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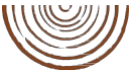
PROGRAMMA DI SVILUPPO RURALE
2014 - 2020

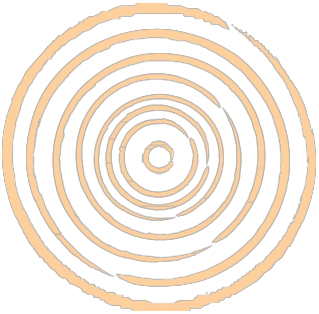
Voisin Rational Grazing

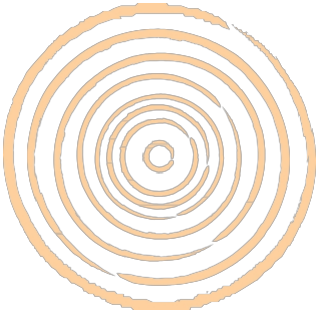
Managing grazing animals by increasing forage yields and soil fertility

Deafal
AGRICOLTURA ORGANICA e RIGENERATIVA

Allevamento Rigenerativo®





The Basics

The implementation of good grazing practices makes it possible to meet most of the nutritional needs of herbivores fed predominantly on grass, while maintaining the sward in a state where forage production and quality is maximised.

Overgrazing or undergrazing are often the main cause of pasture degradation, which occurs through the replacement of pabular species with less desirable, pioneer ones, less valuable from a fodder point of view. Soil and plant diversity deterioration processes are also frequently triggered, exposing the grazing ecosystem to the risk of irreversible loss. In addition, animals are forced to increase their energy expenditure due to motor activity in order to obtain food, resulting in a decrease in daily weight gain and, sometimes, in a deterioration of certain organoleptic characteristics of the meat.

By piecing together the collage of plant and domestic ruminant biology and physiology, we can lay the foundations for designing an efficient and rational grazing system.

High density and diversity of forage species

A good pasture is rich in different species, which guarantee good supply of energy, protein and raw fibre to the animals. The higher the density of the grass, the fewer problems of erosion and compaction.

High animal load

An efficient grazing system must relate the number of animals to the availability of grass. One of the possible techniques is to graze a large number of animals per hectare in a relatively short time, so as to reduce the selectivity of the animals with respect to the most desirable species.

Non-selectivity of grazing. Animals must eat at least 80 per cent of the forage available to them in the time provided. The grazed grass leaves do not dehydrate and the plant can call up all the reserve carbohydrates to cast off. Furthermore, there is equal competition between all species at the time of regrowth. The forage must be grazed when it is very dense and no higher than 25-30 cm.

Correct manure management. Manure and urine are a great source of nutrients and organic matter, and are quickly assimilated by the soil under high animal loads. This is due to the fact that animals, very close together, trample manure and make it more degradable by soil macro- and micro-organisms. Furthermore, with non-selective grazing and a high animal load, the manure is well distributed throughout the parcel: this allows uniform regrowth and the absence of an excess of nitrates in limited areas.

Another advantage of trampling is the breaking of the surface crust of bare soil. This mechanical action, together with the high concentration of plant nutrients, eliminates seed dormancy of species of high forage interest that are usually penalised by the development of unattractive pioneer plants. This process generates an improvement in the overall quality of the pasture.

Ruminants usually avoid eating grass that has grown back around their own droppings, but they have no problem consuming grass that has grown back on the manure of other species. This is also why, as we shall see, it is very advantageous to have different species of animals on

the same plot.

