SUMMARY

The strategy of agricultural development in our country after adhesion to the European Union imposes a new approach in forage production and the structure of forage crops, knowing that among the essential factors that influences zootechnic production lies adequate feeding of animals.

The exploitation of natural resources provided by the green canopy, should become a mean to satisfy the needs and interests in complete harmony with nature. This means that any technological intervention must be sized correctly, with an impact and intensity at the limit of resilient capacity of ecosystem.

Compared with the technologies used in agricultural crops, it is posible to achieve a fast and complex climax of the food chain: plant-animal-human, only by using adequate management of the green canopy.

The experimental results obtained thru time revealed remarcable progresses in the field of temporary meadows, with an efficiency closely related to environmental conditions, crop intensivization and optimization, biological material used, species compatibility and management.

We find today multiple preocupations in the world and in our country in adapting the forage production and conservation technologies to the new demands of both economic and ecologic nature, aiming the rationalization of resources, environment protection and production quality by durable management of meadows ecosystems, maintaining biodiversity, increase of soil fertility and optimal use of organic fertilizers.

The study of temporary meadows presents a great scientific importance, because it can clear and define some fundamental aspects regarding the relation between diversity, stability and maturity of ecosystems, relation between species, biologic balance between natural and artificial ecosystems.

In similar pedo-climatic conditions, temporary meadows reached, in all cases, higher

yields than grasslands, being one of the most important measure in the process of forage crops improvement.

The new tendencies in agriculture lies on fertilizers with smaller polluting effect. The relative high quantities of vinassa as a by-product of food industry, and as an ecologic fertilizer that helps forming high yields at low inputs are some of the reasons that lead us to approach the study of perennial grass/legume complex mixtures performance as a subject for this PhD thesis.

The purpose of the theme of study is to investigate the performance of some perennial grass and legume species in complex mixtures targeting production and production quality, considering species and varieties used, the ratio of each specie in the mixture and temporary meadow management.

In order to achieve the objectives of this study, we organized in the spring of year 2006 a bifactorial experiment in the research fields at Ezareni farm.

This research project will provide the posibility of making the choice between the best performing simple mixtures in the pedoclimatic conditions of Moldova Plain.

The experimental field was set up on an area with 2-3% slope, a silt-clay chernozyom soil type, pH = 6.7-6.8, humus = 2.73-2.93%, 21-25 ppm $P_{AL,}$ 226-232 ppm K_{AL} and 112-139 ppm CaO.

The results, content and objectives of the research project give a great importance to this PhD thesis, wich stands as a modern and practical tool for the enhancement of temporary meadows productivity.

The PhD thesis was elaborated on a rational and very well structured plan, containing nine chapters. The first four chapters have a general aproach of the studied theme, four chapters present the results and discussions and the final chapter present the economic efficiency.

The results were analyzed with statistic instruments, and the results interpretation considered the significance of differences between experimental factors.The field trials and experimental protocol were performed with strict following of scientific methods wich offers valability of results presented in the thesis.

The first chapter of the thesis includes considerations on the importance of temporary meadows contriving to present in a succint manner and a short number of pages the main issues of the studied theme.

The second chapter of the thesis includes results and conclusions of related researches done by divers authors of romanian and foreign nationality, regarding the influence

of grass/legumes mixtures on production, green canopy structure, production quality and soil properties.

In the third chapter were described the environment conditions of trial fields, mentioning the geographic position, geomorphology, hidrology, climatic conditions, soils and natural vegetation. The weather conditions were varied, the year 2006 was quite favorable for agriculture activities but the next year was droughty and warm. The weather conditions in 2008 were also good.

The fourth chapter refers to the research objectives, scientific methods, soil attributes and some considerations on the byproduct vinassa.

The fifth chapter includes research results regarding the performance of perennial legumes and grasses from the complex mixtures studied. This chapter represents an important part of the thesis accordingly to the researches conducted on the performance af all plant species wich were included in the mixtures and were materialized in the structure and composition of the green canopy, in forage yield, forage quality and also in the influence of some physical properties of the soil, the obtaind data being very interesting from both theoretical and practical point of view.

In the sixth chapter are included the field experimentation results undertaken on the temporary meadows in the time period of 2006-2008 with an aim on yielding.

From the analysed data, we can observe that forage yield was influenced by mixture type, meadow's age and climatic conditions.

