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ZINCHENKO O. V., post graduate student

Zhytomyr National Agroecological University

## **THE EVALUATION OF THE EFFECT OF PLANTS GROWTH REGULATORS ON THE PHOTOSYNTHESIS INTENSITY, ROOTAGE AND MORPHOLOGICAL INDICES OF MISCANTHUS GIGANTEUS**

*The paper presents the investigation into the effects of plants growth regulators on the photosynthesis intensity, rootage and morphological indices when *Miscanthus giganteus* rhizomes are treated at various terms of planting. It has been determined that the application of plants growth stimulators has increased the rootage and improved the morphological indices of *Miscanthus giganteus*, especially at late terms of planting.*

**Key words:** *Miscanthus giganteus, plants growth regulators, rootage rhizomes, morphological indices.*

**Introduction.** One of the plants that could become the raw material for obtaining power (generator) gas fuel pellets, briquettes are *Miscanthus giganteus*. He attracted the attention of scientists who are busy searching for new renewable energy, high yields (20-25 t/ha dry mass), and the energy cost (17-19 MJ/g) and demanding to the growing conditions [1]. *Miscanthus* is propagated vegetatively as triploids, pollen is sterile and does not produce seeds. Often multiple copies *Miscanthus* rhizomes Division (rhizomes). Bush rhizomes are divided into pieces 8-10cm long and weighing 20-50g and having at least 5-6 buds. Planting *Miscanthus giganteus* may hold mechanical way that requires human labor costs and requires more time , and the industrial area of planting *Miscanthus giganteus* usually very large. So you need to try to increase the time of planting. The term is relatively late planting and falls, given the possibility of damage to plants by late frosts , the first half of May -

end of April or mid-May[2]. However, the timing of the transfer of planting for the month of May is to extend the storage rhizomes, their dryness.

When planting these trees in some years there has been rarefied plantations, due to weather conditions (high temperature, lack of sufficient moisture in the soil) in the later planting dates.

So very important to study the timing of planting rhizomes to increase the planting period, which will allow large industrial plant sites per season, in conjunction with the study of plant growth regulators on the intensity of photosynthesis. establishment, morphological indicators miscanthus giganteus in the field, especially in the later periods planting.

**Analysis of recent research and problem statement.** Analysis of the literature shows that when multiplying miscanthus giganteus rhizomes each operation, which results in improved plant growth in the year favorite's plantations increases survival. The main factors are the weed-infested control, which when combined with irrigation and fertilizer nitrogen-phosphorus fertilizers can improve plant growth in the year to lay the plantation. Another factor that improves their growth is small depth of planting rhizomes. Marked the best growth of plants when roots were planted at 2 and 6 cm than at 10 cm [3]. Conducted a study that determined the influence of the rhizomes , which are planted and laying date plantation (spring , winter ) on renew growth of plants. Was almost 100% renew growth of plants with large roots ( rhizomes length about 10 - 15cm) smaller seedlings gave inferior results. Studies conducted in the western steppes of Ukraine , have shown that one of the main factors determining the field germination Miscanthus rhizomes , is planting time . The best conditions for planting up in the early period - in the first week of April. Thus , the study of the timing of planting miscanthus giganteus Polessye in Ukraine is an important scientific and practical problem.

**Research methodology.** Study of growth regulators on plant growth and development during ontogeny in field experiments conducted in the Botanic Garden Zhytomyr National Agroecological University on turf-gley carbonate soils. Miscanthus giganteus rhizomes before planting obpryskuvalys solutions of plant

growth regulators Emistim C Agrostimulin and Regoplant concentration 0.02% and water (control). Effect of plant growth regulators and time of planting on the growth and development of *Miscanthus giganteus* studied as follows:

*Factor A* - planting time:

1. The third decade of April
2. And the beginning of May
3. Second decade of May

*Factor B* - *Miscanthus* rhizomes processing plant growth regulators:

