

**RESEARCHES ON MAIN PSAMOSOIL IN THE DANUBE
VALLEY (POIANA MARE AREA) AND MEASURES FOR
IMPROVING THEM
(Abstract)**

The work is presented along the 266 pages and has the following structure:

Introduction

Chapter I. General considerations on the formation and evolution of psamosoil (*sands and sandy soils*) in Romania and their features

Chapter II. The natural formation of psamosoil in the Danube valley (*Poiana Mare-Dolj*)

Chapter III. Aim, objectives and the research methods used

Chapter IV. Main psamosoil encountered in the Danube Valley (*Poiana Mare-Dolj*)

Chapter V. Analyzing of psamosoils and technological characterization of the Danube Valley (*Poiana Mare-Dolj*)

Chapter VI. Partial data on improving psamosoil in the Danube valley (*Poiana Mare-Dolj*)

Chapter VII. The influence of humus and clay content on the properties of psamosoil, in area Poiana Mare-Dolj

Chapter VIII. Research of the fertility in potting psamosoil in the Danube valley (*Poiana Mare-Dolj*)

Chapter IX. Research conducted in the experimental field, regarding the fertility of psamosoil in the Danube valley (*Poiana Mare-Dolj*)

Chapter X. The economic efficiency of wheat and maize

Chapter XI. General conclusions and recommendations for production

Bibliography

Listed a number of 209 scientific papers, treaties and monographies published in Romania and other countries with interests in agriculture.

Aim and research objectives

Soil is the basis for work in agriculture, because the properties depend on the requirements of all the other measures to ensure growth and fruiting plants. Thus, depending on the soil, it is recommended to be used a particular technique of mechanization, various preparatory work of land, measures of fertilization, crop zoning and improvement works.

Knowledge of the natural conditions of soil formation in a given area, their property and how it evolved and how they evolve through the use of agricultural, is a basic requirement in agricultural practice, because practicing a modern and efficient agriculture can be achieved only based on the latest achievements of science and technology.

Sustainable agriculture is a broad concept that involves the application of appropriate technologies that take into account protection of natural resources, maintaining the productive capacity of soils, using modern technologies, materials and energy saving resources, obtaining higher yields and quality, however to ensure the needs of agricultural products both now and in the future.

Rational use of soil, which is the main means of production in agriculture and forestry, maintenance and especially the continuous improvement of its fertility, is a task of prime importance for agricultural research and for all those working in the field.

Experiments were conducted during the years 2006-2008, aiming at understanding the natural productive potential of these soils and how they respond to mineral and organic fertilization.

To achieve the theme in the study we conducted a broad thematic activity documentation and support field research, laboratory and experimental field on which we obtained valuable data, amplified and confirmed by the literature.

Research program was accomplished by studying the main psamosoil encountered in the Danube Valley, area Poiana Mare-Dolj. Soil analysis was carried out within the Department of Agriculture Laboratory in Craiova Dolj and in OSPA laboratories in Dolj.

Our research objectives were related to :

- Knowledge of the natural conditions of the formation of psamosoil in area Poiana Mare-Dolj.

- Identifying and studying key psamosoil researched area.

- Determine the main physical, chemical and hydro psamosoil characteristics identified on the ground.

- Establishing the compatibility of psamosoil for different cultures and ways of use.

- Description of various methods to improve psamosoil studied area.

- The influence of humus and clay percentage on certain properties of the psamosoil.

- increasing the productive capacity of psamosoil through mineral and organic fertilization.

Results

Psamosoil soils have the worst natural productive capacity because they have a coarse grain size composition, are very poor in humus and nutrients, do not retain water and chemical fertilizers and are frequently subjected to wind deflation.

To be successfully used in plant cultivation, improvement works must be applied on a complex psamosoils. Based on the study of a rich bibliographic material and data collected from the studied area, we presented and processed several steps for improvement. Thus, the psamosoil described can be improved by leveling works, works to combat deflation by wind, by mineral and organic fertilizer through irrigation, etc..

In this paper there are presented some practical works to improve the sands in the studied area, among which there are included: setting psamosoil by forest plantations, the plantation of vines, by determining the mechanical fixation by field crops, fixing psamosoil by orchards, etc.

