

GRAZING SYSTEMS IN SHEEP REARING

ISDRARIU IONUȚ BOGDAN ALEXANDRU¹, ȚIBRU IOAN², VĂDUVA LOREDANA^{1*},
ALBULESCU MIHAELA², SAUER IOAN², PETROMAN IOAN¹

¹*University of Life Sciences “King Mihai I” from Timișoara, Faculty of Management and Rural
Tourism, Romania*

²*Development Research Station for Raising Sheep and Goats, S.C.D.C.O.C. Caransebeș*

*Corresponding author's e-mail: loredana_heber@yahoo.com

Abstract: The goal of this study was to clarify a few aspects related to grazing systems in sheep rearing: the fields in which grazing systems are relevant, the domains affected by grazing systems, the domains impacted by grazing systems, and the types of grazing systems – which are thoroughly defined and described – for the benefit of the students in animal husbandry and of the practitioners – sheep breeders. The aspects presented are meant to inspire sheep breeders and make them adopt one or more of the grazing systems presented.

Key words: grazing system, sheep rearing, international terminology, grazing lands, grazing animals

INTRODUCTION

A grazing system is “A defined, integrated combination of soil, plant, animal, social and economic features, stocking (grazing) method(s) and management objectives designed to achieve specific results or goals.” [2].

Good grazing management should include grazing distribution, grazing system, kind of livestock, proportion of livestock, proper stocking rate, and season of use [19].

Grazing distribution is affected by several factors: fencing patterns, forage palatability, grazing system, livestock grazing habits of kind and class, pasture size, prevailing winds, range sites and range condition class kind and combination, salt and mineral placement, shade location, stocking density, vegetation type, and water developments placement [19].

Sustainable grassland management plans include: adequate grazing system, adequate stocking rate, distribution by animal type, distribution by class, and other strategies that maximize the animal production per unit area based on sustainable rangeland management techniques [18].

Adequate management strategies in sheep rearing include: controlled burning, grazing system, stocking rate, and weed control [18].

Grazing systems affect, among others: biodiversity [6], botanical composition [19], production [6], soil bulk density [1], and water infiltration.

In their turn, grazing systems are impacted by grazing intensity [20], livestock breed, and management strategies [21].

MATERIALS AND METHODS

The material used in this study – books and articles – aimed at clarifying a few aspects related to grazing systems in sheep rearing, i.e., fields in which grazing systems are relevant, domains affected by grazing systems, domains impacted by grazing systems, and types of grazing systems – which are thoroughly defined and described. The research method use is the bibliographic one.

RESEARCH RESULTS

According to Schacht, Volsky & Waller [19], “a suitable grazing system should be an early consideration” based on understanding the processes that shape plant communities [5].

The following types of grazing systems can be used individually or combined – alternate grazing [7], continuous grazing [4], extensive grazing [2], flash / mob grazing [19], free grazing [3], high-density, short-duration grazing [4], high-intensity grazing [23], intensive (rotational) grazing, leader-follower grazing, low-density grazing, management-intensive grazing, mixed-grazing [21], multispecies grazing, nomadic grazing, preference-follower grazing, deferment / rest, rest-rotation grazing, rotation(al) grazing, rotationally deferred grazing [1], seasonal grazing, seasonal suitability grazing, season-long grazing, sedentary grazing, semi-sedentary grazing, short-duration (rotation) grazing, small-scale grazing [10], strip grazing, targeted grazing, transhumance grazing, winter grazing, year-by-grazing, year-round grazing [7], etc. but only some of them are common all over the world:

- Continuous grazing (syn. continuous stocking), “a method of stocking livestock on a specific unit of land where animals have unrestricted and uninterrupted access throughout the time when grazing is allowed”: allows animals “free access to the entire field or property year-round or for a defined grazing season”; allows animals to graze within multiple fields or within one field; allows stocking rates to vary; involves animals “being stocked continuously during the time that grazing is allowed”; involves “grazing events being interspersed with resting, ruminating and social activities”; is “easy and inexpensive to implement”; is “feasible and effective in most situations”; is the simplest grazing system; needs “improved livestock grazing distribution through herding or strategic placement of attractants” (mineral licks, supplemental feed, or water development) to minimize excessive use in preferred areas; needs the grazing area(s) to be near shade, supplemental feed, and water; prevents plants from being defoliated or grazed continuously; results in a patchiness of grass height and density if sheep graze at moderate stocking rates on annual rangelands.

- Deferment (syn. rest), “the postponement or delay of grazing or harvesting to achieve a specific management objective” or “a grazing system employing various combinations of full year rest, deferment and full-season grazing, commonly in a 3- to 5-year cycle”: can be used to enhance habitat (bird nesting habitat, riparian areas) during critical periods; can take place for a year or longer; delays “the initiation of grazing, usually after the beginning of the grazing season, to achieve a specific management objective”; “is sometimes used to enhance seed production of perennial grasses where seed availability is a limiting factor for establishment of new grass plants; means any time between grazing periods”.

