

ISSUES REGARDING THE ECOLOGICAL FORESTRY RECONSTRUCTION OF THE DEGRADED LAND INSIDE PODU-ILOAIEI FOREST DISTRICT, IASI COUNTY

Tatiana SANDU¹, Alina-Elena TROFIN¹, Roberto-Renato BERNARDIS¹,
Nicoleta-Luminița PARASCHIV¹

e-mail: tatiana_sandu69@yahoo.com

Abstract

Studies conducted by researchers in our country points out that most of the installed protective forest cultures on degraded land have as basic species black pine (*Pinus nigra*) and sylvester pine (*Pinus silvestris*). It should be noted that under massive regeneration and introduction under the shelter of the massive, in gaps created by extracting damaged pine specimens, of some genetically valuable native species, are an effective forestry method of transition for temporary forest ecosystems to stable (areal) forest ecosystems, but also of increasing the stability and functional efficiency (of protection) of arboretum located in less favorable places (moderately eroded land and potentially sliding lands). Ecological forestry reconstruction actions that are mentioned in this paper are important for the recovery of the hydrological and antierosion protective capacity of these tree stands, but also for assuring their continuity on degraded lands, thus obtaining a more effective protection of the places next to forested areas.

Keywords: ecological forestry reconstruction, degraded lands, black pine, sylvester pine

Ecological reconstruction of degraded lands through reforestation artificial was based on the use of species of pine (*Pinus nigra* and *Pinus silvestris*) by repeated interventions on these provisional arboretums, structurally fragile, predisposed to injury and in serious danger to lose their protection functions (Constandache, 2005).

The ecological reconstruction works in forest arboretums located on degraded land through water flowing clearly illustrates the role of forest cultures to limit surface erosion, increase seepage, improve internal drainage etc. However the installation of woody vegetation in most situations often is not possible due to extremely difficult living conditions they offer the degraded lands as poverty soil nutrients, reduced soil thickness (sometimes with skeletal aspect), land instability, etc. (Sandu, 2015). For that reason, the installation work of forest vegetation are more difficult, referring primarily to the consolidation of land in order to stop and avoid degradation phenomena through *hydraulic works* and, secondly, to improve conditions for installation of vegetation forestry by phyto-improvement works (Muntean, 2005).

MATERIAL AND METHOD

The research assumes that forest ecosystems installed on degraded lands are mostly considered temporary, with the main purpose of stopping land degradation processes and eventually determining the appropriate regeneration measures and works for these lands.

The purpose of this research is to highlight certain elements on the behavior of forest crops protection, degraded land stational development and propose ways of introducing some valuable native species on these lands.

Observations and researches were carried out on the territory of U.P. VI Cenușa, inside Podu-Iloaiei Forest District, Iași. VI Cenușa production unit has 55 lots and a total area of 1919.9 ha, from which approx. 3.80 ha (5%) are degraded lands in need of ecological reconstruction measures.

Research methods in line with the objectives of the research were: bibliographic documentation, direct observations (made both expeditionary and stationary), the theoretical analysis and logical interpretation of the results. Characterization of forest sites was performed according to the method of mapping and classification of degraded land resorts developed by Traci (1985).

In the resorts considered representative for the study we conducted observations on the growth characteristics, vegetative development, the influence of the forest species used on the analyzed degraded lands and the state of vegetation of these

¹ University of Agricultural Sciences and Veterinary Medicine “Ion Ionescu de la Brad” Iasi

crops, to develop proposals and recommendations for placing on these lands other valuable native species.

RESULTS AND DISCUSSION

The study showed that in the U.P. Cenușa, Podu Iloaiei Forest District the protective forest crops installed on degraded lands have in composition, with few exceptions, sylvester pine and/or black pine, this situation being in fact considered valid for over 60% of degraded forested surfaces in Romanian subcarpathian areas. (Constandache, 2005).