1. Control (water)
2. Emistim C
3. Agrostimulin
4. Regoplant

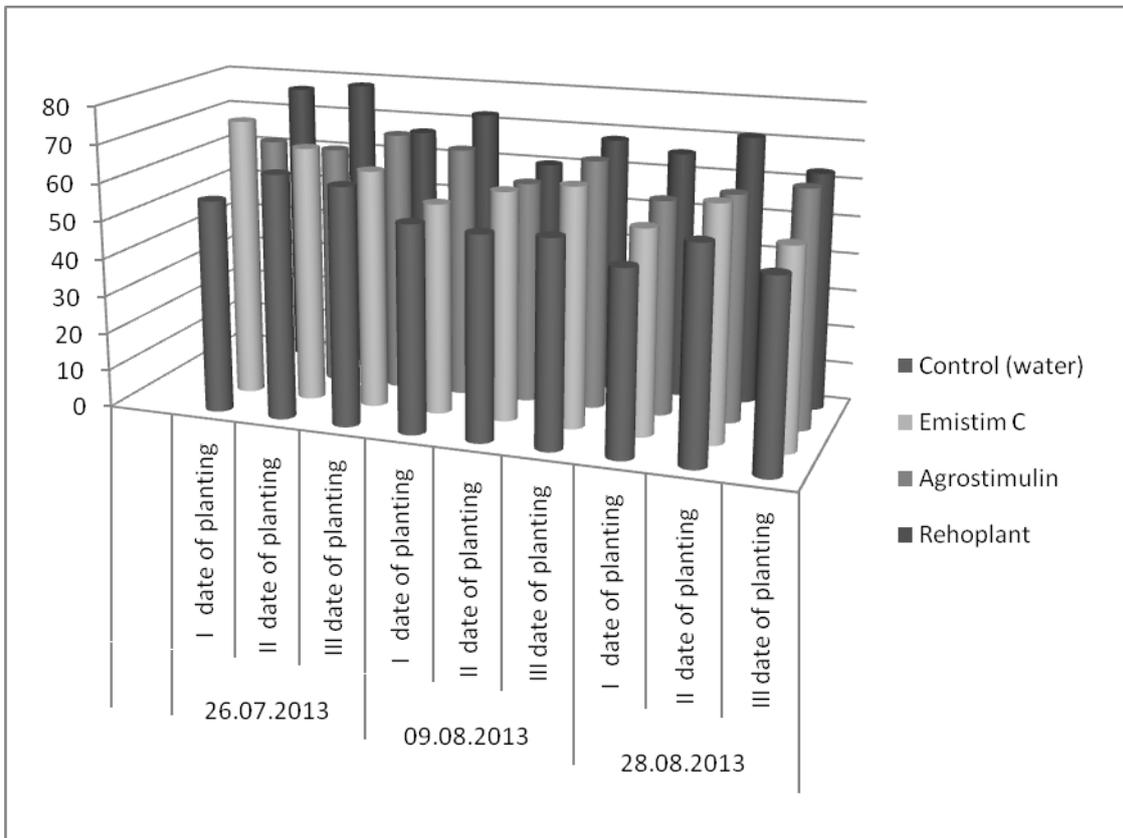
The experiment was laid out in 6 single repetition in accordance with GOST 46.23.74, placing repetitions at each tier options - regular. Total area 195 m<sup>2</sup>, 2.5 m<sup>2</sup> cultivated land, accounting - 1.5 m<sup>2</sup> scheme planting plants 0,75 × 0,75 m, depth of planting rhizomes - 8 cm.

Determination of chlorophyll C \*% was performed by the method of DPCA (Digital - Photo - Chrom - Analyse) [4].

The study of the timing of planting and plant growth stimulators spend on a background of organic fertilizers (40t/ha).

**The results.** The results showed that treatment of rhizomes plant growth regulators stimulated photosynthetic activity of the passage, as evidenced by a higher ratio of chlorophyll (Fig. 1).

