

THE SOILS EVALUATION FOR THE PEAR AND CHERRY (SOUR CHERRY) PLANTATIONS IN THE SÂRCA FRUIT-GROWING BASIN

BONITAREA SOLURILOR DIN BAZINUL POMICOL SÂRCA PENTRU PLANTAȚIILE DE PĂR ȘI CIREȘ (VIȘIN)

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***Abstract.** The soil evaluation is a method and a system determining the favorability of the soils for a certain use or type of culture, expressed as an evaluation grade. This grade is a synthetic expression in a (quasi)quantitative manner of the relative production potential of the terrain, according to the ecological conditions and the way the soil is capitalized by the plants. The expression of the soils favorability for the pear and cherry plantations was done by calculating the average evaluation notes, depending on their values, establishing 10 favorability classes.*

Key words: bonitarea solurilor, note de bonitare, clase de favorabilitate, bazin pomicol

***Rezumat.** Bonitarea solurilor este o metodă și un sistem de stabilire și de exprimare a favorabilității solurilor pentru o anumită folosință sau cultură, redată prin nota de bonitare. Această notă exprimă sintetic, într-o formă (cvasi) cantitativă, potențialul relativ de producție a solului corespunzător specificului său ecologic și modului de valorificare a acestuia de către plante. Exprimarea favorabilității solurilor din bazinul pomicol Sârca pentru plantațiile de păr și cireș (vișin) s-a realizat prin calcularea notelor medii de bonitare, în funcție de valorile acestora, stabilindu-se 10 clase de favorabilitate.*

Cuvinte cheie: soils evaluation, evaluation notes, favorability classes, fruit-growing basin

INTRODUCTION

The evaluation of agricultural terrains represents a complex operation of deep knowledge of the growing and fruit-bearing conditions of plants and of determining the favorability degree of this conditions for each use and culture (because a land can be unfavourable for certain uses and cultures, but favourable for others) by a system of values and evaluation notes (Teaci et al, 1985).

Establishing soil favorability for the fruit-growing plantations (pear and cherry trees) requires not only good knowledge of the multiple functions of the soil, but also the existent interaction between agricultural activities and soils. Evaluation of the soils for the pear and cherry plantations in the Sârca fruit-growing basin was done to establish whether the soils in this fruit-growing basin (especially soils in the western part) enable to be set up the orchards of pear and cherry tree.

MATERIAL AND METHOD

The soil evaluation was done according to methodology elaborated by ICPA, 1987, the data regarding physical and chemical characteristics of the soils representing the result of interpreting data acquired through complex pedological studies performed by OJSPA - Iași (1995, 1999), on a 1:10.000 scale.

For the evaluation notes calculation for the pear and cherry plantations, in the natural conditions in the Sârca fruit-growing basin, some indicators were used, respectively evaluation indicators. Thus, only the environmental conditions considered the most important, easier and more accurately measurable were chosen, namely: mean annual temperature (corrected values); mean annual precipitations (corrected values); gleyzation; salinisation and alkalization; texture in the ploughing horizon (the first 20 cm); soil pollution; slope; landslides; depth of the phreatic water; flooding; total porosity; total content of calcium carbonate in depth until 50 cm; reaction (pH) in the ploughing horizon (the first 20 cm); degree of base saturation in the first 20 cm; soil edaphical volume; reserve of humus in the 0 – 20 cm layer; surface waterlogging. To the land evaluation, in the natural conditions of the studied area, each of the indicators above, except "degree of base saturation" indicator, which intervenes indirectly, participated in the establishment of the evaluation mark by a evaluation coefficient, which varied between 0 and 1. The evaluation marks were obtained by multiplying by 100 of the coefficient product of the 17 indicators, which participated directly in their establishment. Depending on their values, 10 classes of favorability were established: the 1st class – 100 – 91 points; the 2nd class – 90 – 81 points; the 3rd class – 80 – 71 points; the 4th class – 70 – 61 points; the 5th class – 60 – 51 points; the 6th class – 50 – 41 points; the 7th class – 40 – 31 points; the 8th class – 30 – 21 points; the 9th – 20 – 11 points; the 10th class – 10 – 0.1 points.