In conditions of nonirrigation and on soils from Moldova Plain, the best results were achieved at the mixture formed by 40-70% legumes and 60-30% perennial grasses. The mixtures with high percentage of species like *Medicago sativa* or *Onobrychis viciifolia* can withstand the lack of nitrogen fertilization and still produce relatively high yields with the support of good weather.

The experimental fertilization rate of 5 t ha^{-1} and 30 t ha^{-1} + $N_{50}P_{50}$ in the years 2007and 2008 has lead to the the highest yields, and a very good forage quality .

The forage yield in 2006 has been influenced mainly by mixture type, ranging between 4.37 t ha^{-1} DM at the mixture formed by 60 % *Medicago sativa* and 3.19 t ha^{-1} DM at the mixture formed by 20% *Medicago sativa*. The mixtures containing *Onobrychis viciifolia* had lower yields ranging between 3.25 t ha^{-1} DM at the mixture with 60% *Onobrychis viciifolia* and 2.41 t ha^{-1} at the mixture with 20% *Onobrychis viciifolia*.

In the year 2007, under severe drought conditions, we registered yields considered to be quite good for an nonirrigated crop system in the Moldova Plain,ranging between 8.8 t ha^{-1} DM at the mixture with 60% *Medicago sativa* and 7.12 t ha^{-1} DM at the mixture with 20%

Medicago sativa. The mixture with *Onobrychis viciifolia* 60% reached an yield of 9.28 t ha^{-1} DM while the mixture with 20% participation of the aboved mentioned specie reached an yield of 7.48 t ha^{-1} dm.

Under the very favorable climate conditions of the year 2008, forage production ranged between 19 t ha^{-1} DM at the mixture with 60% *Medicago sativa* and 17.77 t ha^{-1} DM at the mixture with 20% *Medicago sativa*. The mixture with 60% *Onobrychis viciifolia* reached a production of 17.69 t ha^{-1} DM while the mixture with 20% *Onobrychis viciifolia* hits a production of 16.1 t ha^{-1} DM.

The mean value of forage production ranged between 10.72 t ha^{-1} DM at the mixture with 60% *Medicago sativa* and 9.36 t ha^{-1} DM at the mixture with 20% *Medicago sativa*. The mixture with *Onobrychis viciifolia* 60% reached a production of 10.07 t ha^{-1} DMwhile the mixture with 20% *Onobrychis viciifolia* hits 8.66 t ha^{-1} DM.

The seventh chapter refers to the influence of mixture and fertilization on chemical composition of the forage.

Chemical composition of the fodder was influenced by mixture structure, by mineral and organic fertilization and by the number of yers when mineral fertilization was used and also by climatic conditions.

The data regarding the fodder content of crude protein, crude fibre, potassium, phosphorus, calcium are quite interesting and reveals the way that mixture type and fertilization rates had influenced the forage quality, as well as the energetic and nutritive value of the forage.

The pertinent presentation of these aspects is convincing due to a large number chemical analyses that were performed on fodder samples, tha data being included in a large number of tables, thus contributing to the enrichment of scientific special literature.

The eighth chapter refers to aspects regarding the influence of mixture type and experimental fertilization rates on soil structure, some agro-chemical indicators and underground biological activity thus reaching some very interesting data about soil aggregates distribution, hydric stability of soil structure and also soil structure quality indicators.

The nineth chapter includes aspects regarding the economic efficiency of using the by-product vinassa and manure as organic fertilizers as well as mineral fertilization on temporary meadows. The statistic interpretation of the results had been done with accuracy thus showing that vinassa fertilization + $N_{50}P_{50}$ in the years 2007 and 2008 has the best economic indicators wich makes it not only a valuable organic fertilizer with beneficial influence on both productivity and quality of fodder, but also a very economicaly efficient fertilizer.

The interpretation of results had been done with great caution, considering the least significant difference between values, and with regard to achieve the most pertinent interpretation phrase.

The scientific level of this thesis apears from the great value of experiment results, that can contribute to the emprovement of temporary meadows yields.

The conclusions presented in the final part of the thesis reveals results with theoretical and practical value in order to choose the best grass/legume mixtures as well as the usefullness of vinassa by-product as an organic fertilizer, the fermented manure and mineral fertilization on temporary meadows in Moldova Plain, without exaggerating the extrapolation of results in other pedo-climatic areas of the country.