

EFFECT OF RYE MULCH ON GROWTH OF WEEDS UNDER NO-TILLAGE CULTIVATION

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Rye is an important cereal crop which can be used as a winterhard and well adapted to Poland's natural conditions cover plant (Borowy et al. 1998). Several authors observed its allelopathic activity in laboratory and field studies (Barnes et al. 1986, Oleszek 1995). The aim of this work was to compare the growth of weeds on no-tilled plots covered with rye mulch and on conventionally tilled plots in a field experiment conducted in the south-eastern part of Poland.

Rye was seeded at the rate of 140 kg·ha⁻¹ on half of the field in the middle of September in the years 1997-1999. Following year, in the beginning of May it was sprayed with glyphosate 1440 g a.i.·ha⁻¹ plus adjuvant. At that time the rye plants reached 80-90 cm height and average fresh weight of their aerial parts and roots was 3,1 and 0,8 kg·m⁻² respectively. After two weeks the seeds of snap bean, carrot, cucumber, red beet and turnip were seeded and transplants of cabbage, leek, celeriac and tomato were planted on the half of the field covered with rye mulch and also on second half of the field which had been tilled conventionally. Each vegetable species was planted in 4 succeeding 6-m-long rows, with interrow distances of 0,75 m (1,5 m in the case of cucumber). Weeds were counted by species in four 0,25 m x 0,4 m frames placed randomly in each interrow space and then the plots were weeded by hand 3 and 7 weeks after planting. Moreover, at the end of the experiment in the middle of September weed species and their share in total weed population were determined.

At the time of planting of vegetables, the rye mulch formed from dry rye plants was 3-4 cm thick and covered entirely soil surface. Its decomposition proceeded slowly especially in the periods of dry weather. Soil coverage with rye mulch was 65% to 85% in the middle and 10% to 20% at the end of the vegetation period. Three weeks after planting of vegetables, 664 weeds representing 22 species grew on 1 m² on plots cultivated traditionally in comparison to 41 weeds representing 25 species on plots covered with rye mulch. Following weed species dominated under traditional cultivation: *Amaranthus retroflexus* (L.), *Capsella bursa-pastoris* ((L.) Med.), *Chenopodium album* (L.), *Echinochloa crus-galli* ((L.) P.B.), *Galinsoga parviflora* (Cav.), *Galinsoga quadriradiata* (Ruiz et. Pav.), *Polygonum persicaria* (L.) and *Urtica urens* (L.). On plots covered with rye mulch, number of these weeds was reduced by 76% (*Capsella bursa-pastoris*) to 100% (*Galinsoga parviflora* and *Galinsoga quadriradiata*). Seven weeks after establishment of the experiment and four weeks after first weeding, the number of weeds grown on 1 m² of no-tilled and conventionally tilled plots were 235 and 97 on an average respectively. In the middle of September weeds covered 9% to 13% of soil surface in plots covered with rye mulch and 3% to 8% in conventionally tilled plots. At that time *Taraxacum officinale* (Web.) was the only species which was more numerous on plots covered with rye mulch.

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