Respect of recovery time

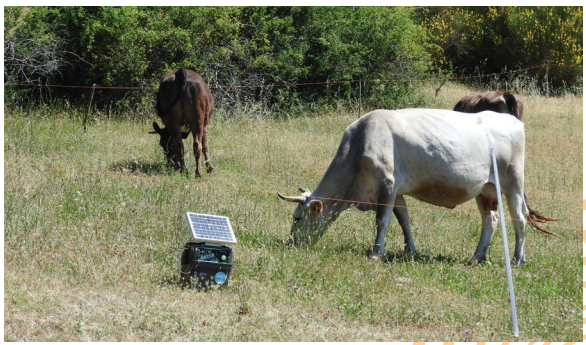
In order to gradually increase livestock and forage productivity, it is crucial not to over-graze. Overgrazing is a combined effect of the variables "load animal' and 'residence time', depending on the productivity and quality of the pasture. Voisin rational grazing is based on the assumption that overgrazing does not occur when there are too many animals in a plot, but when livestock stay too long in the same pen or return to it too quickly. The animals have to leave the plot before the grazed plants can grow back. They will only be able to return when the plants are again at the flower button stage (for leguminous plants) or the stalk stage (for grasses).

In order to know exactly the minimum and maximum recovery time for his pasture, each farmer should check how many days the grass takes to return to the 'optimum resting point' after being grazed. On the same farm, the recovery time may vary from season to season, depending on temperatures and rainfall.

Frequent displacement

There is no ideal dwell time in the same enclosure, the important thing is that the animals have left the plot before the grass starts to re-sprout. Voisin indicated 3 days as the maximum time spent in the same pen. Movement must be organised according to farm logistics and the physiology of the grass, parameters that often do not reconcile. Ideally, herds should be moved not to the neighbouring plot, but to the one that is exactly at the 'optimum resting point'.

Beware, however: undergrazing can also be harmful. Should the absence of animals be prolonged, the cycle of nutrients contained in the grass, returned to the soil through manure, tends to slow down. In arid environments, this process can lead to a rapid loss of grazing. In areas With more constant rainfall, on the other hand, pioneer shrub and tree species enter the pasture, heralding the reconquest of pasture areas by the forest.



Various grazing animals

Animals have different food preferences, consume fodder in different ways and have different digestive capacities variables. For farmers with animals of different species, it is very simple to maximise the utilisation of the pasture: the more hardy species (such as goats and sheep) can be introduced immediately after grazing the somewhat more demanding animals (such as cattle). Or, remaining within the same species, groups with different physiological phases can be alternated: e.g. dry cows can be introduced after lactating cows.

This has several advantages:

- the surface is cleared of grass left standing or partially grazed;
- previously unused fodder is consumed because it has grown around the manure;
- droppings are spread further;
- you go back to fertilising with manure and urine.

Lately, mobile poultry grazing after cattle or sheep passage is also becoming popular. Poultry feed on the seeds and grass left on the ground, but above all they scratch around in the manure in search of grubs and earthworms, an excellent protein supplement to their ration. Furthermore, by digging they spread the manure, favouring its faster degradation. Usually, a balanced ratio of cattle to poultry is 1:3 or 1:4.

Integration of herbaceous fodder with tree fodder

In an efficient grazing system, the presence of trees is essential, even to the extent of a few hundred plants per hectare. Forage supplementation with leaves of shrubs and tree plants is possible. Leaves contain high amounts of protein and are often highly digestible. Their contribution to the diet of cattle can be up to 30% of the total ration, while goats can cover almost the entire diet with forest material.

The leaves can be administered in various ways:

- Free grazing of plants in the pasture or planted in agroforestry systems;
- bringing freshly cut lower branches of forest trees into the pasture;
- pruning branches or cutting off suckers when the leaves contain the most nutrients and drying them to supplement the winter ration.

In many tropical and subtropical countries, the supply of leaves to the fodder diet has never been interrupted and this has resulted in excellent fodder plants such as *Gliricidia sepium, Leucaena leucocephala, Sesbania sesban, Albizia procera* and many others.

In Italy, in more arid or mountainous areas, grazing in the forest is used during the summer period. While waiting for the autumn grass regrowth, the animals, with adequate hay supplementation, can easily overcome the dry period without losing weight and fat by feeding on tree leaves.