The maximum value of the coefficient of chlorophyll marked in variants where *Miscanthus giganteus* rhizomes treated with a solution Agrostimulin and Regoplant, the composition of which are plant growth regulators of plants naturally occurring bioinsektytsyd naturally occurring and trace elements. The combination of separate parts into one system leads to increased efficiency of plant growth regulators. Processing rhizomes above-mentioned drugs contributed to higher photosynthetic activity throughout ontogeny.



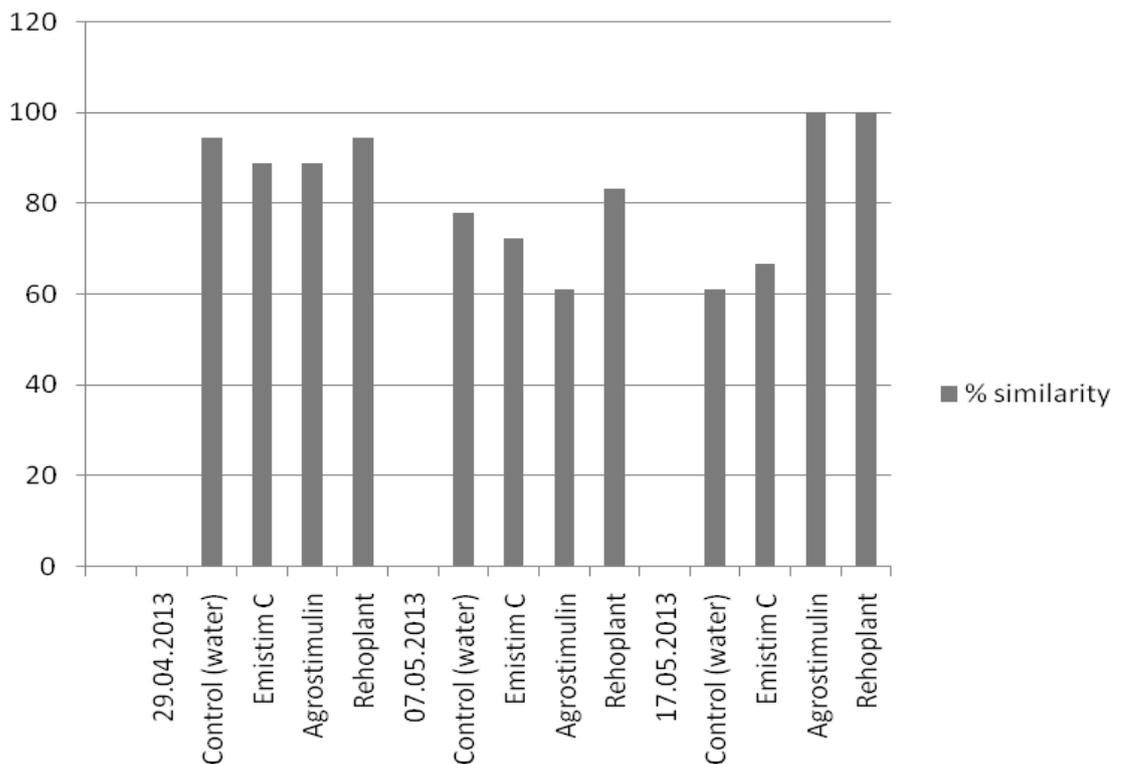
**Figure 1. Effect of growth regulators on the rate of photosynthesis of plants miscanthus giganteus**

Necessary note that original planting associated with the intensity of photosynthesis. Higher performance ratio of chlorophyll in plants miscanthus marked hianteusu at planting roots in earlier periods (the third decade of April).

The use of plant growth regulators reduced the dependence establishment miscanthus giganteus rhizomes of weather conditions, especially in the later planting dates (Fig. 2).