- High-density, short-duration grazing (syn. high-intensity grazing, high-frequency grazing, rapid rotation grazing, Savoury grazing), “a rotational grazing system employing high stocking density, one herd, commonly 5-12 pasture units, grazing periods of 3-10 days (less commonly 1-15 days), and two to several grazing period cycles per year”, “a type of rotational grazing that uses frequent rotations through multiple fields”: adheres to a high-density management; allows “high numbers of livestock graze each field or area within a field for a short time before being moved,” as often as several times per day, to the next one; can also “present some risks to resource conservation on annual rangelands related to biodiversity requirements” for increased pest plants (if the timing is not right), increased soil erosion, structural heterogeneity (varying vegetation heights); can use less-frequent movement; can use lower numbers of animals per field.

- Prescribed grazing (syn. managed herbivory, spot grazing, targeted grazing), “the application of a specific kind of livestock at a determined season, duration, and intensity to accomplish defined vegetation or landscape goals” [8, 14, 15]: “emphasizes creating desirable landscapes over the purpose of livestock production”; “emphasizes managing livestock as a service for vegetation control” (weeds, wildfire fuels); uses sheep [4].

- Rotation(al) grazing (syn. high-frequency / high-intensity grazing, rapid rotation / short duration grazing), “a rotational grazing system employing high stocking density, one herd, commonly 5-12 pasture units, grazing periods of 3-10 days (less commonly 1-15 days), and two to several grazing period cycles per year” [2, 12]: can work well in various circumstances (fields with special habitat, irrigated pastures, seasonally wet meadows, and “sets of fields with differing plant composition”); can “work well when the needs of a diversified livestock operation must be met”; has many forms; is, generally, “more expensive to implement and operate than continuous grazing because it requires more fencing and watering locations and more time to operate”; relies “on more than one field, with animals moved between fields depending on forage condition and availability or based on other objectives” [4].

- Seasonal grazing: can “be continuous or rotational within the season of use”; is sometimes “prescribed on public lands or to achieve a specific objective (on lands owned by private land trusts), to avoid recreational conflict, or where access to forage is limited by lack of livestock water or by the presence of snow or inundation”; may be used “to minimize the time sheep will spend on the property”; “takes place on a particular site for only part of the year”.

- Seasonal suitability grazing: allows farmers “to accomplish rotation without internal fences, replaced by several water troughs rotated by alternately opening and closing (filling and emptying), forcing the sheep to move for water”; has “a flexible rotation schedule that fits the needs of the ranch operation”; may include “installation of riparian pastures so that riparian areas can be managed separately”; needs, sometimes, the subdivision of the farm into different vegetation types; uses several pastures “in a flexible rotation, taking advantage of available forage, shade, water, or other characteristics of a pasture” [4, 9].

The best grazing system for a particular site should rely on the following: considerations of associated trade-offs/risks, cost of materials for improvements and implementation, costs of labour, “evidence that it will be able to achieve all/most of the objectives,” livestock class, livestock species, management objectives, practical considerations (availability of water, fencing), and type of vegetation grazed. It should also consider the purposes of the practice standard [11, 21, 22]:

- “Improve or maintain desired species composition and vigor of plant communities;

- Improve or maintain quantity and quality of forage for grazing and browsing animals’ health and productivity;

- Improve or maintain surface and/or subsurface water quality and quantity, and riparian and watershed function;

- Reduce accelerated soil erosion, and maintain or improve soil condition;

- Improve or maintain the quantity and quality of food and/or cover available for wildlife.”

CONCLUSIONS

The following conclusions can be drawn from the analysis above:

- Grazing systems are central in grazing management, in grazing distribution, in sustainable grassland management plans, and in adequate management strategies;

- Grazing systems affect biodiversity, botanical composition, production, soil bulk density, and water infiltration;

- Grazing systems are impacted by grazing intensity, livestock breed, and management strategies;

- There are tens of grazing systems (most of them synonyms), but the most common all over the world are: continuous grazing, deferment, high-density, short-duration grazing, prescribed grazing, rotation(al) grazing, seasonal grazing, and seasonal suitability grazing;

- The “international terminology for grazing lands and grazing animals” is not established yet (see the definitions for high-density, short-duration grazing and rotation(al) grazing).

