Gocha	1.385	659.52	1.8	118710
Georgia Red	0.752	358.02	1.8	64443.6
Porto Amarello (ordinary bed)	0.595	283.44	1.8	51019.2
Porto Amarello (Rozum bed)	1.129	537.22	1.8	96699.6
Domov-Bay (ordinary bed)	0.496	236.05	1.8	42489
Domov-Bay (Rozum bed)	0.846	402.73	1.8	72491

In 2019 we found that sweet potatoes are well compatible with peppers, tomatoes, beets, chard, onions, cucumbers, pumpkins and dill in small quantities, beans, marigolds, calendula, stevia, young apple, quince, plum, sea buckthorn and cherry trees. Keep in mind that sweet potatoes are light-loving crops, so they should not be planted under large trees and in dense crops.

We also grew new varieties of Porto Amarello and Domov Bay sweet potatoes in the Rozum bed next to the climbing bean and tomato and in the monoculture bed. The yield from the bush in the Rozum bed was 1.9 times higher for the variety Porto Amarello and 1.7 times higher for the Domov-Bay variety. Therefore, it is advisable to grow sweet potatoes in multiculture and in the Rozum beds.



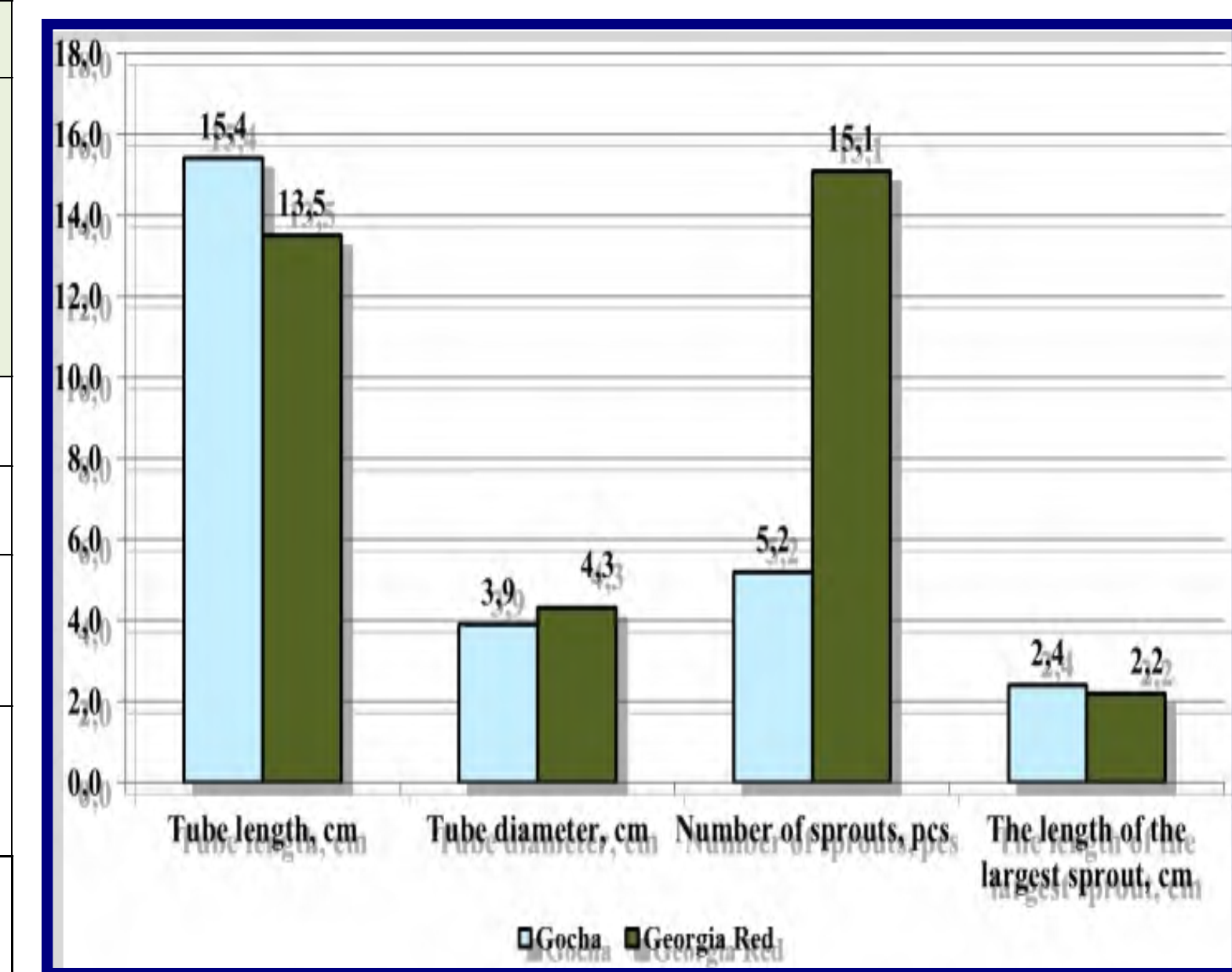
Porto Amarello variety of sweet potatoes in the Rozum bed with the climbing bean and tomato



