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The alpine summer pastures in the Veneto Region: management systems

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ABSTRACT - The aim of this study was to identify the management systems of the alpine summer pastures of the Veneto region and their geographical distribution, by means of detailed questionnaires on 417 holdings. A non-hierarchical cluster analysis identified 5 different management systems: 1: milk and cheese production, 2: milk and cheese with agritourism, 3: milk without cheese, 4: disadvantaged holdings with prevalence of sheep and goats; 5: holdings with dry and replacement cows. The different groups showed also a clear tendency to concentrate spatially in different portions of the study area. Regional policies should consider this variability to better sustain the alpine summer pasture management systems.

Key words: Alpine summer pastures, Livestock systems, Alps.

Introduction – Economic and social changes during the second half of the 20th century caused a great decline in the traditional agricultural practices (MacDonald *et al.*, 2000), with the abandonment of meadows and pastures. This has been related to a loss of agricultural resources, biodiversity, and touristic appeal (MacDonald *et al.*, 2000, Giupponi *et al.*, 2006, Tasser *et al.*, 2007). The mountainous portion of the Veneto region, in the North-eastern Italian Alps, is characterised by a significant climatic, geographic, and agricultural diversity (Giupponi *et al.*, 2006). Previous surveys on the status of summer pastures in the area date back to the early 80's (Berni and Fabbris, 1983). This study aims at identifying the alpine summer pastures management systems, and their territorial distribution, in the Veneto region.

Material and methods – The study area (approximately 4660 km²) corresponds to the 173 municipalities of the Veneto region classified as mountainous. An alpine summer pasture is defined here as a holding where livestock are moved over summertime from the lowland permanent farms to exploit the pastures. Information on alpine summer pastures were collected and edited from regional, local (mountain communities and municipalities) and veterinary (Regional centre for Veterinary Epidemiology) databases. This produced an updated database of 704 alpine summer pastures with their location, ownership (307 public, 365 private individual, and 32 private collective), and present status (530 active and 174 abandoned). A sample of 417 out of the 530 active holdings was then surveyed by interviewing the farmer to fill in a questionnaire on logistic (accessibility, availability of water, electricity, housing, etc.), productive (livestock held, milk processing, equipment and machinery, etc.), and economic (agri-touristic activity, direct marketing of products) features. Data collected were edited and analysed with the non-hierarchical clustering technique FASTCLUS (SAS, 2003), which is well indicated in the multivariate analysis of large datasets and is able to limit problems of redundancy and outliers (McGarigal *et al.*, 2000).

Results and conclusions

The cluster analysis grouped the alpine summer pastures into 5 clusters as shown in Table 1. Cluster 1 contains 30% of the holdings, mostly of public ownership (77%) and accessible by car (94%), with an average of 3.5 employees who live in the holding during the summering period. Availability of water, electricity and housing is very good. More than 20% of the units offer bar service, 35% offer restaurant service, but only 7% can house tourists. About one third of the holdings have a milking parlour, the others use various methods of machine milking, since hand milking is sporadic; 49% of units have a refrigeration tank. Milk is processed into cheese in 70% of holdings, and carried away in the rest. Livestock units (LU) held are mostly given by cows on milk (57%) or dry (31%). This management system is an evolution, with updated facilities and machinery, of the traditional way of exploitation of summer pastures.

Cluster 2 comprises only 13 units, that differ from those of cluster 1 mainly for a further development of agri-touristic services (77% have a restaurant and 31% house tourists), which explain the higher number of manpower employed.

Cluster 3 comprises 24% of the units surveyed, mainly private owned (71%). These holdings are easily accessible but have few employees, who rarely live there during summering (35% of cases). Although dairy cattle account for almost all of the LU held, agro-touristic activity is sporadic and milk is processed *in situ* only in 14% of the units. This management system maintains a close link with the permanent farm, with the farmer visiting the alpine summer pasture only to feed and milk the animals and to collect the milk. Cluster 4 groups 26 holdings, with difficult access, a very short summering period, very few manpower and poor facilities that mostly hold dry/replacement cows and small ruminants. These are the few remaining active units amongst those located in the least productive sites. Finally, cluster 5 has 157 units, with mixed ownership (58% public). Also these holdings are characterised by poor facilities, but have a longer summering period than cluster 4, to hold mostly dry/replacement cows (65% LU) and small ruminants (18% LU).

Table 1. Profiles of identified clusters. Data are given as proportion of summer units in the cluster, unless otherwise indicated.

Variable	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
Number of alpine summer pastures	124	13	97	26	157
Definition of cluster	Cheese	Agritourisms	Milk	Disadvantaged	Dry cows
Public ownership	0.77	0.77	0.29	0.42	0.58
Accessible by normal car	0.94	0.92	0.91	0.60	0.82
Accessible on foot	0.04	0.00	0.02	0.28	0.08
Summering (days; mean ±SD)	117±13	108±21	127±14	42±14	115±13
Total manpower (mean ±SD)	3.5±0.9	7.3±1.1	2.1±0.8	1.4±0.6	1.5±0.6
Resident <i>in situ</i> during summer	0.90	0.92	0.35	0.23	0.43
Potable water	0.96	1.00	0.65	0.56	0.70
Electricity power line	0.44	0.69	0.59	0.23	0.20
Electricity generators	0.50	0.25	0.34	0.12	0.22
Available housing	0.97	0.92	0.92	0.58	0.83
Bar	0.23	0.23	0.04	0.00	0.01
Restaurant	0.35	0.77	0.00	0.00	0.01
Accommodation for tourists	0.07	0.31	0.01	0.00	0.01
Milking parlour	0.34	0.46	0.24	0.04	0.03
Hand milking	0.07	0.00	0.01	0.00	0.02
Refrigeration tank	0.49	0.77	0.72	0.04	0.00
Cheese making	0.70	0.85	0.14	0.00	0.02
Cows on milk (% of LU/unit)	0.57	0.65	0.65	0.05	0.06
Dry/replacem. cows (% of LU/unit)	0.31	0.33	0.33	0.58	0.65
Beef cattle (% of LU/unit)	0.03	0.02	0.03	0.03	0.08
Small ruminants (% of LU/unit)	0.09	0.01	0.01	0.34	0.18

The study area was divided into 7 sub-areas on the basis of administrative (municipalities), morphological (contiguous mountain groups) and geographic location and closeness (figure 1). The identified clusters distributed heterogeneously amongst the sub-areas ($\chi^2 = 137$; $df=24$; $P<0.001$), indicating a link between geographical area and management system.

In conclusion, the summer pastures of the Veneto region showed a remarkable subdivision into different management systems. The traditional summering of milking cows remains in almost 60% of the sampled units, but with at least 3 different groups. One group comprises holdings where direct processing of milk and marketing of cheese increase revenues, with the addition of bar/restaurant service in few cases. A second, small group of holdings have been able to develop the agro-touristic offer into a major economic activity. Both these groups have easy accessibility, good facilities, and appear to be economically viable. Holdings of the third group are mostly private owned and managed as an appendix of the permanent farm, where the milk produced is taken daily to be sold. Viability of these holdings depends on the continuation of farming by the owner. The remaining 40% of alpine summer pastures has generally poor facilities and hold mainly dry/replacement cows and small ruminants, with a small sub group characterised by a very short summering period. These are the holdings whose viability appears more at risk. The different groups showed also a clear tendency to concentrate spatially in different portions of the study area. Policies aiming to sustain the alpine summer pastures of the region must take into account the variability of management systems and their geographical distribution for more targeted and efficient actions.

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Figure 1. Geographical distribution of the 5 management systems identified.

