PLANTS POPULATION AND GROWTH REGULATOR ETHYIL-TRINEXAPAC EFFECT AT FLOWERING AND SEEDS WEIGHT UPLAND RICE CROP

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Palavras-chave: *Oriza sativa*, canopy, sprinkler irrigation.

INTRODUÇÃO

To conduct the upland rice crop, there are still many challenges for the brazilian research to solve problems related to it's tillage. This is mainly due to the fact that the grain yield of rice under these conditions depends on the interaction of various components of production, among them stand out from the genetic factor of the cultivars used and environmental factors to which they are subjected during its life cycle as the density seeding, fertilization, soil management and irrigation (CAZETTA et al. 2008). The increased density of plants in one area and reducing the spacing between planting rows are normally used to hinder the growth of weeds and reduce soil evaporation and increase light interception (DROUET & KINIRY, 2008). Usually the PAR intercepted increases with the reduction of spacing when the seeding rate is constant (SHARRATT & MCWILLIAMS, 2005).

Crusciol et al. (1999) and Crusciol et al. (2000) concluded that the number of stems and panicles per area was increased by reducing row spacing, however, showed a reduction of tillering per plant. The limitations of maximizing the yield of rice by lodging may be due to high competition for light by plants, high density, nutrient imbalance, decreased photosynthesis and reduced harvest efficiency. Problem that can be mitigated by proper plant population, spacing and application of plant growth regulator. The plant growth regulators are synthetic chemicals that alter the hormonal balance of plants and cause a reduction in the size of the shoot with no reduction in productivity (RADEMACHER, 2000).

The objective of this research was looked out the plant population and growth regulator effect at the flowering and 100 grains weight, sowed in Selvíria-MS at 2010/2011 harvest.

MATERIAL E MÉTODOS

The research was carried out at Selvíria, MS, with the follow geographic coordinates, 51º22' W and 20º22' S, with 335 m above the sea. The soil, according to Embrapa (1999) is a distrophic Red-Latosol, the annual average of rain is 1.370 mm, the annual average of temperature is 23,5ºC and the air moisture range since 70 until 80%. After sowing, for soil quimical evaluation, were taken twenty samples in a depth of 0,2m. The soil quimical evaluation show this values: OM. (organic matter), 21 g dm^{-3}; P, 35 mg dm^{-3}; pH ($CaCl_2$), 5,5; K, Ca, Mg and H+Al, 1,7, 21, 11 and 20 mmolc dm^{-3}, in sequence and V% = 63%.

The experimental design was the randomized blocks, in a slip-splot scheme with plant population in the parcels and these were divided in two subplots, one half with and other without the aplication of growth regulator ethyl-trinexapac (Moddus®). The treatments were eighteen (nine plants population 60, 90, 120, 150, 180, 210, 240, 270 and 300 able

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seeds m^{-2}) with and without aplication of plant regulator, randomized distribute in four blocks. There was in each subplot six rice lines with 4,5 m of lenght with 0,35 m row spacements. In each subplot was harvest the two center lines.

For soil surface homogenization and incorporation of dead plants, the soil was plowed and harrowed. After the soil management, was opened grooves throught the soil surface using a cultivator of seven stems. The rice was sowed at 11/19/2010, using the Primavera cultivar, the sowed fertilization was used the Cantarella & Furlani's (1997) recommendations to irrigated rice. Was introduced in sowing lines 180 kg ha^{-1} of 08-28-16 (N-P_2O5-K_2O) + 1% Zn + 3% Ca+ 0,3% S. With the fertilizers and seeds, to plagues control was deposited in the grooves the insecticide carbofurano (Furadan 50 GR®) using the 1000 g ha^{-1} active ingredient rate, this is the same that 20 kg ha^{-1} of Furadan 50 GR®, after the grooves was covered. To control of weeds, after the cover of grooves, was applied the herbicide pendimetalina (Herbadox®) at 1250 g ha^{-1} active ingredient rate, this is the same that 2,5 L ha^{-1} of Herbadox®. Because of weeds emergence after sowing was applied the selective herbicide dioxibentazona (Basagran 600®) at 720 g ha^{-1} rate of active ingredient, this is the same that 1,2 L ha^{-1} of Basagran 600®.