The main types of forest crops resulting from ecological reconstruction of degraded forest lands within UP Cenușa, Podu Iloaiei Forest District are:

- black pine pure cultures or mixed cultures of black pine mixed with deciduous (field maple, ash, cherry bird, flowering ash, Turkish cherry, dogwood, s.o.) – approx. 45%;
- pure cultures of sylvester pine or pine mixed cultures with deciduous (ash, maple, field elm, bird cherry, flowering ash, sorb, s.o.) – approx. 32%;
- cultures of black pine mixed with sylvester pine and deciduous, on various categories of degraded and sliding lands – approx. 23%.

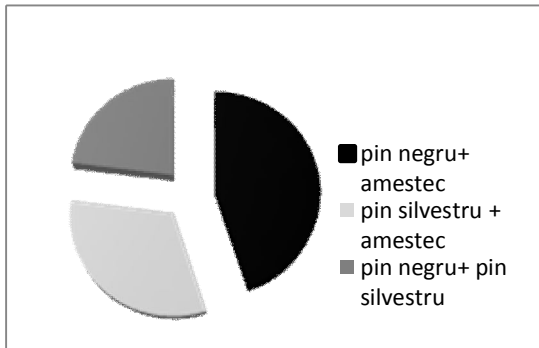


Figure 1 The structure of protective forest cultures share on degraded lands within U.P. Cenușa, Podu-Iloaiei, Iași

Protective forest crops resulted from repeated interventions by reforestation works, so they are of ages varying between 15 and 70 years (mostly in the range 30 - 40 years).

It was found that older crops can mainly be found in portions of land located in more favorable stationary conditions, while younger crops were located in areas with heavier stationary conditions, where the first stage installation of forest vegetation failed, or transitional crops were installed, consisting mainly of sea buckthorn subsequently substituted.

The field observations showed that these protective forest cultures have an uneven disposition, mosaic shaped and the vegetation profile is irregular or stepped.

Regarding the current state of forest crops installed on the degraded lands in the Podu Iloaiei forest district, field observations have revealed the following:

- protective forest crop arboretums on degraded lands had generally a good behavior in terms of vitality, growth and performance of the functions of protection, contributing substantially to reducing superficial leakage and erosion;
- on the forested degraded lands, valuable arboretums were found, mostly consisting of pine trees, with active growth in relation to existing stationary conditions;
- on lands with heavier soils (clay loam to clay) growth and development of pines species were different: under these conditions, black pine developed best, while sylvester pine developed better on lighter textured soils;
- on high saline soils we observed that soluble salts have a negative influence on the development of pines, even on deep soils, underlined by the greatly diminished increases of pine specimens from these locations;
- soil umidity is not a limitative factor for both species of *Pinus*;
- on unstable lands, the black pine had the best behavior.

Depending on the type of the degraded lands we analyzed the evolution of forest cultures and their effectiveness in stopping degradation.

When choosing species in afforestation of the degraded forest lands should be taken into account that their growth is vigorous (especially in youth) in the harsh conditions existing on degraded soils, that they are resistant to dryness and poor soil fertility, cover well the ground, are easy to regenerate under natural conditions, both by seed and by shoots and sprouts, provide a rich litter and develop a high natural resistance to diseases and pests attack (Ciortuz, 1999).

Analyzing the studies conducted in our country (Untaru, 1995, Costandache, 2005) we consider the following forest culture types as effective inside Podu-Iloaiei forest district:

- a) *on land affected by surface erosion on slopes strongly to excessively eroded*, most efficient crops can be as a mixture of black pine with deciduous (maple, ash, wild cherry, flowering ash etc.) and on strongly eroded lands, black pine in combination with white sea buckthorn;

b) *on ravined land, on basins, ravines embankments and torrents*, the most effective may be the following:

- cultures of black pine and / or sylvester pine, mixed with white seabuckthorn are more effective on slopes with inclination less than 25°;
- acacia crops are more effective on slopes developed in loess or sandy gravel, poor in calcium carbonate;
- mixed cultures (white sea buckthorn+ willow + amorphous) are more effective on soils rich in calcium carbonate;
- alder cultures are the most effective on wet slopes with ground water or with northern exhibition.

c) *on sliding land*, with predominance of rock to the surface, are considered more effective the following crops:

- cultures of black pine and / or sylvester pine mixed with some deciduous - on sliding lands, shifting in block or weak to moderate fragmented;
- acacia cultures - on lands with displacement phenomenon with light and medium soils;
- alder + willow cultures - on lands with periodic waterlogging;
- cultures of white seabuckthorn + willow + amorphous - on strongly fragmented lands, with predominance of rock to the surface, strongly carbonated.

