

Gibberellins Stimulator/Growth Regulator/Phytohormone GIBB A3

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GENERAL ASPECTS ABOUT FERTILIZERS

- The main function of fertilizers is to prevent the lack of nutritious substances in the ground. In order to grow and develop normally, plants need carbon, hydrogen and oxygen which they take from air and water, plus thirteen essential mineral elements called nutrients or fertilizers, which normally they take from the soil.

- After a long and continuous use of the soil, it grows poor in nutrients and human intervention is necessary in view of constantly applying fertilizers.

FOLIAR FERTILIZERS

- These are concentrated solutions that use high-purity technical elements and in which nitrogen, phosphorus and potassium (taking into account only some of the elements) are combined in a desired balance, in a controlled environment.
- Foliar fertilizer solutions may be added chelated microelements (organic-mineral compounds), humic acids or other additives depending on the intended result, in order to obtain a balanced fertilizer, which ensures not only the NPK, but also all the microelements, as well as development and growth hormones, vitamins, etc.

FEATURES OF FOLIAR FERTILIZERS:

- they can be applied on most cultivated plants
- they ensure a complete and balanced fertilization
- they stimulate rooting, growth and formation of fruits
- they substantially reduce the effect of stress
- they accelerate the absorption of nutrients from the soil
- they improve production quality; color, sugar content ...
- solubility in water is 100%.

RESTRICTION/INHIBITION OF GROWTH

The action of productivity factors is generally limited after achieving a certain level of production. Thus, chemical fertilizers can be administered up to a certain level, above which the productivity growth goes into regression; water may be administered up to the physiological limits, specific to each crop; the known unconventional solutions (nuclear radiations, magnetic fields, electric fields and ultrasounds, pesticides, phytopharmaceutical substances, etc.) have their limits both in terms of effect and in terms of technical and economic availability. Therefore, the constant growth of crops requires new human invented solutions.

RATIONAL FERTILIZATION OF CROPS

- It requires combined use of growth regulators together with mineral or organic fertilizers, in sufficient and balanced quantities, which would ensure optimum feeding of plants with nutrients for growth and development.
- Rational fertilization of crops is achieved in conditions of maximum economic efficiency, without producing adverse effects on crop's quantity, commercial quality and nutrition value.

GROWTH REGULATORS

- The discovery of growth regulators offered specialists a highly refined, cost-effective instrument to guide and control plant's and crop's growth and development processes.
- In practice, there are 3 groups of growth regulating substances: stimulators, retardants and inhibitors. The stimulating substances comprise three large groups of natural or synthetic compounds: auxins, cytokinins and gibberellins.

- **AUXINS**, Can be found in the tips of the stems, in buds and in young leaves. At cellular level, auxins turn membranes thicker, encourage depositing of substances and stimulate division.
- **CYTOKININS**, Are found in roots, which they are produced naturally by plants, as well as in stems, in lower concentration. They stimulate cell division and increase resistance.
- **GIBBERELLINS**, Are natural stimulators of plant growth and development, with frequent spectacular effects, which caught the attention of specialists in the recent decades, obtaining remarkable results in agricultural production, forestry, horticulture, medicinal plants.

GIBBERELLINS, A BRIEF HISTORY

Gibberellin was discovered in Japan in 1898, when Hotoaro Hori found that excessively tall rice plants had been exposed to the *Gibberella Fujikuroi* fungus. The aqueous fungus extract caused similar symptoms in the tested plants, which led to the idea about the existence of a substance responsible for these effects. The first gibberellin identified was gibberellic acid or GA3. This first discovery was followed by the discovery of other gibberellins until a total of approximately fifty gibberellins were identified in plants and fungi. In practice, the gibberellins used are purified extracts. The most frequently used gibberellin is GA3 and the least used gibberellin is the GA4+GA7 or GA7 composite. Synthetic gibberellins were obtained in the 1980s.



