SUMMARY

In a modern, sustainable agriculture, animal breeding occupies an important role, because it assures a big part of mankind's food supplies. The development of this agriculture domain, depends on the required fodder supply for animal nutrition.

In the actual agriculture's point of view, the fodder production yield obtained from the permanent grasslands, temporary grasslands and forage plants cultures, is part of the agricultural territory's management and implies the durability of the component systems, the economical and social viability of the agricultural activity and a contribution to the durable development of the rural surroundings, in a more and more urbanized world.

Considering the special importance of the fodder production, implicit the modern grassland exploitation, subject that preoccupied the researchers in this field, some branches of the agricultural sciences structured, having grasslands as study object, as follows:

- **Pratology** studies the multifunctional purposes of the grasslands and emphasizes their place and importance in solving some actual and future problems in economical, ecology and social domains.
- **Ecopratology** studies the grasslands'ecosystems.
- **Prato technique** studies the applicative part of the pratology, elaborates the improving measures for the grasslands, the methods and the culture technologies for the grasslands and forage plants, in general.

Grassland has multiple purposes, its most important function being the production of succulent and fibrefill fodder. The economical and ecological importance of the permanent grasslands is special. The wide surfaces occupied by grasslands are linked to the daily life and to the preservation of the environment. Grasslands represent:

- food supply for domestic animals;
- habitat and food supply for wild animals;
- a way to prevent and control soil erosion;
- a way to improve soil's structure and fertility.

On all our globe's dry land surface, grasslands occupy 23.3% (3.055 millions hectares), surface almost twice as large as the one occupied by cultivated land lots (1.488 millions hectares).

In Romania, the permanent grasslands' surface is of 4.845 millions hectares, from which 3.355 mil. ha are pasturelands and 1.400 mil. ha hay fields, this representing 20.3% of country's

total surface, 21.1% from dry land's surface and 32.9% from the agricultural fields' surface (*Statistic Yearbook, 2008*).

This surface could assure, every year, the food for at least 10 millions UVM. In this moment, this economical indicator that appreciates the value of the grasslands' use, it can't be reached because the non rational use of the grasslands and the lack of interest towards the agricultural and ecological potential these surfaces offer.

In our country's conditions, over 70% from the permanent grasslands are placed on slopes, exposed to erosion and if they weren't be covered in herbaceous vegetation, true ecological disasters could happen, with indescribable economical and social effects.

Romania's permanent grasslands still preserve one of the most complex floristic biodiversity in Europe, in the floristic structure participating numerous plant species with great fodder value. Also, these grasslands can be considered true natural gene-pools, a plasma from which, through amelioration, new genotypes can be created, from high performance cultivars and hybrids. In the floristic composition of the permanent grasslands there are over 200 species of annual and perennial leguminous plants, which enrich the fodder with proteins and which allow, through the symbiotic process of atmosphere nitrogen fixation, the storage of 30-150 kg/ha/year biological nitrogen.

The researches which refer to permanent grasslands are relatively numerous, but we consider that in the south western part of Brăila county, these can be completed with new elements related to the study of the grasslands' vegetal associations and to the improvement of the degraded, low productive grasslands by applying some specific technological measures.

In order to realize the doctoral thesis, we accomplished the following objectives: identifying, charting and studying the grasslands' vegetal associations from the south western part of Brăila county; studying the influence of organic and mineral fertilization on the fodder's yield and quality, and on the evolution of the vegetal carpet on a *Festuca valesiaca* grassland; studying the influence of fertilization on production, on fodder's quality and on the evolution of the vegetal carpet on a temporary grassland; studying the influence of fertilization on the nutritional and energetic value for the *Festuca valesiaca* grassland and for the temporary grassland; studying the influence of fertilization on the economical efficiency for the permanent and the temporary grassland.

In chapter I we emphasized the importance of the permanent and temporary grasslands in what regards the required supply of succulent and fibrefill fodder for domestic and wild animals, the prevention and control of the soil's erosion, the improvement of the soil's structure and fertility. Also, we covered the aspect of grasslands' spreading, worldwide, in Romania, in Brăila county and the factors that influence the grasslands' production.

Chapter II shows the actual level of the researches in our country and abroad regarding the improvement of the permanent and temporary pasturelands, specifying the researchers and the items they studied.

The second part of this doctoral thesis starts with chapter III, in which we characterize the natural frame in the south western part of Brăila county, specifying the geographical position, the water net, the climate conditions, the relief, the soils, the vegetation and the fauna.

Chapter IV underlines the objectives of this research, the method and the research material. There are presented: the study method for the grasslands' associations, the modality of organizing the experiments in field and the methods used in conducting the chemical analyses for the obtained fodder.

In chapter V we made a short characterization of the climate and soil conditions in the area where the experiments were organized, between 2005 - 2007.

Chapter VI refers to identifying, charting and describing 10 grasslands' vegetal associations from the target area. In order to study and characterize the grasslands' associations, we used the geo-botanical method, based on which we limited, approximately, the boundaries of the phytocenoses, observing the uniformity of the floristic composition, afterwards we chose surfaces of approximately 100 m^2, inside which we harvested floristic samples.

For each sample we specified the location, the exposure, the land's slope degree, the percentage of vegetation cover, and the plants were framed, after their importance as forage plants, into the following groups: graminee, leguminous and diverse species from other botanical families. For each specie we visually appreciated the abundance and the dominance, grading every specie after Braun-Blanquet scale.