To characterize the climatic conditions in the area Poiana Mare, data from meteorological station during the periods 1959-2008 and 1999-2008 Calafat have been purchased and processed, which show that the area falls within the province Cfax climate, with average annual temperatures around 11.5⁰C and average rainfall of 550 mm. Prevailing winds which are found in the area are North Wind, which blows from east and Austrul which blows from west. B It re ul is also found in the area being a wind that blows from the south.

The research conducted on the field and in laboratory have identified and described in terms of morphological and physic-chemical the following main subtypes of psamosoils:

- **Psamosoil eutrice** (*typical*)
- **Psamosoil mollic**
- **Psamosoil gleyic**
- **Psamosoil saline**
- **Psamosoil calcaric**

To establish the compatibility of the psamosoil in Poiana Mare-Dolj area for different cultures and ways of usage, there have been made works of evaluation and

technical characterization. The interpretation of the data obtained from bonitarea of psamosoil depends on the natural conditions and on soil properties, resulting that sandy soils have very low productive potential, because the notes of evaluation and favorability classes tend to lower limits.

Through field research, laboratory and potting, it is practically presented the influence in humus and clay content on the properties and fertility of psamosoils. Thus, it appears that the growing proportion of humus and clay, soil color is close to three units with a value and chrome, density and decrease the apparent density of 0,1 to 0,2 g/cm³, total porosity increases with 1-5 percent adhesively improve consistency and increase the values of hydro physical by 2-6 percent and the reserve of nutrients to improve radically.

Experiences made in potting, demonstrated that the more the rates of humus and clay increases, the production of oats increases too, with percentage increases of up to 66% and with very significant production increases.

As mineral fertilizers it was used ammonium nitrate with 33,5% active ingredient, concentrated superphosphate with 48% active ingredient and 40% potassium salt active ingredient. Each variant was tested in three repetitions. Seeds of oats were used, 25 seeds of oat being planted in each bucket.

Both on eutric psamosoil and on the mollic psamosoil, chemical and organic fertilization brought very significant production increases. On psamosolul eutric, which has a very low natural fertility, production increases were higher compared with production increases obtained on mollic psamosoil, which has higher natural productive potential.

On the experimental field experiments were performed in two stationary, on the two soils. As test versions were used the same treatments described above. Wheat and maize were used as plants, since they are mostly grown by farmers in the area.

On eutric psamosoil (typical), the version control wheat production was 770 kg/ha, which indicates a very low natural fertility. N100 fertilization increased production to 1040 kg/ha with a production increase of 270 kg/ha, which is significantly distinct. N100 P60 fertilization increased production to 1266 kg/ha, with an increase of 496 kg/ha, which is very significant. Comparing the increase of production of V3, to increase production of V2, we can deduce that the increase of P60 is made of 226 kg/ha, slightly smaller than that caused by the N100. N100 P60 K40 fertilization increased production to 1340 kg/ha with an increase of 570 kg/ha, very significant. Comparing the production increase at the V3 with that of V4, we find that production growth made only K40 is 74 kg/ha, much smaller than that caused by N100 or P60. Production in V5, which was fertilized with manure was the highest of 1496 kg/ha, double the fertilized variant.

On mollic psamosoil in version control, wheat yield was 1306 kg/ha, nearly double than that obtained on eutric psamosoil, which highlights the much higher natural fertility of the soil. In fertilized variants, yields obtained led to the same conclusions as on the typical psamosoil, specifying that increases of production compared to witness version, on the mollic psamosoil were slightly lower, but significantly important.

Production results obtained with maize experiences led to the same conclusions as for experiments with wheat, specifying that the corn yields were somewhat higher. Thus, the variant fertilized on eutric psamosoil maize yield was 1215 kg/ha and on the mollic psamosoil was 1215 kg/ha. In the variant fertilized with manure on eutric psamosoil average yield was 2653 kg/ha and on the mollic psamosoil of 3910 kg/ha.

In conclusion, chemical and organic fertilization on sandy soils is very necessary in order to bring very significant production increases.