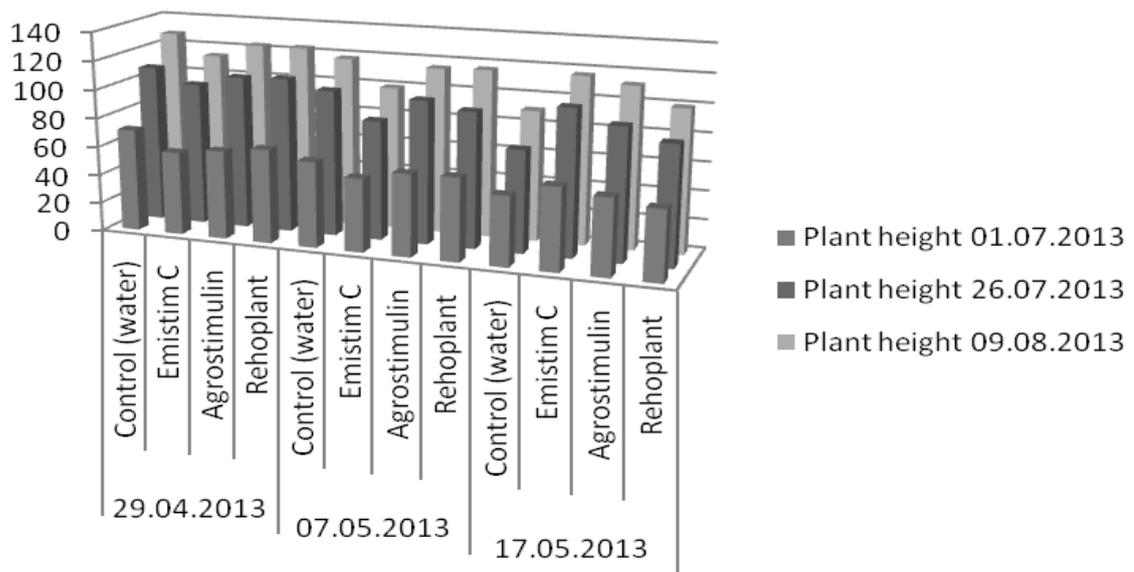
Thus, if the index option establishment maximum observed in the early planting dates, the third decade of April - 94.4%, in the second decade of May, this figure does not exceed 61.1%. Processing rhizomes plant growth regulators before planting in the second decade of May increased their establishment in the form of emistim C to 66.7%, bringing the rate to a maximum value (100%) in versions with and Agrostimulin Rehoplantom.

The use of plant growth regulators also affect plant height, number of stems of shrubs and the density of the crown.



**Figure 2. Dependence similarity miscanthus giganteus from planting period and type of plant growth regulator, %**

Early ontogeny of the above figures for all terms in the control plants planting and research is almost no different, but in the middle and especially the end of the growing season plant height greater than the first term planting control on 32,8-43,6 cm (Fig. 3).



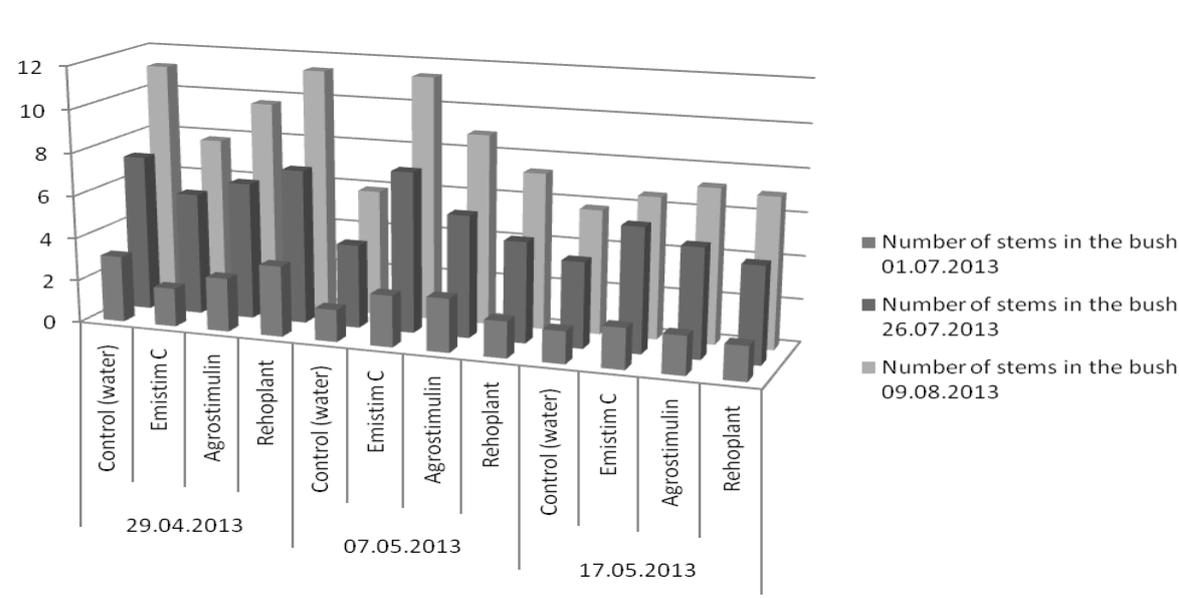
**Figure 3 Effect of timing of planting and plant growth regulators on plant height miscanthus giganteus, cm.**