RESULTS AND DISCUSSIONS

The soils, that assure a very good favorability for the pear plantations, included in the 1st class of favorability with 100 evaluation points, are the typical and cambic chernozems (inclusively those affected by low sheet erosion), in conditions in which the phreatic water is approximately 5 m depth – fig.1; therefore 31.25% of total area of the terrains are very favourable for the pear plantations (fig. 2). The cambic chernozems, the typical chernozems with moderate sheet erosion and the cambic hortic anthrosol are very good for the growing and the fruit-bearing of the pear species, being included in the 2nd class of favorability (81 – 90 evaluation points), which represents 25.87% of entire area of the fruit-growing basin (fig.2). For the cambic chernozems and the cambic hortic anthrosol, the limiting factor, with minor implications, is represented by the phreatic water depth (over 5m depth), while the typical chernozems with moderate sheet erosion are penalized by higher slopes (approximately 10%).

The steep slopes (above 10%) and the high depth of the phreatic water include the cambic and typical chernozems with moderate sheet erosion in the 3rd class of favorability (71 – 80 evaluation points). These soils, that presents a good favorability for the pear tree, occupy 15.27% of the entire fruit-growing basin (fig.2). The hortic anthrosol with moderate sheet erosion, as a result of the steep slopes and of the phreatic water depth above 7 m, is included for the pear plantations in the 4th class of favorability (61 – 70 evaluation points). The mollic

aluviosol and the mollic colluvic aluviosol with low salinisation are included in the same class of favorability (the 4th class). The evaluation notes of these soils are penalized by the waterlogging, the low alkaline reaction, the texture, respectively the low salinisation. The soils in this class of favorability, which ensure a good favorability for pear tree, occupy 2.08% of the total area of the fruit-growing basin.

The soils with medium favorability for pear tree, included in the 5th class of favorability (51 – 60 evaluation points) and the 6th class of favorability (41 – 50 evaluation points), occupy more than 1% of entire surface of the fruit-growing basin (fig.2) and are represented by the typical chernozem with moderate sheet erosion (clay texture), the calcareic erodosol (with slopes of 10,1 – 15%), the cambic phaeozem with strong sheet erosion (fig.1). For the typical chernozem with moderate sheet erosion, the limiting factors are related to the slope, the high depth of the phreatic water and the fine texture. The cambic phaeozem presents restrictive factors as slope, high depth of the phreatic water, low-alkaline reaction, low humus content. As the phaeozem, the calcareic erodosol have the same limiting factors plus high carbonate content.

With a low favorability for the pear plantations, the typical chernozem with strong sheet erosion and the mollic colluvic aluviosols strongly gleyed are included in the 7th class of favorability (31 – 40 points) – fig.1, which represents 0.78% of the fruit-growing basin area (fig.2). The penalties of the evaluation marks are very high. The limiting factors of the typical chernozem with strong sheet erosion are the steep slopes, the phreatic water depth, the high carbonate content, the low – alkaline reaction and the low humus content. The sternly restrictive factor for the colluvic aluviosols strongly gleyed is the phreatic water depth (coefficient of evaluation value is 0.5); the gleyization and the waterlogging are also the limiting factors for the pear tree. The gleyic hortic anthrosols and the low alkalized and gleyed aluviosols, with a low favorability are included in the 8th class of favorability (21 – 30 evaluation points), which 2.89% of the total area of the fruit-growing basin (fig.2).

The calcareic erodosols, with very high slopes, high carbonate content (the penalties are very high for this indicator, the coefficient value being 0.3), low reserve of humus, which have developed on terrains with phreatic water depth over 7 m, are included in the 9th class of favorability. These soils, improper for pear tree development, are complemented by some complex soils, owning 3.87% of entire fruit-growing basin area.

The improper soils for the pear plantations are the gleyic aluviosols, the gleyic chernozems, the salinized cernic gleyosol, a part of the soil complexes are included in the 10th class of favorability, which occupy 16.63% of entire studied area (fig.2).