The grassland associations identified and described in the target zone are the following: As. *Agropyro pectinati – Stipetum capillatae* (Burduja et al., 1956) Chifu et al., 2006; As. *Artemisio austriacae – Poëtum bulbosae* I. Pop 1970; As. *Medicagini – Festucetum valesiacae* Wagner 1941; As. *Cynodonti – Poëtum angustifoliae* (Rapaics 1927) Soó 1957; As. *Bothriochloetum ischaemi* Burduja et al. 1956; As. *Brometum tectorum* Bojco 1934; As. *Agropyretum repentis* Burduja et al. 1956; As. *Puccinellietum distantis* Soó 1937; As. *Staticeto – Artemisietum monogynae* Ţopa 1939; As. *Camphorosmetum annuae* Wenzl 1934.

Chapter VII represent the largest part of this work, containing the measures of improving a *Festuca valesiaca* grassland, through fertilization and radical works, which were followed by the establishment of a temporary grassland.

For this purpose, in 2005 we organized a single factor experiment on a *Festuca valesiaca* permanent grassland and an experiment on a temporary grassland, established after the disassembling of a *Festuca valesiaca* degraded grassland.

We observed, for both experiments, the influence of organic and mineral fertilization on production yield, floristic structure and quality of the obtained fodder.

Permanent grassland. The fertilization with organic and mineral compounds influenced production. In all three experimental years, the biggest productions were obtained in 2006 (1.2-2.8 t/ha d.s.). Analysing the obtained average production yield (2005-2007), we observed that the application of manure (20 t/ha annual and 40 t/ha every two years) lead to production yields with 25-50% bigger than for the control (1.5-1.8 t/ha d.s., compared to 1.2 t/ha d.s.). The application of the complex fertilizer 22-22-0 (100 kg/ha and 200 kg/ha), lead to production increases of 50-67% (1,8-2,0 t/ha d.s.), and the combined application of manure 20-40 t/ha + complex fertilizer 100-200 kg/ha, lead to production increases of 67-117% (2.0-2.6 t/ha d.s.).

The fertilization induced changes in the floristic structure of the permanent grassland. In 2005, the ratio of the graminee species represented 56-65%, the leguminous species' one 5-10% and the diverse species' ratio was 28-37%. After two years we noticed a small increase of graminee species' participation, for the lots fertilized with mineral compounds (64-65%, compared to 60-62% before fertilization). The leguminous species' ratio increased with 1-2% in 2007, and the participation of the diverse species remained almost the same.

The fodder's quality indicators were influenced by the applied fertilizer's type and dose. Thus, the protein content raised, in the third experimental year, for the fertilization with mineral compounds, from 9.40-10.75% in 2005, to 11.55-11.75% in 2007. The raw cellulose content registered small changes, being smaller for the fertilization with manure 40 t/ha (20.75% compared to 21.20%) and for the mixed fertilization with manure 40 t/ha + 200 kg/ha complex fertilizer (20.85% compared to 21.20%). The ash content did not significantly change.

Temporary grassland. Fertilization influenced the production yield; the biggest productions were obtained in 2006 (4.4-8.0 t/ha d.s., compared to 3.8-7.1 t/ha d.s. in 2005 and 3.6-6.0 t/ha d.s. in 2007). The average productions for the three experimental years show that the most important production increases were registered for the fertilization with manure + complex fertilizers (44-79%). The changes in the floristic structure observed between 2005 and 2007 were insignificant; we observed an increase of the leguminous species' participation with 2-3% for the lots treated with complex fertilizers.

The fodder's content in protein, cellulose and ash, for the temporary grassland suffered very small changes under the influence of fertilization. Thus, the protein content was of 15.81-17.96% in 2005 and of 15.62-16.74 in 2007, with bigger values for the fertilization with manure 20-40 t/ha + 100-200 kg/ha complex fertilizers; the raw cellulose had values of 19.20-21.10% in 2005 and of 19,70-21,55% in 2007, and the fat content was of 1.85-2.28% in 2005 and of 2.05-2.35% in 2007.

Chapter VIII refers to the influence of fertilization on the nutritional and energetic value of the fodder. For the **permanent grassland**, in 2005, the fodder's nutritional value, expressed in UNL, increases from 0.89 /kg d.s. for the control, to 0.95-0,96 /kg d.s. for the fertilization with complex fertilizers 200 kg/ha and with manure 20-40 t/ha + complex fertilizers 200 kg/ha; the nutritional value, expressed in UNC, increases from 0.86 /kg d.u. for the control, to 0.94-0.95 /kg d.s., at the same fertilization doses. The values for clear energy, expressed in ENL and ENC, increase, compared to the control, for all fertilization variants; fodder's nutritional values, expressed in UNL and UNC, are close to the values obtained in 2005.

For the **temporary grassland**, fodder's nutritional value was also influenced by fertilization level. Thus, in 2005, the nutritional values expressed in UNL, increase from 1.04 /kg d.s. for the control, to 1.13-1.14 /kg d.s., for the fertilization with manure 20 t/ha + 100-200 kg/ha complex fertilizers, with manure 40 t/ha + 200 kg/ha complex fertilizers and with 200 kg/ha complex fertilizers; the nutritional value expressed in UNC increased from 1.05 kg d.s. for the control, to 1.15-1.16 /kg d.s., for the same fertilization variants. In 2007, the nutritional value expressed in UNL and UNC, registered increases compared to the control, from 1.04 /kg d.s., to 1.09 /kg d.s., respectively from 1.04 kg d.s., to 1.11 /kg d.s., for the fertilization with 100-200 kg/ha complex fertilizers, with manure 20 t/ha + 200 kg/ha complex fertilizers and with manure 40 t/ha + 100-200 kg/ha complex fertilizers.

Chapter IX contains the results for the human intervention's economical efficiency la for the *Festuca valesiaca* permanent grassland and for the temporary grassland. We emphasized the fact that the economical indicators vary in correlation with the fertilizers and the applied dose.

The doctoral thesis ends with conclusions, recommendations and a list of references.