The main changes taking place in the plant metabolism due to gibberellins are:

- intensification of sweating and increased water consumption
- intensification of photosynthesis
- stimulation of seed respiration during germination
- delay in the aging process of plant tissues
- correcting the adverse effects caused by virus infections and *Botrytis*
- decrease in starch content of plants and germinated seeds

GIBB A3

- It is a fertilizer in the form of tablets, containing 5g x 20% gibberellic acid. Its dissolution time is 8 minutes.
- In order to ensure product's maximum efficiency, solutions must be applied to crops within 36 hours from preparation, otherwise the "durity" of water will affect product's quality.
- The product should be applied during cool weather (morning or evening), not in plain sun.
- If it rains heavily within 8 hours after application, the product's effect may be altered. In this case, we recommend reapplying another treatment with a 50% concentration as compared to the initial treatment.





GIBB A3

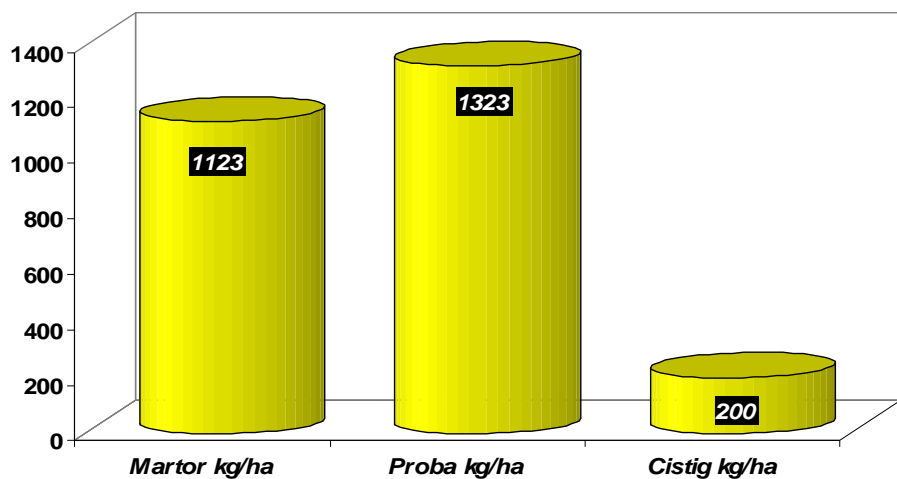
- is administered by sprinkling, by foliar feeding, in 2-3 treatments in the form of solutions in volume of 500 l/ha per each treatment.
- the product should be applied immediately after the preparation of the solution in order to avoid damage
- the products should not be mixed simultaneously with other pesticides or other foliar fertilizers



Results of researches carried out in Romania

Efficiency of the GIBB A3 product, applied to Sun Flower, the Select variety, on unfertilized agrofund, on Cambic Chernozem soil

No. of var.	Version	No. of treatments	Tablets of gibberellic acid 5g*20%	Quantity of product to be used g/ha		Seed production Kg/ha	Efficiency Kg/ha %	
				In one treatment	In all treatments		Kg/ha	%
1	Control sample	-	-	-	-	1123	-	-
2	GIBB A3	2	3.0	15.0	30.0	1323	200	18%
		DL 5%=67		DL 1%=113		DL 0,1%=151		



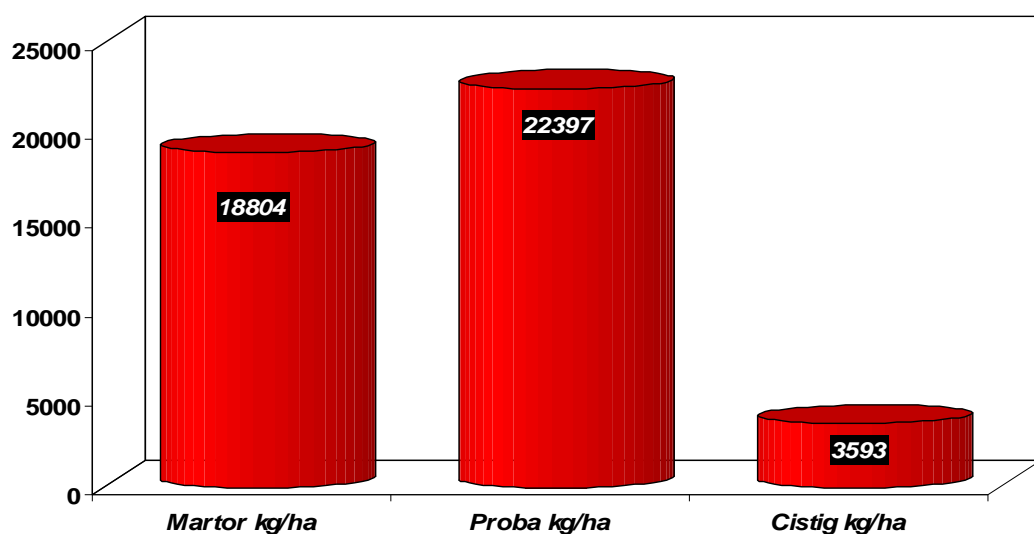
Treatments applied for SUNFLOWER were made in the following stages of vegetation:

