

Ear emergence of different grass species under Finnish growing conditions

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Introduction Timothy is the most commonly cultivated grass species in Finland. Swards cultivated for silage of hay are of pure timothy or timothy is the dominant species of the mixture. Successful timing of harvesting of the primary growth is very critical in Northern latitudes where the stand develops very rapidly at daylengths of above 18 hours with a daily mean temperature close to 20 °C. The primary growth has to be harvested within a very short period to obtain a yield of high and uniform quality. Short harvesting periods require high capacity harvest machinery which lead to high costs. If it would be possible to prolong the harvesting over a longer period of time, it would decrease the risk of bad weather conditions and reduce machine costs through better utilization of harvesting capacity. Sowing different grass species makes it possible to extend the harvesting period. The aim of this study was to investigate timing of ear emergence of different grass species in comparison with timothy. The suitable harvesting time for silage in Finland is closely related to ear emergence of the stand.

Material and methods The emerging ears of different grass species were obtained from the Finnish official variety testing database conducted at 15 various sites in Finland in 1976-2001. Ear emergence data of standard varieties of five grass species were used: timothy cv. Iki, meadow fescue cv. Boris, tall fescue cv. Retu, cocksfoot cv. Haka and perennial ryegrass cv. Riikka. The statistical model used took account of the species and varieties that had been in trials during the same years and had been grown at the same trial sites. In the variety experiments the ear emergence is specified to have take place when approximately 5% of the ears/panicles of the stand have fully emerged from leaf sheaths. The harvest time recommendation for meadow and tall fescue, cocksfoot and perennial ryegrass is to harvest when 5-10 % of the ears/panicles have emerged from leaf sheaths. Detailed information about official variety testing protocols can be found at <http://www2.mtt.fi/atu/epo/lajikekoe/koeohje.html>.

Results and discussion Time to ear emergence among different species is shown in Table 1. Timothy ears emerged on average on 16 June. Cocksfoot ears emerged on average eight days earlier than timothy. Perennial ryegrass came into ear three days later than timothy. There were no statistically significant differences between ear emergence for timothy and tall fescue.

Table 1 The average time to ear emergence of different grass species in official variety trials in Finland counting from 1 May. Statistic significances are in comparison with timothy

Timothy	Meadow fescue	Tall fescue	Cocksfoot	Perennial ryegrass
47	44***	47 ns	39***	50***

***, $P < 0.001$, ns, not significant

Results indicate that, when it is necessary to extend the harvesting period of primary growth over a longer period of time, the use of different species represent a good possibility. In silage production the timing of harvesting is more important than in haymaking, where timing of harvesting is more based on weather conditions than on quality changes of the stand. In haymaking, extension of the harvesting period could alleviate the weather risk as well as facilitate easier management of the labour-intensive harvesting. The results suggest that in timothy dominant stands the harvesting period could be extended by using cocksfoot- or meadow fescue-dominant swards to facilitate earlier harvesting and by using perennial ryegrass-dominant swards to facilitate later harvesting than that of timothy-dominant swards. The validity of the results obtained has, however, to be tested by using data on quality changes in the studied species in the primary growth. Unfortunately the quality data available at the variety-testing databank is currently not adequate to facilitate such a study.