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RESEARCH ARTICLE

ALLELOPATHIC EFFECT OF GORSE AND MYO-MYO ON THE GERMINATION OF TOUGH LOVE GRASSTOUGH LOVE GRASS

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ABSTRACT

paper aims to evaluate the effect of aqueous extracts of *Baccharistrimera* (Less.) DC. and *Baccharisconcordifolia* DC. on the germination of seeds of *Eragrostisplana* Nees These results show that gorse and myo-myodecrease the germination of tough love grass seeds, when appliedseparately, being effective to control this invasive species.

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INTRODUCTION

Eragrostisplana Nees establishes itself easily due to producing many seeds per plant, deep fixing of branched roots, capability of inhibiting natural pasture, and rapid propagation throughout fields (Reis *et al*., 2008). These characteristics, in addition to a high capacity to colonize natural fields, allelopathic activity, and to the tendency of eliminating the native plant community, have made *E. plana* the most aggressive invasive of pastures to date in Rio Grande do Sul, Brazil (Ferreira *et al*., 2006). Allelopathic substances are found in varying concentrations in different parts of plants and during different stages of their life cycle. When these substances are released in sufficient quantities, depending on the concentration, they inhibit or stimulate germination, growth, and/or development of plants already established (Carvalho 1993). Mauli *et al.* (2009) studied the allelopathic effects of *Baccharistrimera* (Less.) DC, *Symphytumofficinale* L. and*Achilleamillefolium* L. on the development of *Cyperusrotundus* L.Gaziri and Carvalho (2009) investigated the allelopathic effects of the essential oil of *Lippiasidoides* Cham. on the germination of seeds of*Bidenspilosa* L. and *Glycine max* L. (Merr.) at different times of application and concentrations. Sampaio *et al*. (2004) verified the allelopathic effect of extracts of *B. trimera* and *S. officinale* on *Helianthus annuus* L. seeds and seedlings. Furthermore, the effects of aqueous extracts of medicinal plants native to Rio Grande do Sul on the germination of *Lactuca sativa* L.seeds were analyzed by Souza *et al*. (2005). The expansion of *E. plana* is problematic since it is difficult to control after it has invaded, requiring the use of herbicides, mowing, and burning, which causes environmental and socioeconomic damages. Studies that contribute to better practices for controlling *E. plana* are necessary. In this context,

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this study aims to evaluate the inhibitory allelopathic effect of aqueous extracts of *B. trimera* and *Baccharis coridifolia* DC. as well as its associated action on the germination of *E. plana* from Bagé, Rio Grande do Sul, Brazil.

MATERIALS AND METHODS

The experiment was carried out at LABCITOGEN (Laboratory of Plant Cytogenetics), Department of Biology, CCNE, UFSM. The seeds for the experiment were obtained from EmbrapaPecuária Sul, Bagé – RS, from samples in the municipality of Bagé. The *B. trimera* and *B. coridifolia* plants were collected in their natural habitat from the municipality of Santana do Livramento, RS. *E. plana* seeds were placed in Petri dishes with simple filter paper to germinate, maintained in a seed germinator at 20ºC for 21 days. The aqueous extracts of *B. trimera* and *B. coridifolia* were prepared by infusion in boiling water for 10 minutes in concentrations of $50g.L^{-1}$ for each extract. Fifty seeds were placed per dish with 4 replicatesfor each treatment. The treatments used were: distilled water (control), *B. trimera* extract at $50g.L^{-1}$, *B. coridifolia* extract at $50g.L^{-1}$, and *B. trimera* extract at $25g.L^{-1}$ plus $25g.L^{-1}$ of *B. coridifolia* extract. Counts of the number of germinated seeds were made daily in a cumulative way and were registered for 21 days. After the first application of the treatments (initially, 2 mL), they were repeated evey 02 days until the end of the 21 days of the experiement, totalizing in 10 applications for each treatment. The seeds that were considered germinated were those that had a rootlet of at least 1 mm. The observation of the germinated seeds was undertakenusing a stereoscopic microscope.

RESULTS AND DISCUSSION

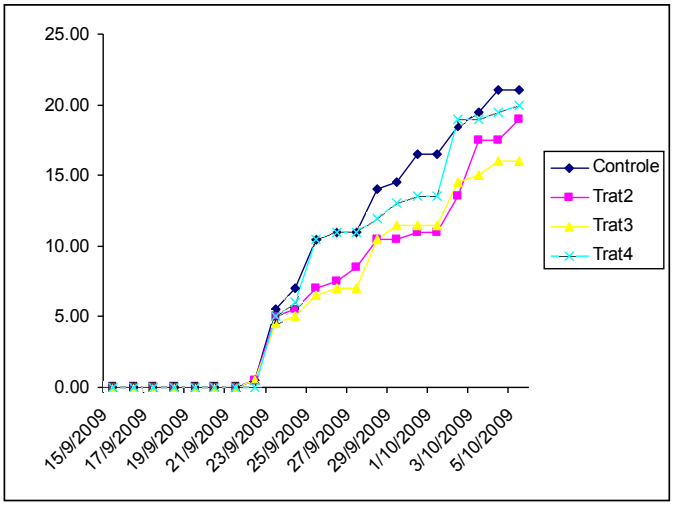
In this study, the allelopathic effects of aqueous extracts of *B. trimera* and *B. coridifolia* were studied, as well as their actions associated with *E. plana* seed germination. The results obtained on the germination of *E. plana* seeds after each treatment, in meanpercentage values are shown in Table 1.