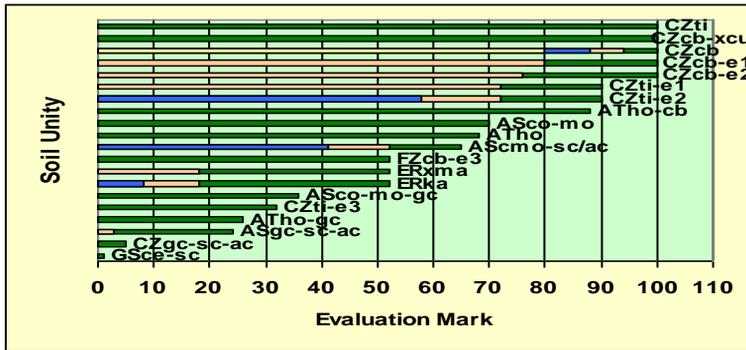


Fig. 1. The favorability of the main soil types in the Sârca fruit-growing basin for the pear plantations

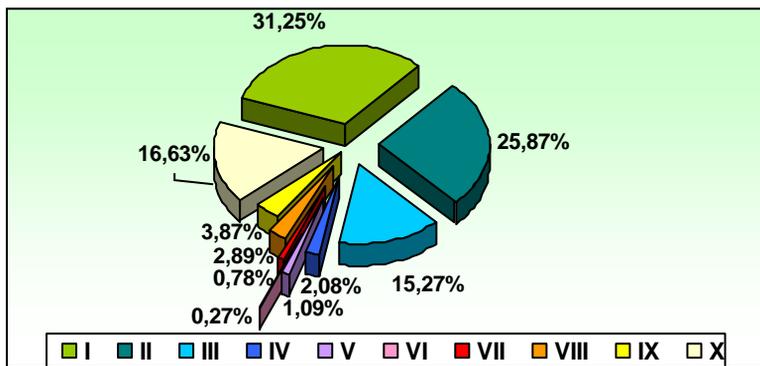


Fig. 2. The distribution of the classes of favorability of the soils in the Sârca fruit-growing basin for the pear plantations

The typical chernozems (including those with low sheet erosion, which present a medium texture) are included, in a 1.65% proportion, in the 1st class of favorability with 100 evaluation points (fig. 3, 4), presenting a very high favorability for cherry plantations. The minor restrictions related to fine texture classify the typical chernozems (even those affected by low sheet erosion) and the cumelic cambic chernozem in the 2nd class of favorability, with 90 evaluation points (fig. 3). With 81 evaluation points, the typical chernozems with moderate sheet erosion are included also in the same class of favorability (the 2nd class of favorability) – fig. 3, the minor penalties being represented by the slope, which exceeds 10%, and the fine texture. Although these terrains with very favourable soils for the cherry plantations occupy 31.59% of the fruit-growing basin area, currently all these terrains are used as arable lands.

The fine texture and the phreatic water depth over 7 m are the factors which classify the cambic and typical chernozems (including those with moderate sheet erosion) and the cambic horticultural anthrosol in the 3rd class of favorability (71 – 80 evaluation points) – fig. 3. These soils with high favorability for the cherry plantations occupy 36.81% of entire studied area (fig. 4). The 4th class of favorability (61 – 70 evaluation points) contains the typical and cambic

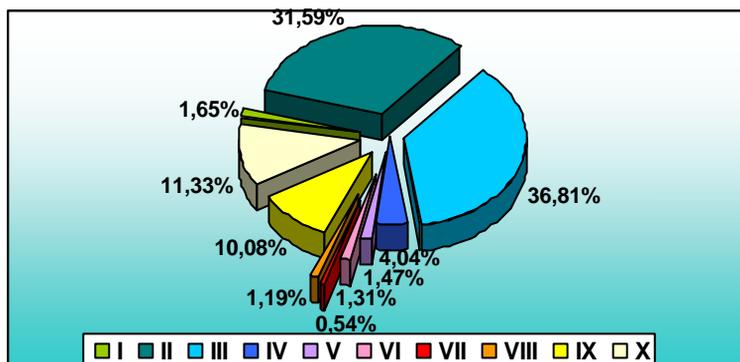


Fig. 4. The distribution of the classes of favorability of the soils in the Sârca fruit-growing basin for the cherry (sour cherry) plantations

CONCLUSIONS

From among studied species (pear and cherry tree), the pear tree is the most tolerant species to environmental conditions in the Sârca fruit-growing.

The fine texture of the soils in the fruit-growing basin is the main limiting factor for the cherry (sour cherry) plantations.

Within the whole study area where the soils have been charted (4195,5 ha), in the pear orchards the soils included in the 1st class of favorability are prevalent (31,25%), while in the cherry (sour cherry) plantations, the soils belong mostly to the IIIrd class of favorability (36,81%).

The soils which assure a special favorability to pear and cherry (sour cherry), are the typical and cambic chernozems (cernisol class), as well as the cambic anthrosols.

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