The same pattern is observed in the second and third terms of planting.

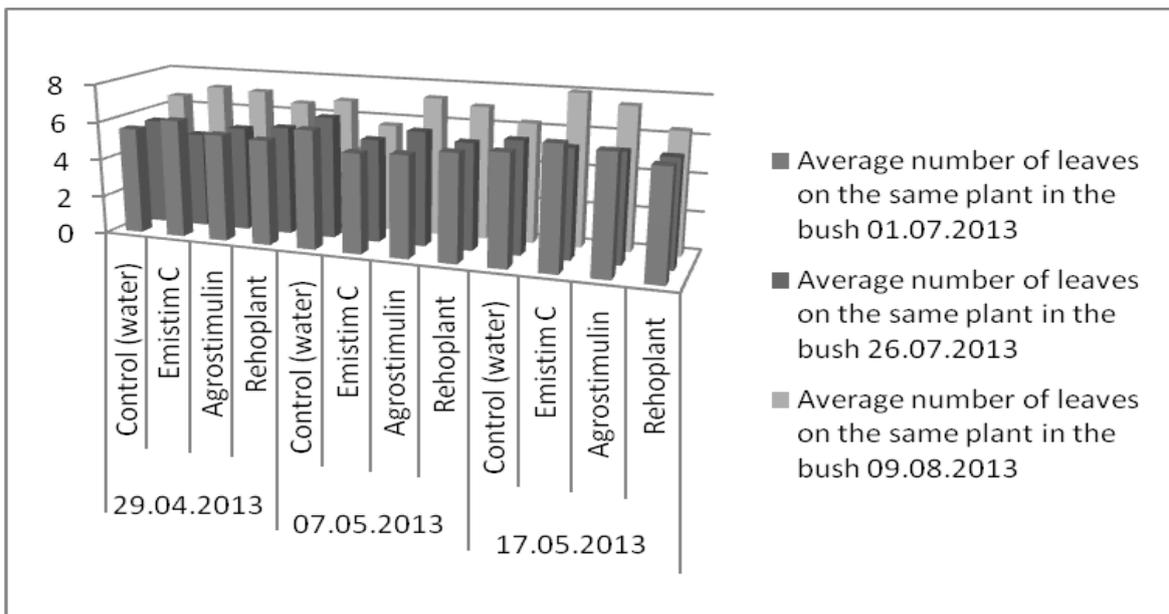
Term planting *Miscanthus giganteus* rhizomes significantly affected the number of shoots in the bush. Thus, in the control variant the maximum number of shoots on all dates of observation was by planting rhizomes in the third week of April. Planting in first and second decade of May reduce their number by 1.5 times.

The use of plant growth regulators had a positive impact on the dynamics of shoots of shrubs *Miscanthus giganteus*. Thus, at the beginning of the growing season shoots in the bush was almost the same, but the middle and end of the growing season emergence of new shoots in comparison with the control significantly increased (Fig. 4A).