The analysis of stationary conditions of the perimeters of improving degraded lands have highlighted the opportunity to introduce in culture, by direct sowing in solid or plantations, of specimens of beech, oak, fir, maple Field, ash, wild cherry etc. in favorable resorts, occupying about 25% of the total area of the analyzed perimeter.

The favorable evolution of the hardwood mixtures (field maple, wild cherry, ash, maple, beech, dogwood etc.) in forest cultures installed on degraded lands on the territory of Cenușa unit, Podu Iloaiei forest district, may justify the proposal to use higher proportions of native deciduous species on the lands with a moderate to strong erosion rate where soils are less deep. The ameliorative function of mixtures of deciduous and pine trees is known to be effective (*Traci, Untaru, 1986*) as the litter formed decomposes quickly, thus ensuring quick soil improvement, the snow reaches easier on the ground as leaved species are lacking foliage in winter and fungal attacks on pine specimens are reduced and less virulent.

CONCLUSIONS

Following ecological forest reconstruction of degraded lands within Cenușa unit, Podu Iloaiei forest district, there were detected the following types of forest cultures installed on degraded lands: black pine pure cultures or mixed cultures of black pine with deciduous - approx. 45%; sylvester pine pure culture or cultures of sylvester pine mixed with deciduous - approx. 32% and cultures of black pine mixed with deciduous and sylvester pine on various categories of degraded and sliding lands - approx. 2.3%.

Aged forest cultures are found mainly on large portions of land located in more favorable stationary conditions, while younger cultures are located in areas with difficult stationary conditions and hardly accessible.

Analyzing the stationary conditions of the improvement perimeters of degraded lands in the Cenușa unit, Podu Iloaiei forest district, has shown the possibility to insert in culture by direct sowing or planting in solid, specimens of beech, oak, fir, field maple, ash, wild cherry etc. in the resorts more favorable, occupying about 25% of the total analyzed perimeter.

Following the assessment of vegetation state of the mixed deciduous cultures (field maple, wild cherry, ash, maple, beech, dogwood etc.), it was considered favorable for most species listed, and the proposal is to use higher proportions of indigenous deciduous species on the moderately to strongly eroded lands where soils are less profound.

REFERENCES

- Ciortuz, I., 1999** – *Acțiunea de ameliorare silvică a terenurilor degradate și principiile acestei acțiuni*, Volumul Pădurea românească în pragul mileniului III, Editura Univ. Transilvania, Brașov.
- Constandache, C., 2005** - *Cercetări privind regenerarea sub masiv și introducerea la adăpostul masivului a unor specii autohtone valoroase în arboretele de pe terenuri degradate*, Analele ICAS, nr. 47, pag. 63-81, București.
- Muntean, O.L., 2005** - *Evaluarea impactului asupra mediului*, Editura Casa Cărții de Știință, Cluj-Napoca.
- Untaru, E. 1995** – *Compoziții și scheme de împădurire a terenurilor erodate de apă și a celor cu fenomene de deplasare gravitațională*, Îndrumări tehnice, ICAS București.
- Sandu, Tatiana, 2015** – *Reconstrucția ecologică a peisajelor*, Editura Ion Ionescu de la Brad, Iași.
- Traci, C., Untaru E., 1986** – *Comportarea și efectul ameliorativ și de consolidarea culturilor forestiere pe terenuri degradate din perimetre experimentale*, ICAS, București.

