BRS PAIAGUAS IS MORE DROUGHT RESISTANT THAN OTHER BRACHIARIA

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Brachiaria (syn, Urochloa) species occupy about 70 million hectares in the Cerrado and Amazon biomes, but climate change may make usingthis grass unfeasible in some regions due to severe periods of drought. The aim of the project was to study the response mechanisms of types of Brachiaria to water stress and identify materials capable of surviving more severe droughts, reducing the vulnerability of livestock to climate change.

Plants have different drought response strategies. Some delay dehydration, which depends on mechanisms that provide greater absorption of water from the soil or less loss through transpiration. This allows plants to maintain their growth and display productivity during shorter and lighter periods of drought, however, it doesn't always ensure plant survival in severe drought conditions.

In the case of perennial pastures cultivated in places subject to severe droughts, it is often more important to guarantee the survival of the grass than to provide high productivity in the short term. When the pasture does not survive the stressful environmental conditions, it won't survive in the production systems. For this reason, it is important that plants used in regions subject to more severe droughts can withstand dehydration, survive and sprout when water is adequately available in the soil again. This drought response strategy is related to mechanisms that the plant uses to protect its growth points from dehydration.

To identify Brachiaria cultivars capable of surviving more severe droughts, two experiments were carried out in a greenhouse at INRA/CNRS/CEFE (Figures 1 and 2), In the first, the plants were grown in small pots to evaluate the strategies for tolerating dehydration in specific tissues, without the effect of differences in root depth on the plant's hydration condition. In the second experiment, rhizotrons (long transparent tubes protected from solar radiation by opaque film) were used to evaluate the rate of root elongation and the depth of the roots.

The research was carried out with financial support from the Capes/Embrapa agreement and the CNRS/CEFE Experimental Infrastructure, involving Embrapa – Pecuária Sudeste and the Department of Animal Science Esalq/USP,The results have not been validated in the field.

The potential beneficiaries of the project are farmers in areas subject to prolonged droughts.

RESULTS

BRS Paiaguás is more capable of sprouting after a period of more severe drought than other brachiaria, The results obtained so far indicate that BRS Paiaguás may be a good alternative for locations with water deficit problems, especially in marginal areas, subject to more severe droughts.

In conditions of short, light droughts, the deepening of the roots combined with other mechanisms that delay dehydration, allows cv, Marandu and B, decumbens to continue growing and maintain good productivity. On the other hand, BRS Paiaguás, in addition to deepening the roots, activates water saving mechanisms that promote a slower depletion of water in the soil, Thus, the absorption and maintenance of hydration in parts of the plant that are important for survival is guaranteed during longer periods of drought.

BRS Paiaguás was also able to sprout after more severe periods of drought than the other two brachiaria (Figure 2), In one of the trials, the researchers stopped irrigation for longer periods and then started irrigating again to evaluate the plant's regrowth. With approximately 8% humidity, more than half of the BRS Paiaguás plants were able to sprout, while those of cv, Marandu and B, decumbens showed a much lower percentage of sprouting. This result indicates that BRS Paiaguás activates mechanisms to protect its growth points, in severe drought conditions.

NEXT STEPS AND RECOMMENDATIONS

The characterization of plants' response mechanisms to drought was carried out and BRS Paiguás was identified as a species with the potential to reduce the vulnerability of livestock in areas subject to more severe droughts. For next steps, results under field conditions must be confirmed along with an economic analysis of the production systems.

DATA PUBLISHED IN:

BELONI. T.; SANTOS. P. M.; ROVADOSCKI. G. A.; BALACHOWSKI. J.; VOLAIRE. F. Large variability in drought survival among Urochloa spp. cultivars. Grass and Forage Science. v. 73. n. 4. p. 947-957. July 2018.

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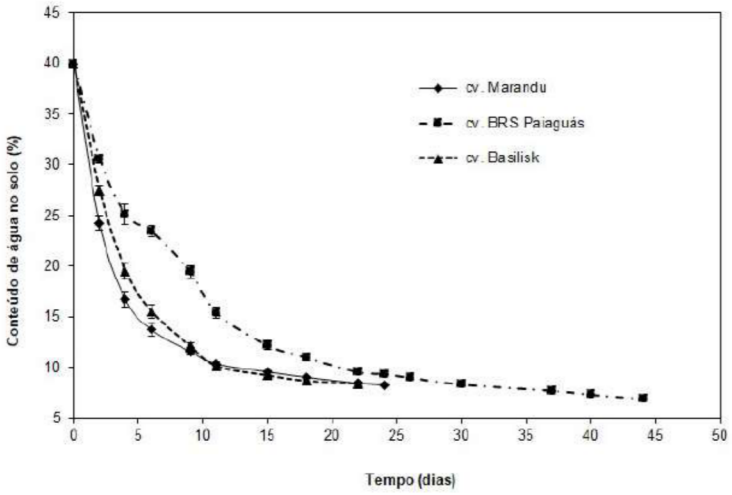
Figure 1: Soil water content in pots cultivated with cv. Marandu. B. decumbens cv. Basilisk and BRS Paiaguás



Note: The water content in the soil dropped more quickly for cv. Marandu and B. decumbens. indicating that BRS Paiaguás activates water saving mechanisms during periods of stress.

Source: Beloni et al. (2018).

Figure 2: Percentage of regrowth in cv. Marandu. B. decumbens and BRS Paiaguás plants after rehydration

Note: With about 8% moisture in the soil. more than half of the BRS Paiaguás plants were able to sprout after rehydration. while the cv. Marandu and B. decumbens plants practically did not sprout.

Credit: Tatiane Beloni.