- phase I, upon the formation of the 3-4 leaves;
- phase II, upon the formation of the 10-12 leaves



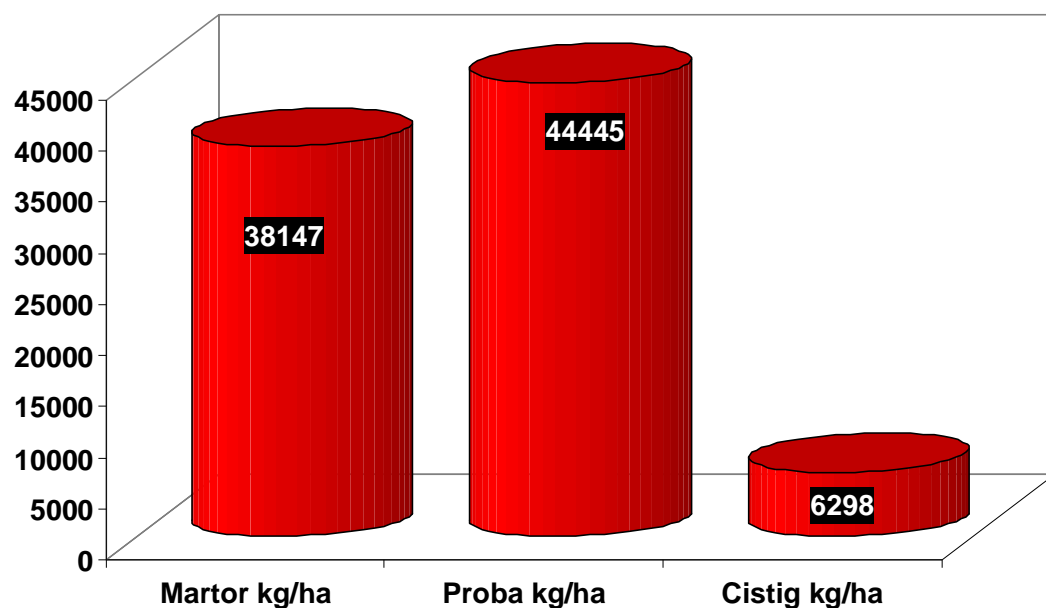
Efficiency of the GIBB A3 product, applied to Tomatoes, the Belladonna variety cultivated in FIELD, on unfertilized agrofunds, on Cambic Chernozem soil

No. of var.	Version	No. of treatments	Tablets of gibberellic acid 5g*20%	Quantity of product to be used g/ha		Seed production Kg/ha	Efficiency	
				In one treatment	In all treatments		Kg/ha	%
1	Control sample	-	-	-	-	18804	-	-
2	GIBB A3	3	3.0	15.0	45.0	22397	3593	19%
		DL 5%=203		DL 1%=387		DL 0,1%=898		