Plants such as mulberry, greater ash, alder and lime can supplement the diet of lactating cows very well due to their high protein content and high digestibility. Other species are certainly interesting for cattle with lower requirements or for somewhat more rustic animals. Compared to the performance of high quality forage species, hazelnut, oak and chestnut seem to be the most difficult to assimilate.

Soil fertility. The presence of perennial species allows roots to make mycorrhizal associations with soil fungi. Choosing to plant leguminous or nitrogen-fixing trees from other families, such as alder, ensures a continuous supply of nitrogen to the soil. These processes only enhance the fertility and overall productivity of the pasture system.

Microclimate. In summer, the presence of trees is essential to provide shelter for the herds. It has been observed that in the shade, both pasture productivity and the meat and milk yields of the animals increase. Breaking up strong wind flows with the wind-breaking properties of trees also protects herds from extreme events and herbaceous plants from dehydration.

Introducing animals to pasture

Knowing the daily needs of the animals, the productivity of the pastures and the duration of grazing, the number of animals that can be bred. The size of the plots is based on the average recovery time of the grass. If we choose to make daily rotations, simply divide the total area by the average grazing recovery time, which is 60 days. The surface area of each plot is thus obtained.

Be careful, however: this data varies greatly depending on the microclimate, temperature and rainfall, and even within the same farm there may be areas that are more productive than others, and the shifts following the first will probably have lower yields. Therefore, all planning must be based on constant observation, gradually adapting the choices to the variables of the moment.

At this point, one must consider how to subdivide the plots. The ideal solution is to create regular fences of the same shape and size. Each parcel could be divided into four equal sub-parcels. The cross dividing the pasture could be a 3-5 metre wide walkway, useful for moving animals quickly from one sector to another. The entire pasture could be furrowed by another perimeter walkway.

It is advisable to set up the perimeter and the central cross with permanent fences, while for the inner plots, electrified wire can be used. At the intersection of the sub-plots, water points can be set up to serve the four divisions. It should be borne in mind that the performance of animals decreases if they have to travel long distances to water: for cattle, it must be ensured that they do not have to travel more than 250 m to reach the watering trough.

When morphology and micro-parcel landscaping do not allow for this uniformity, we try to have similarly sized plots and well-distributed water points, trying to strike a balance between good farm logistics and the time needed for operations.

The training of the animals is perhaps more important than the technical choices. Especially those coming from many years of wild grazing, or worse still from the barn, will be uncomfortable in the first few weeks. Breakdowns of fences and wire are not uncommon during this period, especially when they are in unproductive plots, but this is part of the process of change and adaptation.

In this new phase, in order to accustom the animals to the electric wire, it is possible to confine the herd for a few days in a traditional enclosure in which the electrified fence is placed at the inner perimeter or in part of it. As the weeks go by, the cattle will learn to trust the farmer and will look forward to moving on to the next parcel, wait patiently and pass neatly through the new enclosure. This phase is facilitated if you schedule the movements at regular times, always performing the operation at the same time. We will also notice an unusual voracity, because the animals will have learned to make staying in an enclosure more efficient.

Pasture enrichment

We can improve a spontaneous grassland without destroying it. Very often, the technique we use is trans-seeding, which consists of enriching a natural ecosystem with high-value forage species.

We can seed in at least three ways:

- sowing by scattering and immediately afterwards putting the animals out to graze, which with their trampling bury the seeds of fodder crops;
- sowing by scatter sowing and then passing with a spring or tine harrow that lightly scratches the soil crust burying the seeds;
- using a direct seeding machine (on sod), which with its disc mechanism opens a microgroove in the soil and deposits the seeds there.

Except in the high mountains, it is useful to re-seed in late summer, hoping that some September rain will help the seeds to germinate. In this way, the new plants can establish themselves well before winter and will be ready for a nice growth spurt the following spring.

Simplified profit and loss account

A highly simplified profit and loss account is presented below, the sole intention of which is to show the production differential and return on investment relating only to the infrastructure expenditure required for the realisation of a Voisin Rational Grazing project.

