SUMMARY

In these days and the nearby future, in a world torned by harsh competition for economic supremacy, by ecological unbalances with unpredictible consequences for the existence and health of living organisms, including mankind, it is imperative to change the conception regarding the use of natural and agricultural resources.

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.

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.

With these considerations, we can say that the value of the green canopy formed by perennial grasses and legumes, as a natural resource with practical utility for mankind, gains a new content, subjected to the concept of durable development.

After more than a decade of studies, researches, emprovment of cultural technics and technological transfer, the concept of durable agriculture continues to be a concept in change.

Along with Romanian economy integration in the economic system of European Union it is imperatively necessary, that in the matter of providing food for both animals and humans, to elaborate and enforce new exploitation systems. These systems should allow the use of fodder resources in beneficial economical conditions, strictly following the principles of environment protection and primary (animal) and secondary (man) consumer protection, the ecological principles of landscape, the principles that define life quality in general on unlimited time.

Among today's problems and of a great importance for our country, considering the providing of suficient green forage and hay for the existing livestock, we lean also to enhance the productive potential of grasslands and to improve the forage quality.

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 the conditions of continuous and sustained growth of Earth population, the suficient providing with food products became a more acut problem, transformed from a national matter to a global one. Due to this fact, the demand for animal products keeps on

growing, and the development of zootechnic industry forces an increase in quantity and quality of the forage.

Temporary meadows are an essential component of agricultural ecosystems in the plains regions. In the context of durable agriculture, the exploitation value of these crops achieves another dimension. They must be evaluated not only by agricultural and economic indicators but also by ecological indicators.

One of the most efficient measures that contribute to the improvement of fodder crops, is the temporary meadow, with perennial grasses and legumes. Because Romania has a varied landscape, it is necessary to find new technolgies and to improve the existing ones in order to answer to distinct pedoclimatic conditions and to keep up with the dinamics of pratology and pratotechnics.

The purpose of this PhD thesis is to study the evolution of simple mixtures of perennial grasses and legumes as subjected to experimental fertilization.

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 eight chapters. The first four chapters have a general aproach of the studied theme, three 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.

In chapter five we present the results and discussions of researches undertaken between 2006-2008 regarding temporary meadow productivity.

Analyzing the data registered from the simple grass/legumes mixtures, we observe that forage yield has been influenced by mixture structure, fertilization rates, 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*, *Trifolium pratense* or *Onobrychis viciifolia* can withstand the lack of nitrogen fertilization and still produce relatively high yields with the support of good weather.

In the year 2006 the forage yield was mostly influenced by mixture structure, registering 4.53 t ha^{-1} DM at the mixture formed by 70 % *Medicago sativa* + 30 % *Dactylis glomerata* and 2.79 t ha^{-1} DM at the mixture formed by 20 % *Medicago sativa* + 80 % *Dactylis glomerata*. The mixture with 50% *Trifolium pratense* had an yield of 4.27 t ha^{-1} DM and the mixtures based on *Onobrychis viciifolia* had productions between 3.91 t ha^{-1} DM with the participation of 30% *Bromus inermis* and 2.31 t ha^{-1} DM when the grass specie had a participation percent of 80% in the mixture.

In the year 2007, under extreme drought conditions, the yields were quite good considering a nonirrigated management. The mixture 70 % *Medicago sativa* + 30 % *Dactylis glomerata* had a production of 8.82 t ha^{-1} DM, and the mixture 20 % *Medicago sativa* + 80 % *Dactylis glomerata* reached an yield of 7.21 t ha^{-1} DM. The lowest yield was registered at the mixture with 50% *Trifolium pratense* (4.99 t ha^{-1} DM). The mixture 70 % *Onobrychis viciifolia* + 30 % *Bromus inermis* had an yield of 9.52 t ha^{-1} DM, as for the mixture 20 % *Onobrychis viciifolia* + 80 % *Bromus inermis* the yield droped to 7.21 t ha^{-1} DM.

The year 2008 was exceptionally favorable for forage production and so the mixture

70 % *Medicago sativa* + 30 % *Dactylis glomerata* had an yield of 19.9 t ha^{-1} DM, while the mixture 20 % *Medicago sativa* + 80 % *Dactylis glomerata* had only an yield of 17.48 t ha^{-1} DM. The mixture with 50% *Trifolium pratense* had a good production of 17.09 t ha^{-1} DM, and the mixtures with *Onobrychis viciifolia* had an yield ranged between 19.78 t ha^{-1} DM (30% *Bromus inermis*) and 14.45 t ha^{-1} DM (80% *Bromus inermis*).

The mean values for all three years of research, in terms of forage yields, were ranged between 11.08 t ha^{-1} DM at the mixture 70 % *Medicago sativa* + 30 % *Dactylis glomerata*, and 9.16 t ha^{-1} DM at the mixture 20 % *Medicago sativa* + 80 % *Dactylis glomerata*. The mixture formed on *Trifolium pratense* had average yield of 8.78 t ha^{-1} DM. The mixtures with 70 % *Onobrychis viciifolia* had an average yield of 11.07 t ha^{-1} DM, while the mixture with 80 % *Bromus inermis* had an yield of 7.99 t ha^{-1} DM.

From the data presented in this paper we learned that the forage production was influenced both by mixture structure and mineral-organic fertilization.

The highest yields were reached at fertilization rates of 5 t ha^{-1} vinassa and 30 t ha^{-1} fermented manure. Organic fertilization produced a higher increase of production compared with single-handed mineral fertilization.

In nonirigated conditions and degraded soils from Moldova Plain, the best results were obtained at the mixtures with 50-70 % *Medicago sativa*, followed by mixtures with 50-70 % *Onobrychis viciifolia*, while the poorest results were registered at the mixtures with 20-30 % *Medicago sativa*, followed by 20-40 % *Onobrychis viciifolia*. The mixtures with high procentage of *Medicago sativa*, *Trifolium pratense* or *Onobrychis viciifolia* can withstand the lack of nitrogen fertilization and still can produce high yields accordingly to the climatic conditions.

The sixth chapter presents data regarding the influence of mixtures and fertilization rates on the green canopy and fodder quality of temporary meadows with perennial grasses and legumes. 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 nutritive and energetic value of the fodder. 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 seventh 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 eight chapter includes aspects regarding the economic efficiency of using the by-product vinassa and manure as organic fertilizers and mineral fertilization on temporary meadows. The statistic interpretation of the results had been done with accuracy thus showing that vinassa fertilization 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 simple 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.