

A new computer program for the calculation of pasture carrying capacity

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Introduction The calculation of pasture carrying capacity is essential to the sustainable management . Several methods can be used for the calculation in farms or small territories , mainly : visual comparison , biomass esteem , biomass measurement , analysis of botanical composition (Pastoral Value : Daget & Poissonet , 1972) and integration of botanical composition and biomass measurement (Ponderal Contribution : Pardini et al . , 2000) . Moreover some parameters can be taken into consideration to improve the quality of the results , these are related to physical environment (slope , orientation) and to the livestock group (cattle , sheep , goat , wild grazers , wild browsers) , but this results in complex calculations . A computer program has been designed to elaborate data of specific contribution , biomass measurements , palatability to different livestock groups , productivity in different climatic areas , and average quality of the forage species . The program offers 5 methods of calculation : visual esteem , herbage height , biomass , botanical composition , integration of biomass measurement and analysis of botanical composition (Pardini et al . , 2007) .

Materials and methods The computer program has been developed by an Italian company that worked in association with the University of Florence (Italy) and the University of Santiago de Compostela (Spain) . The program offers five methods of calculation : visual comparison , average pasture height , biomass , botanical analysis (Pastoral Value) , integration of biomass and botanical analysis (Ponderal Contribution) . A data base on productivity , palatability and chemical composition and eventual presence of toxic compounds in 2 000 plant species of pastures and rangelands has been assembled from former research of the authors and collecting data available on literature . The data base contains data of species from temperate , Mediterranean and tropical-subtropical climates . Results got by the five methods have been compared also with separate fraction weighing that is the most precise but also a very long field method known .

Results and discussion The program design offers a home page with links to the five methods . Once chosen the method , inputs are requested . The number and types of inputs depends on the chosen method . However , they are all easily available for the farmer , being the most complex the botanical composition . The comparison of results suggests that the visual comparison and biomass height methods should be considered just orientative . The pastoral value method is not very reliable as it calculates biomass availability on the base of productivity indexes and introduces subjective conversion indices to calculate the carrying capacity . Also the biomass method is orientative as it cannot consider the quality of pasture , however , it is fast and easy to use and can be useful for gross calculations . The Ponderal Contribution method is scientifically more reliable than the other four and at the same time sufficiently speditive and practical for farmers .

Conclusions Ranger 3 .0 program is able to manage complex calculations on pasture and rangeland carrying capacity , it is a versatile tool as the data base can be increased by any farmer and the current botanical composition and the actual biomass availability are considered . Consequently it is more reliable for farm assessments than methods based on aerial or satellite pictures . The program is written in Italian , Spanish and English .

References

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