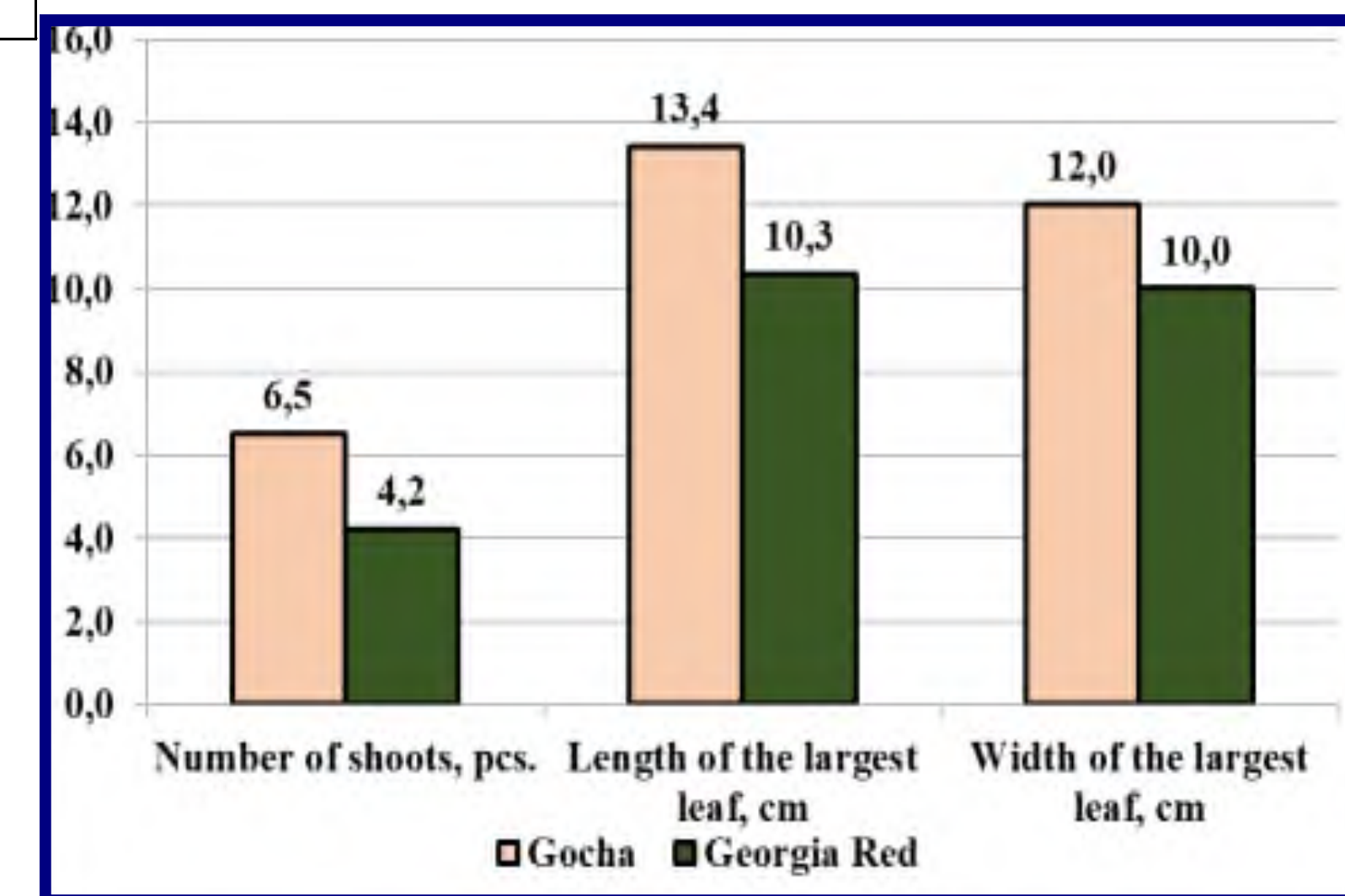
Bushes of sweet potato variety Domov-bay (left - from Rozum bed, right - from usual bed)