BUSINESS PLAN PRV

Installazioni PRV

Ettari
10

Costo indicativo per ettaro	Investimenti iniziali / Capex		Ammortamento
€230	Sistema idraulico	€ 2.300	€ 230
€200	Recinzioni interne	€ 2.000	€ 200
€250	Preparazione terreni	€ 2.500	€ 250
	Progettazione	€ 5.000	€ 0
	Totale investimenti di Start Up	**€ 11.800**	**€ 680**

Below is a simplified example of a profit and loss account for a farm with 10 hectares of land that raises beef cattle and specialises in the cow-calf line. In the example, only the grazing load is taken into account with a of extensive grazing VS one with Voisin rational grazing. The weight of the calves was defined as 200 kg assuming a beef breed with good hardiness.

It is evident how the breed has a great impact on the profit and loss account, so it will not be the same to talk about a Maremma, Aberdeen Angus or other continental beef breed. The purpose of this example, however, is to present, by way of simplification, the potential of a beef herd, which will then have to be declined on a case-by-case basis. As will be seen at the bottom of the table, the increase in marginality (MOL) according to the conditions indicated in this profit and loss account, is equal to approximately +290% with a payback time of only 34 months.

Bovini da carne - Linea vacca vitello

Produzione estensiva tradizionale:

Ettari	Uba	Bovini
10	0,50	5,00

Produzione con PRV

Ettari	Uba	Bovini
10	1,50	15,00

Produzione/Prezzi	Senza PRV	Con PRV
Capacità produttiva mandria	80%	80%
Vitelli anno	4	12
Peso Vitello Vivo	200	200
Prezzo Kg	€3	€3

Totale fatturato	**€2.400**	**€7.200**
Spese di produzione (Non pascolo)	**Intensivo**	**Con PRV**
Kg/giorno	*15*	*15*
Giorni Integrazione	*180*	*120*
Totale quintali Fieno	*135*	*270*
Costo Quintale	*€ 10*	*€ 10*
Totale costo integrazione Fieno	€1.350	€2.700
Oneri Finanziari (Mutuo a 5 anni pari ad investimento totale)		€378
Totale costi	**€1.350**	**€3.078**
	Intensivo	**Con PRV**
MOL (Margine operativo lordo)	**€1.050**	**€4.122**
BEP - Ritorno sull'investimento (Mesi)		**34**

In the following example, we have analysed the case of a dairy farm, again proceeding by simplification. The dairy farm also has 10 hectares of land at its disposal, but in this case there is clearly an increased animal load due to the supplementation of feed, even in extensive grazing.

It is evident that the example below assumes the ability of animals to graze and a reduction in milk production that is not always possible on the basis of the breed in use: see ad example Friesian vs. other dairy breeds or dual purpose breeds. The profit and loss account therefore does not go into the specific analysis of each farm, but is intended to show, again by way of simplification, how a different production approach is possible.

As you will also see here at the bottom of the table, the increase in marginality (GOP) according to the conditions shown in this income statement is +249% with a payback time of only 4 months.

Bovini da latte

Produzione estensiva tradizionale:

Ettari	Uba	Bovini
10	1,00	10,00

Produzione con PRV

Ettari	Uba	Bovini
10	3,00	30,00

Produzione/Prezzi	Intensivo	Con PRV
% Vacche in lattazione	75%	75%
Vacche in lattazione	7,5	22,5
Media giornaliera litri di latte	25	16
Prezzo L	€0,35	€0,35
Totale fatturato	**€23.953**	**€45.990**