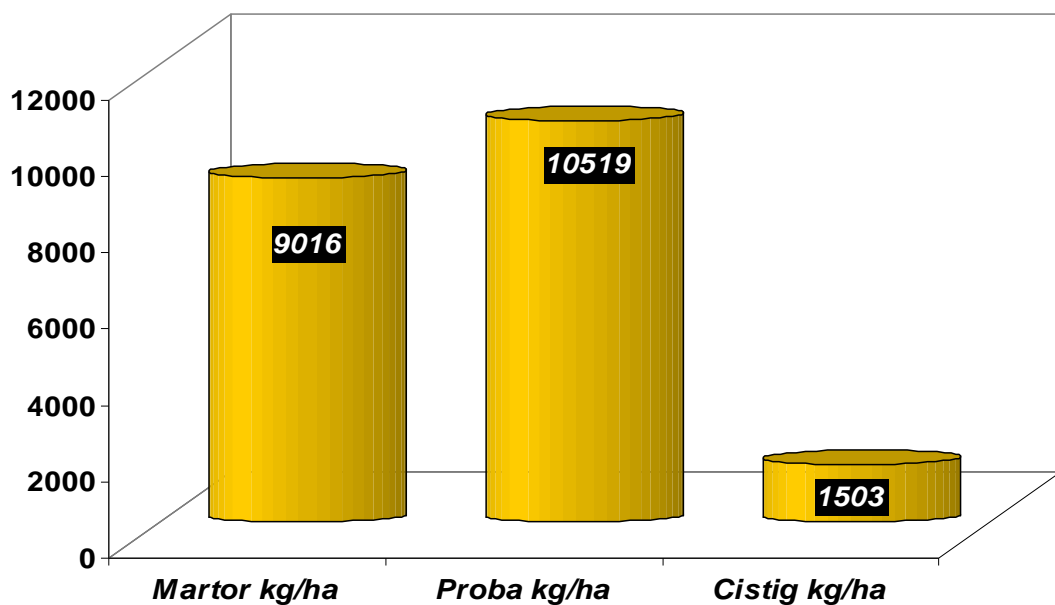
Efficiency of the GIBB A3 product, applied to Tomatoes, the Belladonna variety cultivated in GREENHOUSE, on unfertilized agrofunds, on Cambic Chernozem soil

No. of var.	Version	No. of treatments	Tablets of gibberellic acid 5g*20%	Quantity of product to be used g/ha		Seed production Kg/ha	Efficiency Kg/ha %	
				In one treatment	In all treatments		Kg/ha	%
1	Control sample	-	-	-	-	38147	-	-
2	GIBB A3	3	3.0	15.0	45.0	44445	6298	17%
		DL 5%=1113		DL 1%=2385		DL 0,1%=3044		



Efficiency of the GIBB A3 product, applied to Vine, the Chasselas Dorè variety, on unfertilized agrofunds, on Cambic Chernozem soil

No. of var.	Version	No. of treatments	Tablets of gibberellic acid 5g*20%	Quantity of product to be used g/ha		Fruit production Kg/ha	Efficiency Kg/ha %	
				In one treatment	In all treatments		Kg/ha	%
1	Control sample	-	-	-	-	9016	-	-
2	GIBB A3	3	3.0	15.0	45.0	10519	1503	16%
		DL 5%=641		DL 1%=873		DL 0,1%=1257		



