

Genetika a šlechtění lesních dřevin

Forest Tree Seed Sources in Serbia

Professor Dr. Vasilije Isajev,

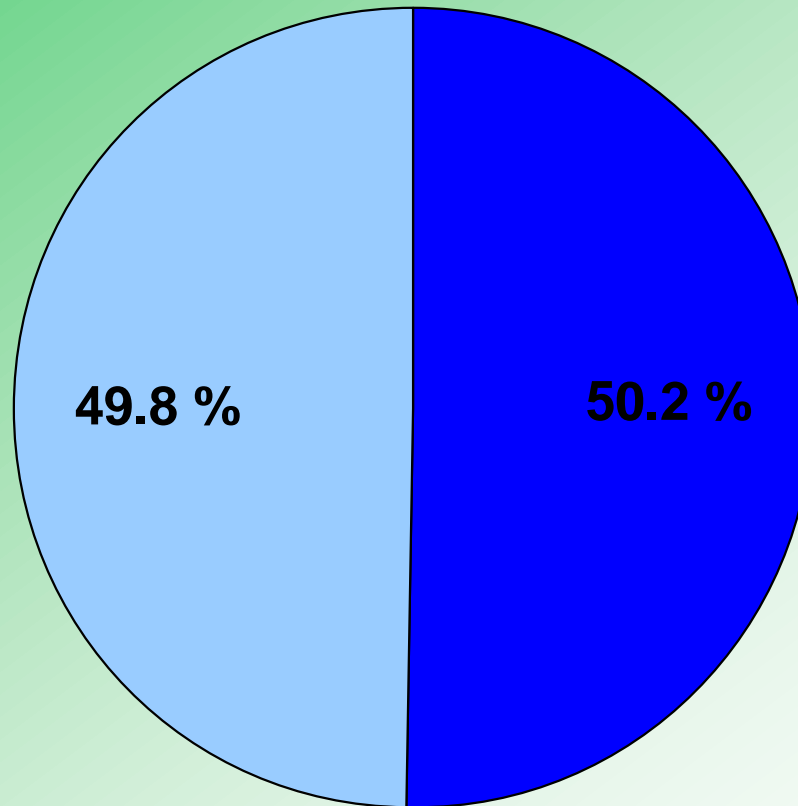
Faculty of Forestry, Belgrade University, Serbia



INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

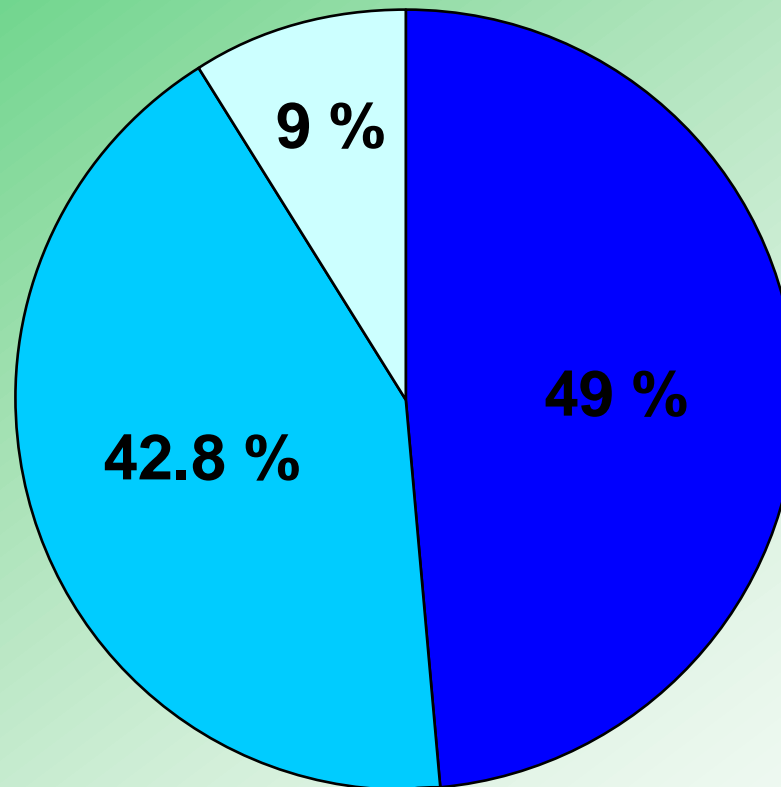
Growing stock in Serbia and Montenegro covers 39.3% of state territory, i.e. 2.85 million ha, of

which are:



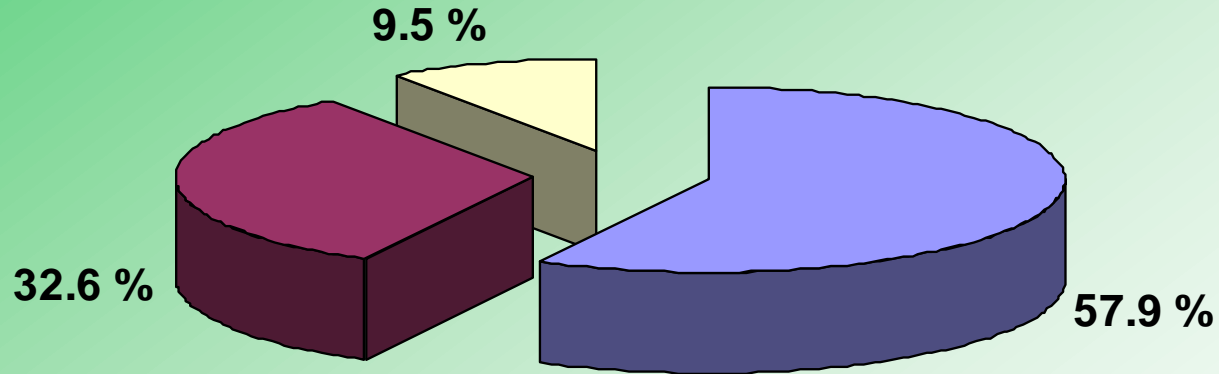
■ State forests ■ Private forests

Forest categories



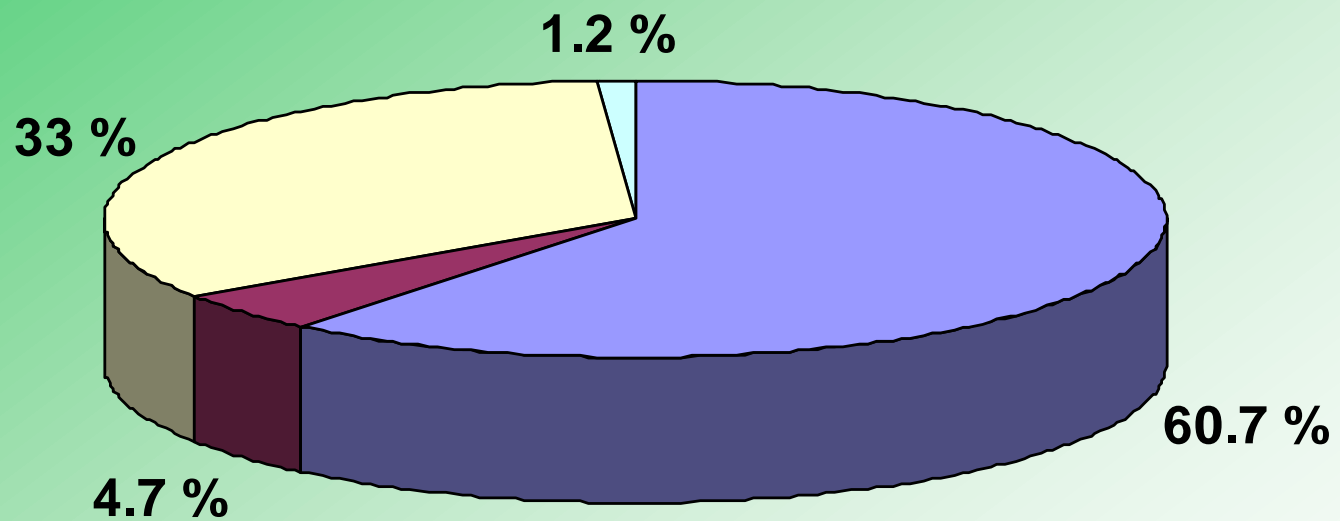
■ forests and plantations ■ coppice forests ■ thickets and brushwood