Spese di produzione (Non pascolo)	Intensivo	Con PRV
Kg/giorno	*15*	*15*
Giorni Integrazione	*180*	*120*
Totale quintali Fieno	*270*	*540*
Costo Quintale	*€ 10*	*€ 10*
Totale costo integrazione Fieno	€2.700	€5.400
Kg/giorno	*10*	*2,5*
Giorni Integrazione	*365*	*365*
Percentuale Vacche in lattazione con mangime	*100%*	*30%*
Totale quintali Mangime	*274*	*62*
Costo Quintale	*€ 38*	*€ 38*
Mangimi	€10.403	€2.341
Oneri Finanziari (Mutuo a 5 anni pari ad investimento totale)		€378
Totale costi	€13.103	€8.118
	Intensivo	**Con PRV**
MOL (Margine operativo lordo)	**€10.851**	**€37.872**
BEP - Ritorno sull'investimento (Mesi)		**4**

In both of the above cases, additional variables improving the profit and loss account were deliberately not taken into account, as they would have greatly increased the variables analysed and risked making the example itself difficult to understand. Consider, for example, the reduction in costs due to:

- health costs: grazing animals have a lower incidence of health problems, just as the reduction in litres of milk per head has a strong impact on this item of expenditure;
- bedding and barn cleaning: the shortest time spent by the animals in the cowshed greatly reduces the expenses related to the ordinary and extraordinary maintenance and general management of the cowshed;
- manure: spreading manure is no longer necessary with grazing animals, thus reducing expenses related to farm vehicles, tractors and infrastructure;
- land processing: in a PRV, polyphytic grazing does not require special soil tillage (never, however, the plough in favour of tillage if necessary). Si
  They thus reduce the expenses associated with owning agricultural equipment, its maintenance and use in addition to those needed for annual grassing.
- working hours: the workload is greatly reduced as a result, leading to lower financial burdens and an improved quality of life, especially, it must be said, for dairy farms.

Similarly, no consideration was given in either case to improving elements of the profit and loss account that could increase cash inflows:

- verticalisation: the possibility of selling directly meat and dairy products to end consumers, thus obtaining better prices and leaving in-house the margins that would otherwise go to other intermediaries;
- product enhancement: the premium-price that could be recognised for products derived from animals grazing managed with environmentally sustainable and animal welfare-friendly techniques;
- organic and other measures: the price does not take into account any improvements resulting from the conversion to organic farming of the farm in question or from measures that reward the conversion of land to grazing, for example.

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Note

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Project references:

- Measure 16 "Cooperation", Sub-measure 16.1 "Support for the establishment and management of EIP operational groups on agricultural productivity and sustainability".
- VOISIN project: Introduction of the Voisin Rational Grazing (PRV) system for fodder resource management on cattle and sheep farms in Lazio
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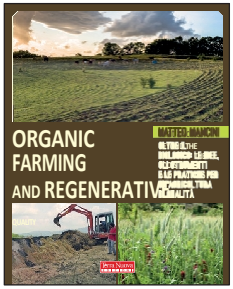

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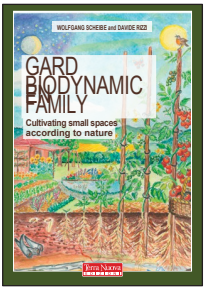

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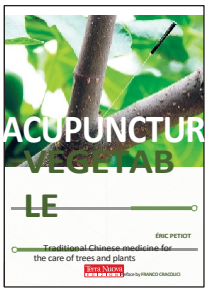

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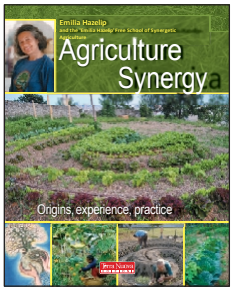

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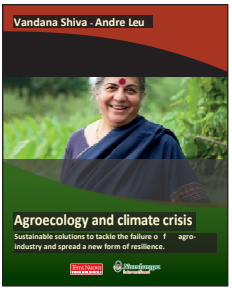

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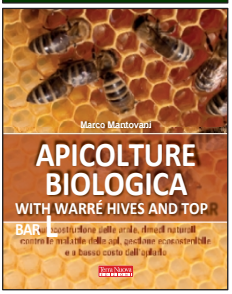

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