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Presenter Information

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The allelopathy of 3 companion weeds with alfalfa

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Key words companion weeds alfalfa ,water extract ,ethanol extract allelopathy

Introduction Allelopathy is an interference mechanism in which living or dead plants release allelochemicals exerting an effect (mostly negative) on the associated plants , and can play an important role in natural and managed ecosystems (Kong *et al .* , 2007) . In southwest China ,weeds such as *Cerastium* sp . , *Alopecurus aequalis* , *Youngia japonica* , *Calamintha graclis* and *Veronica didyma* heavily infest alfalfa (*Medicago sativa* L .) grassland . In addition to competition for water and nutrient requirement , these weeds might interfere with alfalfa through allelochemicals which inhibited alfalfa growth and reduced the forage yields . The objective of this research was to test the allelopathy of companion weeds to alfalfa using water extract and ethanol extract .

Materials and methods Shoots of 3 weeds were washed , dried at room temperature , and cut into 1-cm segments . These segments were dipped into distilled water and 99 .9% ethanol respectively at a ratio of 1g :5ml , and after 48h , crude water extract and ethanol extract were filtered by turns with filter paper and 0 .45 μ m aperture film respectively . Seeds were surface-sterilized as described by Nan (1995) , sown onto 9cm diameter filter paper which were soaked by 2 ml extracts (50 seeds/petri dishes) , and incubated at room temperature . Seed germination , seedling length and dry weight were tested after 7days . Statistical analysis was performed by the Statistica program . Analysis of variance with LSD was carried out to determine the differences .

Results Seed germination which were treated with crude extracts of *C . sp .* were significantly less than that of control ; and there were significant differences in seedling length between control and water steep of *C . sp .* ($p < 0 .01$) (Table1) . *Y . japonica* and *C . graclis* decreased the seed germination by 14 % and were significantly less than that of control .

Conclusions *C . sp .* may release water-soluble allelochemicals that inhibit seed germination and seedling growth of alfalfa ; *Y . japonica* and *C . graclis* only affected the seed germination by ethanol-soluble and water-soluble allelochemicals , respectively ; and none of these weed extracts caused inhibition to seedling dry matter of alfalfa .

Table 1 The effect of 3 different weeds on seed germination and seedling growth of alfalfa .

Weeds	Seed germination(%)		Seedling dry matter(g)		Seedling length(cm)	
	water steep	ethanol steep	water steep	ethanol steep	water steep	ethanol steep
CK	95A	98a	0 .0172b	0 .0186a	5 .56AB	5 .70AB
<i>Y . japonica</i>	97A	84b	0 .0201a	0 .0196a	5 .90A	4 .14B
<i>C . graclis</i>	81B	99a	0 .0178ab	0 .0198a	4 .80B	4 .70B
<i>C . sp</i>	34C	86b	0 .0158b	0 .0173a	3 .52C	5 .87A
LSD	8 .7496 ($p < 0 .01$)	9 .1581 ($P < 0 .05$)	0 .0027 ($P < 0 .05$)	0 .0036 ($P < 0 .05$)	1 .0596 ($P < 0 .01$)	1 .0477 ($P < 0 .01$)

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