

## Effect of sowing and oversowing on species abundance in mountain pastures of central Italy

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**Introduction** Large parts of Central Italy are mountainous and marginal due to climate constraints , shallow soils , steeped slopes and distance from main roads . Pasture productivity is low nonetheless of the agronomic advances , and farmers increase their incomes by offering tourist services . Agro-tourism is favoured by conservation of biodiversity (Uncini Manganelli et al . , 2002) . Under this point of view , farmers seek low input techniques for pasture management that sustain the productivity and at the same time conserve plant diversity (Pardini , 2002) . A trial was done to control what is the effect of sowing and oversowing on productivity and abundance of pasture species . This research has been fund by ARSIA of the Regional Government of Tuscany .

**Materials and methods** The trial took place from 2004 to 2007 in a mountain pasture (830 m asl , 40% slope) . We compared 3 treatments :

1 .Native pasture (control test , not changed) .

2 .Sown pasture (sown in April 2004 after ploughing at 20 cm depth and then disk harrowing . Sowing mixture *Lolium perenne* (25%) , *Poa pratensis* (25%) , *Trifolium repens* (25%) , *Onobrychis viciifolia* (15%) , *Lotus corniculatus* (10%) , the total seed quantity was 50 kg/ha) .

3 .Oversown pasture (seeded in April 2004 after light disk harrowing . We seeded the same pasture mixture) .

Measurements carried out were the following .

1 .Botanical composition (linear analysis , plus a list of rare species found out of the lines) .

2 .Forage yield (monthly cuts inside cages during the growing period April-October) .

**Results and discussion** The number of plant species in oversown plots (49) was not significantly higher than in native pasture (52) , but it was lower in sown plots (41) , the species missing are mainly short (*Crocus albiflorus* , *Taraxacum officinalis*) , most of them have biological importance and they are known as medicinal plants .

The biomass of the sown plots doubled in 2004 in comparison to the native (Table 1) , it was high also in oversown plots . The positive effect terminated after 3 years in the sown plots and after 2 in the oversown plots .

**Table 1** Biomass in native , sown and oversown pasture .

	2004	2005	2006	2007	Average
Sown	6 .0 a	5 .7 a	4 .5 a	3 .4 a	4 .9 a
Oversown	5 .0 b	3 .7 b	3 .4 b	3 .2 a	3 .8 b
Native	3 .1 c	3 .0 b	3 .3 b	3 .1 a	3 .1 b

Values that share same letters in columns are not significantly different at  $P=0 .05$  .

**Conclusions** We conclude that the repetition of sowing practices can reduce the number of species ; on the other hand biomass is increased for 2-3 years maximum . Oversowing did not increase the biomass enough . The good management of native pasture will be cheap and will favour the conservation of plant diversity and , in turn , support the development of the industry of rural tourism . Sowing should be limited only to flat areas where there is only little soil erosion and there is deeper soil , in these areas would be reasonable to repeat the sowing at 4-5 years of distance and to change always sowing mixture introducing several grasses and legumes in order to help maintaining the diversity of plants .

### References

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