This is because the application of plant growth regulators reduced the negative impact of weather conditions and stimulated the emergence of new shoots because of the prevailing well densely covered with leaves stems in August exceeded the control by all terms of planting.



**Figure 4. Impact terms of planting and plant growth regulators on number of shoots in the bush *Miscanthus giganteus* (average, pcs.)**



**Figure 5. Effect of timing of planting and plant growth regulators on number of leaves of *Miscanthus giganteus* (Average of 1 plant, pcs.).**

Processing rhizomes plant growth regulators before planting affected miscanthus giganteus the density of the crown. Thus, at 1.07. maximum number of leaves was observed in the first planting period (third decade of April) in the form of Emistim C. In the middle and at the end of the growing season maximum the density of the crown observed in variants with Emistim C and Agrostimulin all terms planting.

### **Conclusions**

1. Results studies indicate that the use of plant growth regulators can increase the coefficient of chlorophyll, especially in the early stages of planting rhizomes of *Miscanthus giganteus*. Higher photosynthetic activity observed in variants with application of plant growth regulators and Agrostimulin Rehoplantu.

2. The use of plant growth regulators reduced the dependence establishment miscanthus giganteus rhizomes of weather conditions, especially in the later planting dates.

3. Found that the processing plant growth regulators had a positive impact on the increase in plant height, number of stems of shrubs and the destiny of the crown.

## **Bibliography**

1. Лось Л.В., Зінченко В. О., Жайвороновський В.Р. Вирощування і газифікація біопалив – ефективний шлях вирішення «енергетичних» і екологічних проблем на прикладі міскантуса гігантеуса // Вісник ЖНАЕУ, 2011. – №2 – С.46-58.
2. Квак В. М. Вплив маси ризомів міскантусу та густоти їх садіння на енергетичну продуктивність біомаси / В. М. Квак; [Зб. наук. праць Інституту біоенергетичних культур і цукрових буряків НААН / за ред. академіка НААН М. В. Роїка]. – [вип. 17, том 1] – Київ, 2013. – С. 146–151.
3. Вплив глибини садіння ризомів міскантусу на їх проростання / О. М. Ганженко, М. Я. Гументик, В. М. Квак, П. Ю. Зиков // Біоенергетика. – 2013. – №1. – С. 36–38.
4. Nowik. Die Digitia – Photo – Chrom – Analyse (DPCA) – 1. Radostim – Seminar, Chemnitz, 22 – 23.04/2004 (Tagungsband).

## **Анотація**

**Зінченко О. В.**

***Оцінка впливу регуляторів росту рослин на інтенсивність фотосинтезу, приживаність, морфологічні показники міскантусу гігантеусу***

*Досліджено ефект впливу регуляторів росту рослин при обробці ризом міскантусу гігантеусу в різні строки садіння на інтенсивність фотосинтезу, приживаність, морфологічні показники. Встановлено що застосування стимуляторів росту рослин збільшило приживаність і поліпшило морфологічні показники рослин міскантусу гігантеусу, особливо у пізні строки садіння.*

***Ключові слова:*** міскантус гігантеус, регулятори росту рослин, приживаність, ризоми, морфологічні показники.

## *Аннотация*

*Зинченко А. В.*

*Оценка влияния регуляторов роста растений на интенсивность фотосинтеза, приживаемость, морфологические показатели мискантуса гигантеуса*

*Исследованы эффект влияния регуляторов роста растений при обработке Ризом мискантуса гигантеусу в разные сроки посадки на интенсивность фотосинтеза, приживаемость, морфологические показатели. Установлено, что применение стимуляторов роста растений увеличило приживаемость и улучшило морфологические показатели растений мискантуса гигантеуса, особенно в поздние сроки посадки.*

***Ключевые слова:** мискантус гигантеус, регуляторы роста растений, приживаемость, ризома, морфологические показатели.*