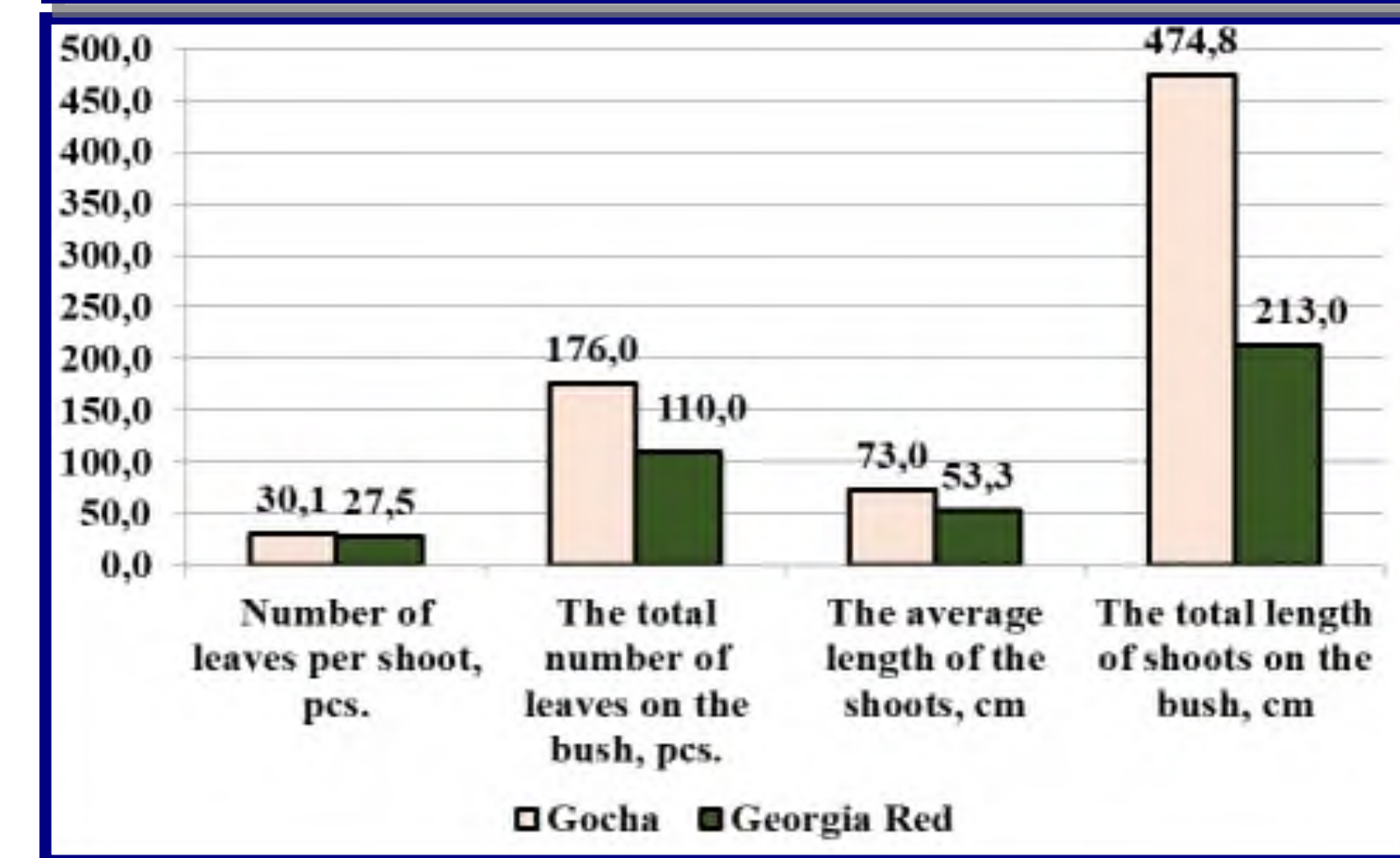
Accounting of morphometric indicators and statistical processing



Morphometric parameters of sweet potato tubers



Morphometric parameters of the aboveground part of sweet potato plants before harvest



Morphometric parameters of the aboveground part of sweet potato plants before harvest



Sweet potato in multiculture