

GENERAL CHARACTERIZATION OF THE TREES FROM THE PRODUCTION UNIT No. V-DEJ(CLUJ COUNTY) WITH A VIEW TO THE ECOLOGICAL RECONSTRUCTION OF THE ZONE

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Abstract. *The thesis presents aspects concerning the general characterization of the arboreta from the production unit No. V Dej with a view to establishing the species that will be used within the process of ecological reconstruction of the degraded fields in the area. The structure according to species of the trees was determined, the age, the consistency, the production classes, the phytosanitary state as well as the structure of the under arboreta and of the herbaceous forest. The level of forestry vegetation is FD2 and FD1. The main natural types of forests within the production unit V Dej are the common oak grove and the oak grove. Varying with their consistency: 88.3% almost full, 8.8% full consistency, 2.6% with thinned out consistency, 0.3% with degraded consistency. The largest share is taken by the III rd class of production, followed by the IV th and the II nd class and with a smaller percentage by the V th class. There is no arboretum of the I st class of production. The under arboretum is made up of the following species: wild rose, hazel nut, hawthorn, cornel tree, privet, common elder, sloe tree.*

Keywords: arboretum, under arboretum, forest

INTRODUCTION

The lands affected by the more advanced degradation processes can be improved and given back to the productive circuit (forestry) only through the implementation of an improving complex of works, in which the main link consists of the afforestation works, known being the fact that the forest vegetation is the most efficient means to gradually diminish and then to stop the degradation processes caused by water (Costandache, 2010, Ivan, 2010, Slee, 2004, Zhang, 2002).

In order to establish the afforestation formula that will be used in the process of the ecological reconstruction of the degraded fields a special importance is held by the study of the structural and qualitative characteristics of the arboretum within the production unit in which the area taken into study lies so as to learn the state, structure, stability, the bioproductive, bioprotective and bioregenerative capacity of the forests in the zone. Knowing the dynamics of the development of the arboreta and the tendencies of their further development there also can be established the directions that are to be followed to guide them, by projecting the forest improving works in order to conceive an as good as possible structure with a view to reconstruct the zone ecologically.

The purpose of the thesis is to study the general structure of the arboreta, under arboreta and of the herbaceous forest within the production unit V Dej under the structure aspect with a view to species, age, production classes, stages and phases of development, of the ratio between the vegetation levels in order to establish the species that will be used in process of ecological reconstruction of the degraded fields in the area.

MATERIAL AND METHOD

The surface taken into study is part of the production unit V Dej, the component forests of the unit being administered by the Ministry of Environment, the Forests Department, through its territorial unit the Forestry of Dej which belongs to Romsilva Branch R. A. Cluj.

The surface of the occupied fund by the arboretum is of 1508 ha from the total of 1603,4 ha the rest being represented by the surfaces unoccupied by forest vegetation due to the presence on the sloping sides, with unevolved soils, with small edaphic volume because of the content in skeleton. The forest vegetation here is absent or has the aspect of shrubs. The unit is distributed in 14 bodies of forest which are made up of forest planning units with different surfaces.

For the study of the forest vegetation the following determinations have been undertaken:

- The structure of the arboreta
- The structure on species of the arboreta
- The structure of the arboreta varying with the consistence
- The structure of the arboreta as against age
- The structure of the arboreta on production classes
- The structure of the arboreta on stages and phases of development
- The phytosanitary structure of the arboreta
 - General characterization of the sub arboreta
 - General characterization of the herbaceous forest
 - Correlative relations among the vegetation levels
 - The typological analysis and sorting of the forest

RESULTS AND DISCUSSION

The forest administration before nationalization was done in simple boscage, the main sort pursued being the wood for fire and on the second place for rural constructions. Once the forests from the production unit V Dej got into the property of the state (1948) forest plantings were undertaken which had in view the conversion from young trees to wood and their rejuvenation from seed. As a consequence of the exploitation works from the previous decades resinous trees were mainly introduced, these ones being out of their vegetation area. In the last period the planting of resinous trees was stopped and the introduction of autochthonous species which has gradually led in the next decades to an improvement of the quality and quantity of the forestry fund. At present, the majority of the arboretum results from young trees and the percentage of 63,1% of derived arboreta is due to the process of regeneration.

The structure of the arboreta shows the following characteristics

The structure on species of the arboreta indicates the present composition of the production unit and varying with the proportion of the species and with the qualitative and quantitative results it can be prognosticated which of these can be used in the process of ecological reconstruction of the degraded zones within the production unit by the adequate proposed measures.

Given the local and vegetation conditions in which the production unit V Dej is situated a mixed foliage forest should dominate where the common oak should make up an

arboretum together with the hornbeam, the common maple, the maple, the beech, etc. The results show that within the production unit the hornbeam is found in a greater proportion (Fig.1) whose expansion endangers the common oak, this expansion being favoured by the repeated cuttings in boscage.

