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### Effect of White Clover Variety on Yields and Persistency of Grazed Mixed Sward

Wpływ odmiany koniczyny białej na plony i trwałość mieszanej runi pastwiskowej

A good economic case exists for the use of grass/clover swards under low fertilizer nitrogen (N) use (1). Grass/clover swards can give significantly greater yields than pure grass swards at low N rates or without N fertilization (2, 3, 5).

There is general agreement that white clover (*Trifolium repens* L.) is at a competitive disadvantage when grown with most pasture grasses. Management concentrates on providing a favourable environment for white clover. In spite of that, it is bound to be difficult to maintain a useful proportion of clover plants in a mixture with grasses. Wilman and Asiegbu (6) found the choice of variety as one of the factors affecting white clover performance. The large-leaved varieties, taller growing and more vigorous, appear to be more tolerant of the competition from the grass species, particularly when fertilizer N is applied to the sward.

This paper also reports on the effects of white clover variety.

### METHODS

The studies were carried out in a cattle grazed pasture founded on brown soil developed from loess. This soil was high in phosphorus and magnesium and low in potassium, with a pH of 6.9. Preparation of seedbed comprised damaging old sward by spraying a herbicide (Roundup - 4 l/ha), rototilling and roller treatment before and after seed broadcasting. The swards used in the experiment were established in spring 1988. A randomised block design was used. Seven varieties of white clover - medium-leaved: AND-887 (present name - Romena), Anda, Armena, Podkowa, Rema, Santa and large-leaved Radzikowska - were used in four species mixtures with perennial ryegrass (*Lolium perenne* L.) cv. Argona, meadow fescue (*Festuca pratensis* Huds.) cv. Skra and cocksfoot (*Dactylis glomerata* L.) cv. Berta (25% of each species). Those mixtures were compared with a grass mixture containing only the three grass species (one third of each species).

The pasture fertilization included 90 kg N (in three equal dressings each season, following the first, second and third grazing), 100 kg P<sub>2</sub>O<sub>5</sub> and 90 kg K<sub>2</sub>O/ha/year (one dressing in spring).

During the grazing season the pasture was grazed four times by dairy cows, the grazing dates being decided by the stage of growth of the herbage when the yield reached about 1.5 t/ha. DM yields and botanical analyses were measured on all plots before each grazing, for four years.



## RESULTS AND DISCUSSION

Over the four years of this trial to grass/clover mixtures on average yielded better than the pure grass mixture (Tab. 1).

Tab. 1. Annual DM yields for the eight pasture mixtures (t/ha)  
Roczne plony s.m. ośmiu mieszanek pastwiskowych (t/ha)

Mixture Mieszanaka	Year - Rok				Mean Średnia
	1988	1989	1990	1991	
(1) Grasses (G) Trawy	5,39	5,82	4,63	5,74	5,40
(2) G + AND-887	6,16	7,74	6,18	6,26	6,59
(3) G + Anda	6,08	7,66	5,80	6,44	6,49
(4) G + Armena	6,36	7,80	6,13	5,63	6,48
(5) G + Podkowa	5,44	7,68	6,32	6,42	6,46
(6) G + Radzikowska	8,60	8,86	7,00	7,49	7,99
(7) G + Rema	6,34	7,17	6,16	6,29	6,49
(8) G + Santa	7,10	7,29	5,89	6,33	6,65
Mean - Średnia	6,44	7,50	6,01	6,33	-
Lsd (p = 0,05)					
Mixtures - mieszaneki					
Years - lata	0,84	1,53	0,48	1,31	0,52
Mixtures x years - mieszaneki x lata					0,31
					1,23

In all years of the study, significantly greater annual yields were obtained from the treatment sown with Radzikowska, except for 1991. The grass/clover swards produced significantly greater DM yields than the grass mixture in the first three years (except combination with AND-887, Anda, Podkowa in 1988 and Rema in 1991). In the fourth year, significant differences in the yields were observed only between the pure grass mixture and grass mixture with cv. Radzikowska.

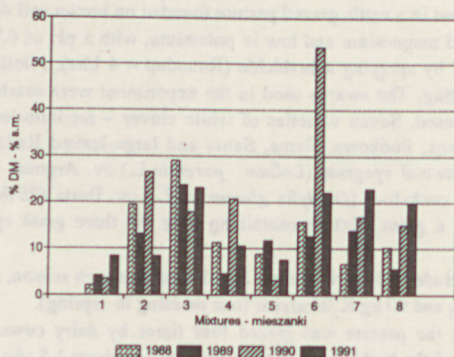


Fig. 1. Contribution of white clover in the summer regrowth of the pasture sward (% DM)  
Udział koniczyny białej w letnim odroście runi pastwiskowej (% s.m.)



Initial establishment of all species in the pasture sward was satisfactory, although white clover contribution to the sward changed from year to year (Fig. 1). At most combinations the clover content of the sward increased from 1989 to 1990 and then decreased in 1991. That decrease was greater for some of medium-leaved varieties (AND-887, Podkowa, Santa) than for a large-leaved variety such as Radzikowska. Radzikowska appeared to be the best white clover variety for yield and persistency in the sward.

A point of main interest in the present experiment is the fact that after four years of pasture utilization, at 90 kg N/ha/year application, white clover contribution decreased but not to an insignificant level. In tests conducted by Ostrowski et al. (4) in Western Poland even low N doses caused considerable reduction of white clover, already in the second year of pasture utilization. However, the influence of spray irrigation in that experiment was beneficial as irrigation increased yield and persistency of clover. It should be noted that climatic conditions over the four growing seasons of the current trial influenced DM yield and proportion of white clover in the sward, particularly in summer. Like some other experiments (3, 5), the yield in mixed sward of the large-leaved clover variety at the present experiment was higher than that of smaller-leaved varieties.

The benefits are obtained from white clover used nowadays and further advantages are predicted because of increase of N fertilizer prices.

#### CONCLUSION

Using large-leaved variety of white clover to the grass mixtures under low nitrogen fertilization conditions can give better yielding and more persistent pasture sward than from smaller-leaved varieties of this species.

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## STRESZCZENIE

Badania przeprowadzono na pastwisku, przy niskiej dawce azotu. Porównano plony i trwałość 7 polskich odmian koniczyny białej (*Trifolium repens* L.), z których każdą posiano w mieszance z trawą zawierającą życię trwałą, kostrzewę łąkową i kupkówkę pospolitą, z czystą mieszanką zawierającą te trzy gatunki traw.

Ruń traw i koniczyny zwykle dawała znacznie lepsze plony s.m. niż ruń czystej trawy podczas pierwszych 3 lat. W czwartym roku istotne różnice plonów zaobserwowano tylko między czystą runią trawiastą a mieszanką z wielkolistną białą koniczyną odmiany Radzikowska. Stwierdzono, że ta odmiana była najlepsza w kategoriach ogólnych plonów i trwałości w runi.

Wydanie publikacji finansowane przez Komitet Badań Naukowych