The cover nitrogen fertilization was made two times. The first time the nitrogen was applied at the start of tillering and the rate of nitrogen was 70 kg ha^{-1} using the urea (45% de N) as source of this nutrient. The second nitrogen fertilization was at the panicle differentiation applying 30 kg ha^{-1} of N using ammonium sulfate as source. The ethyl-trinexapac application was made on the plants at the 150 g ha^{-1} rate at the panicle differential prime (NASCIMENTO, 2008). After the crop managements was installed a sprinkler irrigation system. To water management was used three crop coefficients (Kc). For vegetative stage adopted 0,4; for initial and final reproductive stage were used 0,7 and 1,0 respectively and at maturation stage the values were change, the initial was 1,0 and the final 0,7. To get the reference evapotranspiration (ETo), was used the Class A evaporation multiplied with the pan coefficient – Kp. The crop evapotranspiration was estimated throught the equation 1.

$$\text{ETc (mm day}^{-1}) = \text{ETo x Kp x Kc} \qquad (1)$$

During the growth of upland rice crop, were looked the number of days to flowering in each treatment and the results were expressed in days after emergence (DAE). In relation 100 grains weight, in each subplot was made a sample of 100 grains and this were weight and it moisture was correct to 13%.

RESULTADOS E DISCUSSÃO

The results concerning the weight of 100 grains and number of days to flowering are described in Table 1.

For the mass of 100 grains was observed that the effect of growth regulator and seeding rates were significant. Was obtained with application of the regulator seeds 0.15 g heavier than the control. For seeding rates obtained an increasing linear fit of the data ($Y = 0.0013 x + 2.02$, $R^2 = 0.85$) indicating that there was a direct relationship between the rise of the stand and the weight of 100 grains. Different results were verified by Mariot et al. (2003) and the values it the quadratic equation with increase in sowing density. Silva (2009) work in the same region showed a positive linear trend of the 100 grains weight.

For days after emergence to flowering was observed that there was significant effect of seeding rates, however the effect of growth regulator interactions and seeding rates x no increase was significant. By the results of Table 4, note that there was a reduction in time to flowering with increasing seeding rate. The results fitted to a decreasing linear equation ($Y = -0.022 x + 79.80$, $R^2 = 0.73$). Silva (2009) to obtain the different results of this study and found significant effect of ethyl trinexapac growth regulator on flowering BRS Primavera.

Table 1. Weight of 100 grains and flowering average accordig to growth regulator and plant population of upland rice. Selvíria-MS, 2011.

Treatments		Weight of 100 grains (g)	Flowering (DAE)
RC	CR	2,33 a	76,47 a
	SR	2,18 b	75,30 a
DS	60	2,08$^{(1)}$	80,12 $^{(1)}$
	90	2,07	77,87
	120	2,25	76,25
	150	2,22	76,62
	180	2,27	74,75
	210	2,33	74,00
	240	2,38	75,00
	270	2,33	73,50
	300	2,38	74,87
F test	RC	19,43**	7,31^{ns}
	DS	5,11**	3,87**
	RC x DS	0,42^{ns}	0,69^{ns}
	R.L.	38,45**	19,43**
CV^1	%	6,33	2,41
CV^2	%	6,44	3,96

Means followed by the same letter, lower case in columns do not differ significantly by the Tukey test at 5% probability. ns - not significant, **, * significant at 1% and 5% probability by F test, respectively. CR: With application of the regulator. SR: Not applicable regulator. DS: Density of sowing. RC: growth regulator. CV^1 - Coefficient of variation for densities. CV^2 - Coefficient of variation for the application of growth regulator. $^{(1)}$Y = 0.0013 x + 2.02, R^2 = 0.85. $^{(2)}$ Y = -0.022 x + 79.80, R^2 = 0.73.

CONCLUSÃO

According to results of this study, for the mass of 100 grains was obtained with application of the regulator seeds 0.15 g heavier than the control. For seeding rates obtained an increasing linear fit of the data. For the flowering, the plants population had a decreasing linear equation adjust.

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