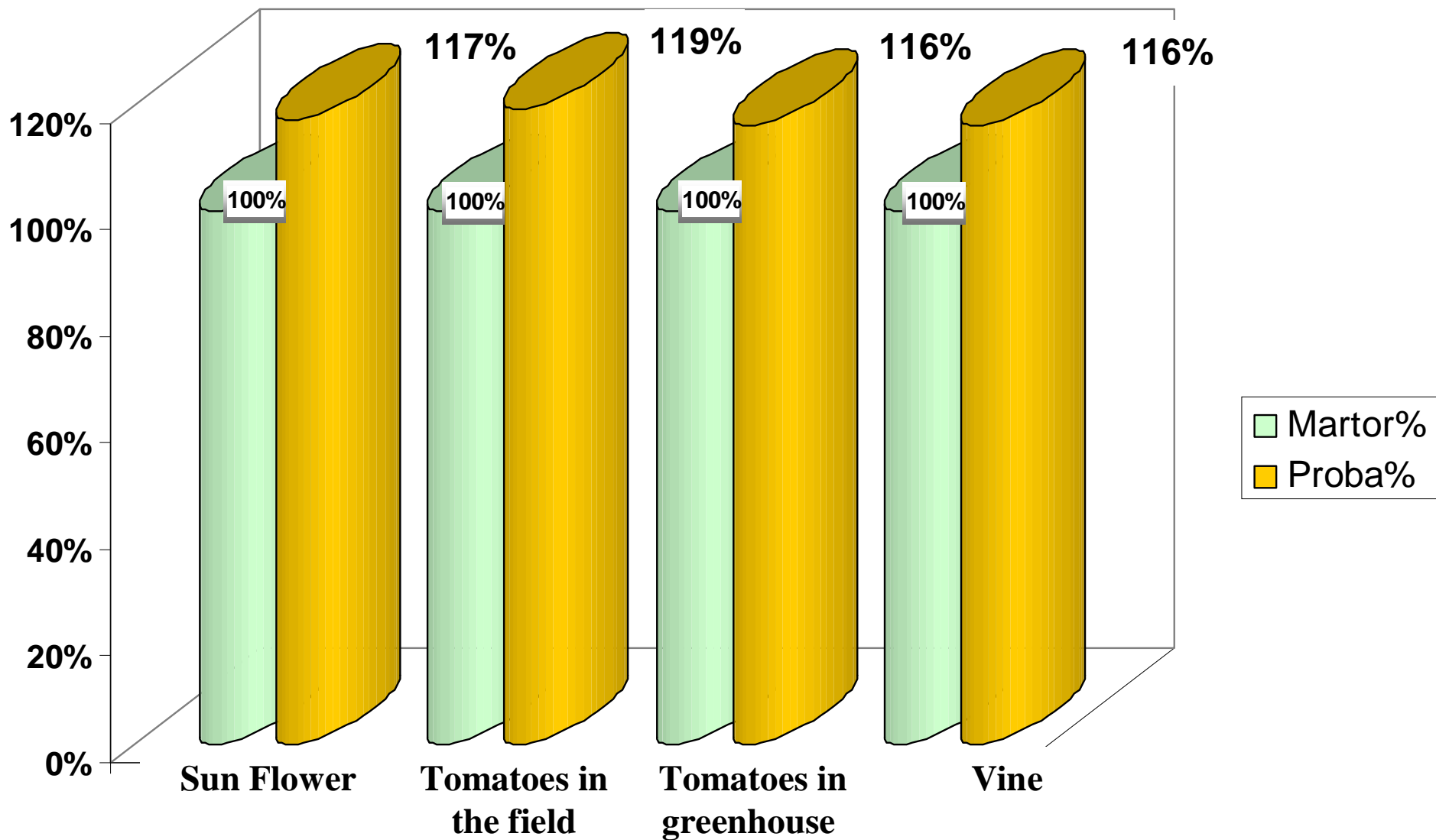
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Treatments applied to VINE were made in the following stages of vegetation:

- phase I, before flowering;
- phase II, after flowering;
- phase III, at the beginning of the formation of grape clusters

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Efficiency of the GIBB A3 product





Results of researches carried out in other countries

STRAWBERRIES

The effects resulting from the application of the gibberellic acid (GA3) were as follows:

- more vigorous plants were obtained**
- productivity increased considerably**
- the number of deformed fruit was reduced**
- it had no negative effects on quality parameters (content of juice, ascorbic acid content, acidity, etc.);**
- following the application of GA3 solutions on harvested fruit, an inhibitory effect was noticed on fruit ripening after harvest due to: reduction of the respiratory activity, delay in the synthesis of anthocyanins and in the degradation of chlorophylls**



TOBACCO

Researches conducted in Canada on the influence of GA3 on the nicotine content in tobacco, highlighted the following conclusions:

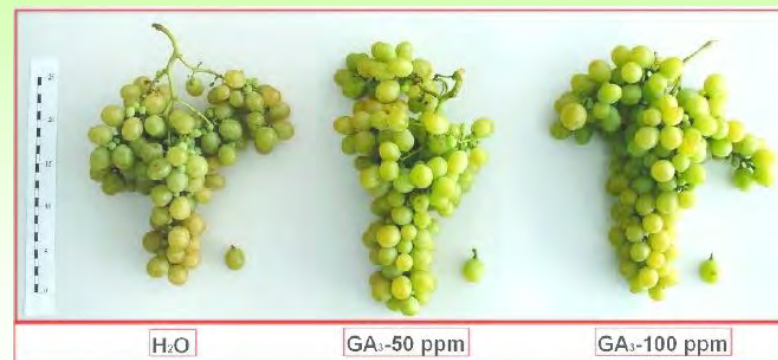
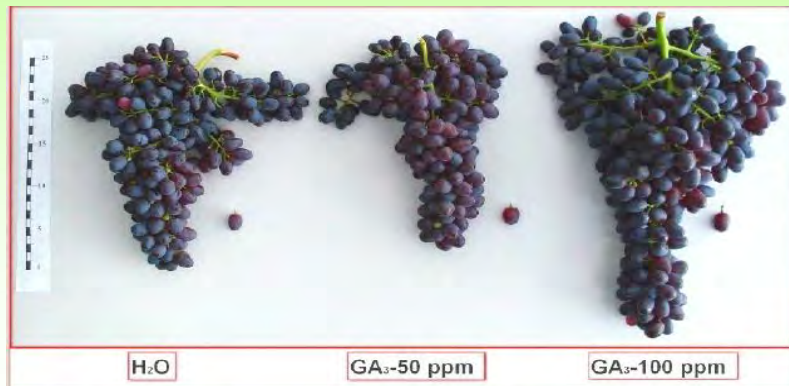


