X Congresso Brasileiro de Fisiologia Vegetal
XII Congresso Latino Americano de Fisiologia Vegetal

Recife - Pernambuco - Brasil

11 a 16 de setembro de 2005

ALLELOPATHIC EFFECTS OF *RAPHANUS RAPHANISTRUM* AND INTERACTIONS OF EFFECTS ON WHEAT AND OAT

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Introduction

Allelopathy was considered one of the characteristics that the "ideal" weed would possess (Oka & Morishima, 1982), and a good number of highly successful weeds are known to be simultaneously allelopathic species (Rice, 1984).

Raphanus raphanistrum L. (wild radish) is a widespread and important competitive weed in many crops and many situations in Western Europe (Williams, 1982) and throughout the World (Holm et al., 1977). Aqueous extracts of wild radish shoots variously affected germination and radicle growth of some crops and weeds (Norsworthy, 2003) while wild radish-amended soil reduced tuber production and tuber weight of *Cyperus esculentus*, caused necrosis in leaf margins of the crops tomato and bell pepper, but in general increased the competitiveness of the crops over *C. esculentus* (Norsworthy & Meehan, 2005). These allelopathic effects might be due to glucosinolates and derived isothiocyanates known to be produced by wild radish, namely allyl isothiocyanate, 3-methylthioalkyl isothiocyanate, and 4-methylthiobut-3-enyl isothiocyanate (Cole, 1976).

Assuming allelopathy as an important and primary trait of weediness in wild radish, one should expect high levels of phytoactivity of wild radish secondary metabolites against crops where it ranks high as a weed, like wheat and oat. In addition, still assuming allelopathy as an important weed characteristic of wild radish, synergy which means that a lesser investment has to be made to achieve the same result (Berenbaum, 1985) should also be expected for the combined effects of leaves and stems.

Materials and Methods

Seeds of wheat (*Triticum aestivum* L. cv. 'Anza') and oat (*Avena sativa* L. cv. 'Avon') were provided by Estação Nacional de Melhoramento de Plantas (Portugal) and shoots of wild radish were harvested in spring at Mitra Experimental Farm, near Évora (southern Portugal). Leaves and stems were separated and grounded. Leaves (L), stems (S), and leaves plus stems (LS) were soaked in distilled water during 24 h at 30 ºC, continuous dark. Extracts were filtered through Whatman paper No. 1, and their concentration adjusted to a concentration of 200 mg/ml (fresh weight:volume) of leaves or stems. Osmotic pressure and pH of treatments, control included, were determined with a semimicro osmometer (Knauer type M) and a pH-meter (Metrohm E-520).

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