Table 1. Percentage of germination of *E. plana* seeds, submitted to the treatments with *B. trimera* and *B. coridifolia*. Santa Maria

Treatments	Germinated seeds(%)
Control	21 [a]
B. trimera	19 [a]
B. coridifolia	16 [b]
B. trimera and *B. coridifolia*	20 [a]

Means followed by the same letter do not differ significantly between themselves, according to the Tukey test ($p<0.05$)

Twenty-one percent of *E. plana* seeds germinated in the treatment that received only distilled water (control), while seeds treated with the extract of *B. trimera* showed a germination of 19%, and only 16% of the seeds germinated from the extract with with*B. coridifolia*. In the treatment with the combined extracts of *B. trimera* and *B. coridifolia* the percentage of seed germination was 20%. These results (Table 1) indicate that only the treatment with *B. coridifolia*was significantly different, thus interfereing with *E. plana* germination. Santana *et al*. (2006) reported that germination standards can be modified without changing the overall significant germination percentage affected by allelochemical action.The results obtained for the germination of *E. plana* seeds over the 21 days of observation are represented in Figure 1, where it is possible to observe that the seeds germinated in water reached the medium value of 21%, and those submitted to the treatments T2, T3 and T4 had their medium values of 19, 16 and 20%. This demonstrates a higher inhibition of germination of *E. plana* seeds with the application of T3.



Means followed by different letters are significantly different according to the Tukey's test ($p < 0.05$).

Figure 1. Chart representing cumulative germination of seeds in percentage of *E. plana*

The inhibition of seedling germination by *B. trimera* is attributed to substances found in these plants. Phytochemical studies by Bona *et al*. (2002) found that this species contains flavonoids, tannins, fatty acids, steroids and/or triterpenoids, coumarins, amino groups, and traces of saponin glycosides. According to Hagerman and Butler (1981), tannins formed irreversible complexes with proteins, inhibiting enzymatic processes. Various flavonoids such as quercetin, isoquercitrin, rutin, among others, are reported due to their effects on the growth of plants (Rivera-Vargas *et al*., 1993; Parvez*et al*., 2004).

Conclusion

We concluded that *B. trimera* and *B. coridifolia* inhibit the germination of seeds of *E. plana*, when appliedseperately in concentionsof 50g/L, where*B. coridifolia* extracts were more efficient in this study and with putative efficiency for the control of this invasive species. More studies should be performed for the extrapolation of these results for application.

REFERENCES

Bona, C.M., Biasi, L.A., Nakashima, T., Zanette, F. and Correa Junior, C. 2002. Carqueja:cultiveestaidéia. Curitiba: SEAB/UFPR. 18p.

Carvalho, S.I.C. 1993. Caracterização dos efeitosalelopáticos de *Brachiariabrizantha* cv. Marandu no estabelecimento das plantas de *Stylosanthesguianensis*var. *vulgaris* cv. Bandeirante. MS Thesis. Universidade Federal de Viçosa, Viçosa, 72p.

Ferreira, N.R., Medeiros, R.B., Carlotto, S.B. andFreitas, M.R. 2006. Padrão de Banco de SementesemFunção de Atributos de Solo emBordaViáriaDominadopor Capim-Annoni-2. In: Reunião do grupotécnicoemforrageiras do Cone Sul, 21.

Gaziri, L.R.B. andCarvalho, R.I.N. 2009. Efeitoalelopático de Carqueja, Confrei e Mil-folhassobre o desenvolvimento da Tiririca. Rev. Acad.: Ciênc. Agrár. Ambient. 7(1): 33-40.

Hagerman, A.E. and Butler, L.G. 1981. The specificity of proanthocyanidin-protein interactions. Journal of Biological Chemistry 256: 4494-4497.

Mauli, M.M., Fortes, A.M.T., Rosa, D.M., Piccolo, G., Marques, D.S., Corsato, J.M. and Leszczynski, R. 2009. Alelopatia de *Leucena*sobresoja e plantasinvasoras.Semina: CiênciasAgrárias 30(1): 55-62.

Parvez, M.M., Tomita-Yokotani, K., Fujii, Y., Konishi, T. andIwashina, T. 2004. Effects of quercetin and its seven derivatives on the growth of *Arabidopsis thaliana* and *Neurosporacrassa*. *Biochemical Systematics and Ecology*, 32: 631-635.

Reis, J.C.L., Infeld, J.A., Scivittaro, W.B., da Silva, J.J.C. and Da Silva, C.A.S. 2008. Racionalização da Aplicação de Calcário e Fertilizantespara o Aumento da Sustentabilidade e Rentabilidade da IntegraçãoArroz-Pastagens. Embrapa ClimaTemperado. 199: 1-6.

Rivera-Vargas, L.I., Schmitthenner, A.F. and Graham, T.L. 1993. Soybean flavonoid effects on and metabolism by *Phytophthorasojae*. *Phytochemistry*, 32: 851-857.

Sampaio, M.C.A., Oliveira, M.A.S., Bezerra, A.P.L., Calvet, A.S.F., Guerra, M.E.C. and Innecco, R. 2004. Efeitoalelopático do óleoessencial de alecrimpimenta (*Lippiasidoides*) sobre a germinação de sementes de picão-preto e de sojaemdiferenteépocas de aplicação e concentrações. *HorticulturaBrasileira*, 22(2): 1- 4.

Santana, D.G., Ranal, M.A., Mustafa, C.V. and Silva, R.M.G. 2006. Germination measurements to evaluate allelopathic interactions. *Allelopathy Journal*, 17: 43-52.

Souza, S.A.M., Stein, V.C., Cattelan, L.V., Bobrowski, V.L. and Rocha, B.H. 2005. Utilização de sementes de alface e de rúculacomoensaiosbiológico sparaavaliação do efeitocitotóxico e alopático de extratosaquosos de PlantasMedicinais. Revista de Biologia e Ciências da Terra 5(1): 1-8.

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