It can also be noticed an important presence of the resinous (spruce fir, black pine and pine) introduced here as a consequence of the politics led in the previous years (the planting of resinous trees). These species are not situated in their natural perimeter and as a consequence the qualitative and quantitative results are negative in comparison with a development in their area. The beech has reduced proportions and due to this fact the raising of the proportion of this species will be pursued in the future.

Among the species included at the various resinous heading we can note the presence of the Douglas fir, of the larch tree and at miscellaneous hard and soft there are present in vegetation specimens of mountain maple tree, ash tree, lime tree, cherry tree, dwarf weeping willow, elm tree, Turkey oak, alder tree. They have an important role from the point of view of the ecological diversity of the zone, but a careful supervision and selection of these ones is recommended so that their proportion should be preserved in the case of future arboreta without becoming a limitative factor in the development of the basic species.

The structure of the arboreta varying with their consistency shows that the biggest proportion of the production unit is held by the arboretum with the almost full consistency 88,3% followed by the full consistency contained by the arboretum which occupies a surface of 132,7 ha, that is 8,8% after which, with a small percentage 2,6%, there comes the arboretum with rarefied consistency, and those with degraded consistency only 0,3%.

From this point of view the situation within the production unit is good, the arboretum have an almost full consistency.

The surface with rarefied consistency of 2,6% within the production unit is due to the pollution effect caused by the cement factory in Dej. The effect of the pollution is felt differently in the affected forest planning units, the phenomenon making itself present in the forest planning unit 19D and 19C. The degraded consistency, although it appears in a very small percentage of the surface of the production unit 0,3%, is due to the fact that in the forest planning unit 19F the heaviest pollution took place caused by the activity of this factory.

The structure of the arboreta varying with age shows that the arboreta within the production unit V Dej are divided in five classes of age. The first class from 1-20 years holds 39% of the surface, the second from 21-40 years holds 26.2%, the third from 41-61 years holds 32.6%, the fourth from 61-81 years only 0.1%, the one from 81-100 years does not hold not even a percent, while the one from 100-120 years holds 2.1%.

Varying with age, the arboreta which are part of the production unit V Dej, are an exact reflection of the forest administration from the past. The first three classes of age hold the majority percentage so that the arboretum with big ages do not hold a large share thus being a weak production unit from an economical point of view, because they do not accomplish important productions of main quality products. Because of the measures that were taken, forestry formations have been built, which if properly administered can become a factor of balancing of this shortcome.

The structure of the arboreta on production classes within the production unit V Dej represents a state of fact of these ones that shows what judicial measures of the forest are to be taken to ensure an as good as possible development of the forest so as to obtain

some quality arboreta which might accomplish better productions both quantitatively and qualitatively. A complex of measures is about to be put into practice in order to promote the local autochthonous species, genetically capable of producing arboreta of superior quality.

The biggest share is held by the III-rd class of production, followed by the IV-th and the II-nd class, and with a small percentage the V-th class. There are no arboreta from the I-st class of production.

This situation can be improved by promoting the valuable autochthonous species such as the common oak and the the beech which can produce surfaces with forest of superior production classes. Because of the existence of the species resulted from the young trees and of the fact that the necessary works of maintenance and support of the species mentioned above have not been done, this depreciation of the forest within the production unit V Dej has taken place.

The structure of the arboreta on stages and phases of development shows that the biggest share is held by the PANIS with 51,6%, small wood and PRAJINIS follow with 14,1% and respectively with 12% after which with approximately equal values 9,3 and 9,2 follow the seed bed respectively the thicket and the smallest percentages of 2% and 1.8% are held by the medium wood and MIELIS (Table 1)

Table 1

The structure of the arboretum on stages and phases of development

Occupied surface-ha-	Phase of development							
	Seed bed	Thicket				Small wood	Medium wood	Total
	140.2	138.7	27.1	181.9	778.2	212.7	30.2	1508
% of the production unit	9.3	9.2	1.8	12	51.6	14.1	2	100

The phyto-sanitary structure of the arboretum which make up the production unit V Dej is normal. The pollution of plots 18 and 19 from the cement factory from Dej is to be noted. This pollution is also reflected upon the consistency of the arboreta from those plots. Another aspect concerning the phyto-sanitary state of the arboreta is the drying phenomenon of the oaks from 1985-1986 which affected the whole forestry region, fact which determined the fact that the proportion of the hornbeam is bigger in the production unit. These drying phenomena have not taken place any more. We can find a number of dried, sick or bug-eaten trees, but on isolated surfaces. Damages occur in some cases because of the grazing which is found in the arboretum limitrophe to the grazing fields endangering the accomplishment of the state of massive.

