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Food crops as temporary cover before pasture sowing in mountains of central Italy .

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Key words : forage production , *Solanum tuberosum* , shrub encroachment , *Triticum dicoccum*

Introduction A consistent reduction in pastoral and agricultural activities has caused and degradation in marginal pastures of Central Italy . Many pastures are being invaded by unpalatable grasses and encroached by shrubs . . The recovering of the area is based on crop diversification , reintroduction of native crops and livestock breeds , development of farm services connected to tourism (Pardini et al . , 2002) . However the preliminary restoration of good pastures is necessary . We compared productivity and costs of 2 strategies for rehabilitation of mountain pastures . The research has been fund by ARSIA agency of the regional Government .

Materials and methods We compared 2 succession strategies (debrushment-pasture , debrushment-crop-pasture) including 3 treatments : T1 (debrushment-pasture sowing) , T2 (debrushment-one year potato crop-pasture sowing) , T3 (debrushment-one year cereal crop-pasture sowing) .

An encroached area of 2 ha was cleared in September 2003 , cultivated and sown in summer 2004 . In T1 40 kg/ha pasture mixture has been sown , this comprised 6 species : 25% *Festuca rubra* Engina" , 17 .5% *Phleum pratense* Clima" , 17 .5% *Lolium perenne* Lisabelle" , 15% *Trifolium repens* Huja" , 12 .5% *T . pratense* Start" , 12 .5% *Lotus corniculatus* S . Gabriele" . Contemporarily , a native *Solanum tuberosum* was planted in T2 at the dose of 1 t/ha tubers , and a native *Triticum dicoccum* was sown in T3 at the dose of 100 kg/ha . After one year crop (potato or cereal) the two plots (T2 and T3) were sown with pasture mixture (the same of T1) in March 2005 .

Measurements done were the following : Crop and forge yield (sampling areas of 5 m in 2005) . Costs and theoretical incomes (investigation in local markets in 2005) . Pasture botanical composition (linear analysis in 2007) .

Results and discussion Crop and forage yield in 2005 were good (4 .8 t ha⁻¹ forage hay , 10 .0 t potato , 2 .4 cereal) . Costs and gains (Table 1) . The most convenient strategy for pasture rehabilitation in the area was one year potato cropping followed by pasture sowing (gain of 5370 € per hectare) however establishment costs were the highest of the 3 treatments . The cereal gave only 840 € per hectare , however this system gives some gain already at the first year with limited costs slightly higher than direct pasture sowing . Direct pasture establishment is not convenient for the first 1-2 years (balance - 312 € per hectare) as it takes time before the pasture can be grazed and some livestock sold .

Table 1 Comparison of costs and gains .

| | T1(€/ha) | T2(€/ha) | T3(€/ha) |
|---------|----------|----------|----------|
| Costs | 840 .00 | 1630 .00 | 980 .00 |
| Gains | 528 .00 | 7000 .00 | 1820 .00 |
| Balance | -312 .00 | 5370 .00 | 840 .00 |

The specific contribution of the sown species in 2007 was better were the pasture sowing was preceded by one year crop (45 .14% with potato , 39 .68% with the cereal) than were pasture was sown directly (22 .31%) , probably the new cultivation after harvesting has destroyed more weeds .

Conclusions There is economic convenience for pasture rehabilitation in mountains of Central Italy , moreover there are environmental benefits . Higher incomes and better botanic composition suggest that encroached pastures are sown better after one year cropping phase than with direct pasture sowing .

Finally , an overall return for the economy of the area is possible by pasture rehabilitation thanks to links with naturalistic tourism .

Reference

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