- gibberellic acid significantly lowers the nicotine content, not only in the tobacco seedling, but also in tobacco plants approaching maturity;**
- the decrease in the nicotine content is not correlated with a significant decline or increase in the efficiency of leaf dry matter content**
- the decrease in the nicotine content in tobacco leaves is due to the change in root's metabolism, caused by the application of the gibberellic acid.**

OTHER RESEARCHES ON VINES

Researches (2007-2012) conducted by the departments of Viticulture (Gh.Nicolaescu, A.Stirbu, D.Mihov) and Botany and Plant Physiology (A.Derendovskaia, S.Josan) in the Agrarian University of Moldova, Republic of Moldova (www.uasm.md), revealed the following effects of GA₃ in concentration of 50 mg/l, used in the numerous vine varieties:

- the application to Thompson seedless variety led to productivity rise by 13%;
- the application to Cardinal, Codreanca (Black Magic), Muscat of Hamburg varieties led to productivity rise ranging between 31.4% - 85.6%.
- the use of GA₃ to Cardinal and Codreanca (Black magic) varieties led to increased sugar content and accelerated maturation of grapes;
- the application of GA₃ to the Italy vine led to productivity rise by 10%;



GIBB A3 can be also applied successfully to other crops

Crop	Use (tablets/100 l water)	Application method	Period of absorption
Orange	1-2	Applied by spraying, dosage depends on variety	12 hours
Grapes	1-3	To apply by spraying within 5 days from the formation of the cluster	
Potatoes	0.5	The tubers are dipped into solution for 10 minutes and then they are kept in a cool place until germination	
Flowers	2-3	To apply by spraying before blooming	
Cotton	1-2	To apply upon the occurrence of the first flower	
Pineapple	4-8	To apply by spraying when plants are in full bloom at the rate of 20-30%	
Celery	2-10	To apply foliar feeding by two weeks before harvest	
Rice	2-3	To apply by spraying 2 - 3 weeks before harvest	

CONCLUSIONS AND RECOMMENDATIONS

GIBB A3:

- **Has an important role in regulating the process of plants' growth and development (it stimulates flowering, fruit growth and the growth of aerial stems, leaves, buds, flowers)**
- **Has a very wide applicability and can lead to:**
 - **significant increases in the quantity and quality of cereals, vegetables, fruits, flowers, etc**
 - **a complex action on seed germination or start-up in vegetation of latent buds when weather conditions (low temperatures) do not allow this**
 - **annual increases at tree and shrub seedlings**
 - **it may stimulate the growth of the turf**
 - **it may lead to ramification of chrysanthemums and other plants**
 - **germination of potatoes**
 - **treatment of gladiolus tuberos bulbs with GIBB A3 leads to increased stimulation of plants' growth and an improvement in the quality of the flowers**
- **Has an affordable price.**

Research team and collaborators

I.C.P.A. Bucharest and University of Agricultural Sciences Iasi:

- *PhD. doc. Aurel Dorneanu*
- *PhD. Traian Cioroianu*
- *PhD. Catalin Simota*
- *PhD. M. Dumitru*

Collaborators:

- *PhD. Eng. Toța Cristina Elena*
(University of Agricultural Sciences and Veterinary Medicine of Banat Timișoara)

Complementary researches in the Republic of Moldova:

- **Departments of Viticulture (Gh.Nicolaescu, A.Stirbu, D.Mihov) and Botany and Plant Physiology (A.Derendovskaia, S.Josan) in the Agrarian University of Moldova, Republic of Moldova (www.uasm.md).**