The general characterization of the sub arboreta

Within the production unit V Dej there is sub arboretum which fulfills a positive role both for its participation to the building of the state of massive as well as for the improvement, protection and preservation of the soil. Besides these main roles it also serves as a habitat for a series of birds useful for the forest or as shelter for some species of game. It is met especially at the skirt of the forest but also in its interior. The encountered species provide and produce accessories (berries).

The sub arboretum is made up of the following species: wild rose, hazel nut, hawthorn, cornel tree, privet, common elder, sloe tree. It stretches over 0.2% of the surface of the arboretum and it has a mixed coverage (both grouped as well as uniform).

General characterization of the herbaceous forest

The herbaceous forest constitutes the subsystem having the most reduced dimension which integrates the totality of the herbaceous plants:moss and lichens. It receives and reflects perfectly the conditions of the soil and of the arboretum thus being a differentiated indicator,of great value,of these conditions. Within the production unit V Dej this subsystem is found again under the form of the present species and associations among the species presented in Table 2.

Table 2

Species and associations among species in the herbaceous forest

Species and associations	% of the surface
Carex pilosa	47.2%
Asperula-Asarum	24.8%
Asperula-Stelaria	13.5%
Poa-Carex	8.4%
Cystus-Genisia	2.3%
Brachypodium pulmonares	1.8%
Vaccinium	1.1%
Festuca-Altissima	0.5%
Carex-Argrostis	0.4%

The species in the herbaceous forest have a coverage of 30% of the forest surface and do not raise any major problems in the surfaces where regeneration is pursued. Yet,there are some fields where the coverage with herbs is dangerous because it covers the soil on important strips preventing the normal development of the seeds. These fields hold a small proportion,though.

The correlative relations among the vegetation levels

Correlative relations among vegetation levels meet within the production unit V Dej through the interactions and the interconnections that occur among them. Thus the existing arboretum with young ages between 1-80 years old influence the development of the inferior levels of vegetation.

The sub arboretum on its turn protects and helps to fulfill the state of massive and it actions on the soil through its protection and conservation,a very important role on the other hand as there are underdeveloped soils or unstable ones and thus by the presence of the sub arboretum its stability in the future is preserved. The herbaceous blanket appears in the less bright zones and constitutes itself a factor of stability for the soils.

The analysis and the typological classification of the forest

The main natural types of forests within the production unit V Dej are the common oak grove and the oak grove. The types of forests are presented in Table 3.

CONCLUSIONS

The structure according to the species of the arboretum indicates the presence in a bigger proportion of the hornbeam whose expansion endangers the common oak. The beech is found in smaller proportions.

At the same time it can be noticed an important presence of the resinous(spruce fir,black pine and pine) although it is not their natural perimeter and as a consequence the qualitative and quantitative results are negative in comparison with a development in their area. There also appear:Douglas fir,larch tree,mountain maple tree,ash tree,lime tree,cherry tree,dwarf weeping willow,elm tree,Turkey oak,alder tree. They have an important role

from the point of view of ecological diversity of the zone, but it is recommended a careful supervision and selection of these ones so as to preserve their proportion in the case of future arboreta without becoming a limiting factor in the development of the basic species.

The levels of characteristic forest vegetation are FD2 and FD1.

The main natural types of forests within the production unit V Dej are the common oak grove and the oak grove.

Varying with their consistency the structure is as it follows: 88.3% almost full, 8.8% full consistency, 2.6% with thinned out consistency, 0.3% with degraded consistency. The greatest share is held by the III rd class of production, followed by the IV th and II nd class and with a lesser extent by the V th class. There is no arboretum belonging to the I st class of production.

The sub arboretum is made up of the following species: wild rose, hazel nut, hawthorn, cornel tree, privet, common elder, sloe tree. It stretches over 0.2% of the surface of the arboretum and it has a mixed spreading (both grouped as well as uniform).

Table 3

Types of forest

Code	Type of forest Name	Covered surface -ha-	Productivity		
			%	Sup.	Med.
513.1	Slope common oak grove and <i>Luzula luzuloides</i>	120.6	8	-	120.6
517.2	Rocky region common oak grove	30.2	2	-	30.2
512.2	Common oak grove with <i>Carex Pilasa</i>	135.7	9	-	135.7
531.2	Common oak grove-mixed foliage forest with beech of medium productivity	30.2	2	-	30.2
531.4	Hill mixed foliage forest with common oak and beech	618.3	41	-	618.3
532	Common oak grove-mixed foliage forest	60.3	4	-	60.3
532.4	Hill mixed foliage forest with common oak	437.3	29	-	437.3
613.2	Slope oak grove and plateaus from the hill area	15	1	-	15
613.3	Slope oak grove and plateaus from the hill area	30.2	2	-	30.2
614.2	Low terraces oak grove and old water meadows from the hill area	30.2	2	-	30.2
	Total of production units	1508	100	-	1508

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