REFERENCES

- [1]. **ABDEL-MAGID A. H., SCHUMAN G. E., HART R. H.**, 1987, Soil bulk density and water infiltration as affected by grazing systems, *Journal of Range Management*, 40(4), 307-309
- [2]. **ALLEN V. G., BATELLO C., BERRETTA E. J., HODGSON J., KOTHMANN M., LI X., MCIVOR J., MILNE J., MORRIS C., PEETERS A., SANDERSON M.**, 2011, An international terminology for grazing lands and grazing animals, *Grass and Forage Science*, 66(1), 2-28. <https://doi.org/10.1111/j.1365-2494.2010.00780.x>
- [3]. **ARSOY D.**, 2017, Ecological Sheep & Goat Breeding and Marketing Management, *Balkan and Near Eastern Journal of Social Sciences*, 3(2), 29-36
- [4]. **BARRY S., LARSON S., FORD L. D., BUSH L.**, 2015, *Achieving Management Goals by Balancing Livestock Grazing with Time and Space*. Oakland, CA: University of California
- [5]. **BUDD B., THORPE J.**, 2009, *Benefits of Managed Grazing: A Manager's Perspective*. Wichita, KS: Society for Range Management
- [6]. **DUMONT B., ROOK A. J., CORAN C., RÖVER K.-U.**, 2007, Effects of livestock breed and grazing intensity on biodiversity and production in grazing systems. 2. Diet selection, *Grass and Forage Science*, 62, 159-171
- [7]. **FRESCHI P., MUSTO M., PAOLINO R., COSENTINO C.**, 2015, Grazing and Biodiversity Conservation: Highlights on a Natura 2000 Network Site. In A. Vastola (ed.), *The Sustainability of AgroFood and Natural Resource Systems in the Mediterranean Basin* (271-288). New York, NY: Springer Publishing Company
- [8]. **LAUNCHBAUGH K.** (ed.), 2006, *Targeted Grazing: A natural approach to vegetation management and landscape enhancement* (1-8), Englewood, CO: ASI
- [9]. **MARIN DIANA, PETROMAN CORNELIA, PETROMAN I., BĂLAN IOANA, CIOLAC RAMONA, DINCU ANA MARIA, DUMITRESCU CARMEN, LOZICI ANA**, 2013, The role of non-agricultural activities in rural are development, *Lucrări Științifice Management Agricol*, 15(4), 77
- [10]. **NORTON B. E., BARNES M., TEAGUE, R.**, 2013, *Grazing Management Can Improve Livestock Distribution: Increasing accessible forage and effective grazing capacity*, Wichita, KS: Society for Range Management
- [11]. **PETROMAN I., PETROMAN CORNELIA, MARIN DIANA, BUZATU C., DUMITRESCU A., COMAN S.**, 2012, Solutions for destination management on agri-tourism farm. *Scientific Papers Animal Science and Biotechnologies*, 45(1), 456-456
- [12]. **PETROMAN I., PETROMAN CORNELIA**, 2010, *Agritourism and its forms*, *Lucrări Științifice Seria AGRONOMIE*, ISSN 1454-7414
- [13]. **PETROMAN I.M. VĂDUVA LOREDANA**, 2021, Forms of active tourism, *Ouaestus* 271-279
- [14]. **PETROMAN I. M., PETROMAN CORNELIA, MARIN DIANA**, 2015, *Transporturi turistice*, Eurostampa, Timișoara

- [15]. POPA DANIELA, PETROMAN I., PETROMAN CORNELIA, LALA V., PAICU D., HEBER LOREDANA, MARIN DIANA, 2010, World European and National Policies in the Field of Cultural Tourism, Scientific Papers Animal Science and Biotechnologies, 43(2), 433-433
- [16]. RAȚA GEORGETA, PETROMAN I., PETROMAN CORNELIA, 2013, The English of tourism, Cambridge Scholar Publishing
- [17]. RISTEA I., BOLOCAN RODICA, PETROMAN CORNELIA, IANCU TIBERIU, MARIN DIANA, PETROMAN I., 2018, Implementing measures for the safety of products obtained in agrotourist farms, Journal of Biotechnology, vol.280, Supplement, S37-S38
- [18]. SANTOS S. A., DESBIEZ A., CRISPIM S. . A., CO-MASTRI FILHO J. A., PINTO DE ABREU U. G., GRACI RODELA L., 2009, Natural and cultivated pastures and their use by cattle. In W. J. Junk, C. J. Da Silva, C. Nunes da Cunha & K. M. Wantzen (eds.), The Pantanal: Ecology, biodiversity and sustainable management of a large neotropical seasonal wetland (127-141), Brussels: Pensoft. DOI: 10.13140/2.1.3056.7367.
- [19]. SCHACHT W. H., VOLESKY J. D., WALLER, S. S., 1996, Proper Livestock Grazing Distribution on Rangeland. Lincoln, NE: University of Nebraska
- [20]. SCIMONE M., ROOK A. J., GAREL J. P., SAHIN N., 2007, Effects of livestock breed and grazing intensity on grazing systems 3. Effects on diversity of vegetation, Grass and Forage Science, 62, 172-184
- [21]. SOLLENBERGER L. E., AGOURIDIS C. T. VANZANT E. S., FRANZLUEBBERS A. J., OWENS L. B., 2012, Prescribed Grazing on Pasturelands. In C. J. Nelson (ed.), Conservation Outcomes from Pastureland and Hayland Practices: Assessment, Recommendations, and Knowledge Gaps (111-204). Washington, DC: U.S. Department of Agriculture Natural Resources Conservation Service
- [22]. VĂDUVA LOREDANA, PETROMAN CORNELIA, PETROMAN I., 2018, Ways to practice Islamic tourism in Banat, Lucrări Științifice Management Agricol, 20(1)
- [23]. VĂDUVA LOREDANA, PETROMAN CORNELIA, 2017, Ecumenical tourism in Banat Timiș County, Lucrări Științifice Management Agricol, 20(1)