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ABSTRACT



FISCIANO
12/13
LUGLIO
2023



S4 P83

CAN SPECTRAL DETECTORS EFFECTIVELY PROXY FORAGE QUALITY INSTEAD OF TIME-DEMANDING BOTANICAL SURVEYS?

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Forage quality of Alpine pastures can widely vary along the vegetative season in different ways depending on the different grassland types. Analytical methods provide precise assessment but are often time- and cost-demanding. We hypothesised that forage yield and quality can be effectively proxied by remote sensors, namely portable NDVI (normalised difference vegetation index) scanner and stationary PhenoCam, rather than by in-field vegetation surveys or laboratory analyses. We selected three grassland types in the Alpine summer pastures within Gran Paradiso National Park (NW Italy) characterised by contrasting plant compositions, i.e. belonging to eutrophic, mesotrophic, and oligotrophic vegetation communities. In 2021 and 2022, we carried out botanical surveys to assess grassland Pastoral Value (PV, i.e. a synthetic species-based index of forage yield and quality) and we collected a grass sample from each pasture type in four to five dates along the vegetative summer season, then sent to laboratory for biomass and quality (digestibility) assessment. At the same time, we recorded the NDVI measured by the portable scanner and we obtained the green chromatic coordinate (gcc) of the pasture from a PhenoCam positioned close to the permanent survey plots. The suitability of the three synthetic variables (i.e., PV, NDVI, and gcc) in proxying grass biomass and digestibility was assessed through statistical analyses. The tested relationships were highly significant in all contrasts and higher values of biomass and of digestibility corresponded to higher values of PV, NDVI, and gcc. Among the three proxies, the PV showed similar results to gcc, while the best fitting was obtained by the NDVI. This outcomes highlight the relevant potential of new monitoring tools for the assessment of forage yield and quality, especially in harsh environments where in-field measurements can be time-demanding and uneasy, like Alpine summer pastures.