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CHANGES IN SHEEP MORPHOMETRIC PARAMETERS INDICATE THE DECREASE OF THE MOUNTAIN LIVESTOCK SUSTAINABILITY FOLLOWING THE ARIDITY DUE TO CLIMATE CHANGE

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Hofmann's long-term studies demonstrated that Ruminant's digestive apparatus underwent to evolutionary steps and its evolution is still going on in addition to adaptation to environmental modifications (Hofmann, 1976, 1989, 1999), also during a short period (Catorci et al., 2014; Scocco et al., 2011, '12, '13). In Apennine grasslands, the flowering peak period yields the highest quantity of forage with the best nutritional value; in summer, a lack of green forage often characterizes the pastoral systems. So, the forage feed value decrease because it contains a greater percentage of fibers (Crofts and Jefferson, 1994). Sub-Mediterranean climate, characterized by inter-annual variability, is undergoing increase in aridity thus the worsening of semi-extensive grazing activities sustainability is expected. To test this hypothesis, we used 18 sheep nourished with dry hay and cereals during the winter season and with fresh hay during the pasture vegetative cycle; samples from rumen indicative regions (atrium, A; dorsal and ventral sac, DS and VS; dorsocaudal blind sac floor, DBF) were collected for two consecutive years (2007 and 2008). We estimate the rumen Surface Enlargement Factor (SEF and the degree of keratinization of the epithelial lining (EK) . Data on precipitation, soil water deficit, aboveground phytomass, forage chemical composition and animal body state (as BCS evaluation) were collected. SEF varied in the rumen regions in relation to the diets in both years; SEF of VS and DBF showed a trend similar to that of pasture vegetative cycle in 2007, while in 2008 the SEF trend of SD and SV were overlapping to that of pasture phytomass production. The opposite behavior was observed in the EK of both VS and A, which increased when animals were nourished with highly fibrous hay, and decreased when animals grazed on fresh fodder. Rumen VS reveals a modification trend strictly related to pasture vegetative cycle. Drought stress negatively affected forage quantity and quality. The most negatively affected plant communities are those of productive habitats. Also a decrease in the re-growth capacity after clipping was observed in dry year (2007), especially in xeric plant communities. Results indicated that a very detrimental joint effect might acts in sub-Mediterranean pastoral systems undergoing intense drought stress, in that the decrease of aboveground forage production and the increase of its lignification give rise to a combined negative effect. In fact, significant positive correlations were identified for sheep BCS with phytomass and crude protein and for EK with crude fiber and ADF. This means that, though other physiological factors undoubtedly involved in animal loss of welfare under drought event, the modification in rumen features plays a key role in the worsening of the sheep body status and thus their welfare.

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