Geographic - floral elements of forest trees and shrubs species:



■ Central European ■ Pontic ■ Mediterranean

Total area of forests are covered by:



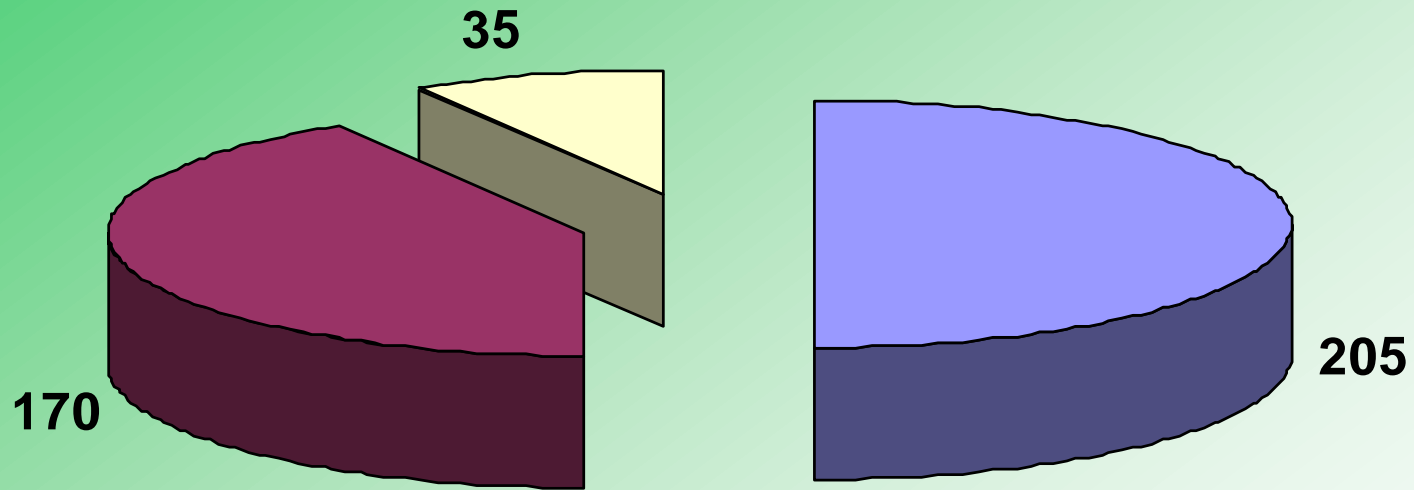
■ broad leaf stands

■ conifer stands

■ mixed stands b-c

■ mixed coniferous stands

Forests are composed of:

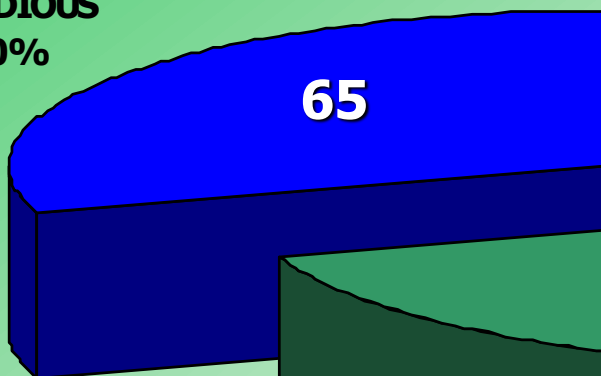


■ autochthonous species ■ broadleaf ■ coniferous

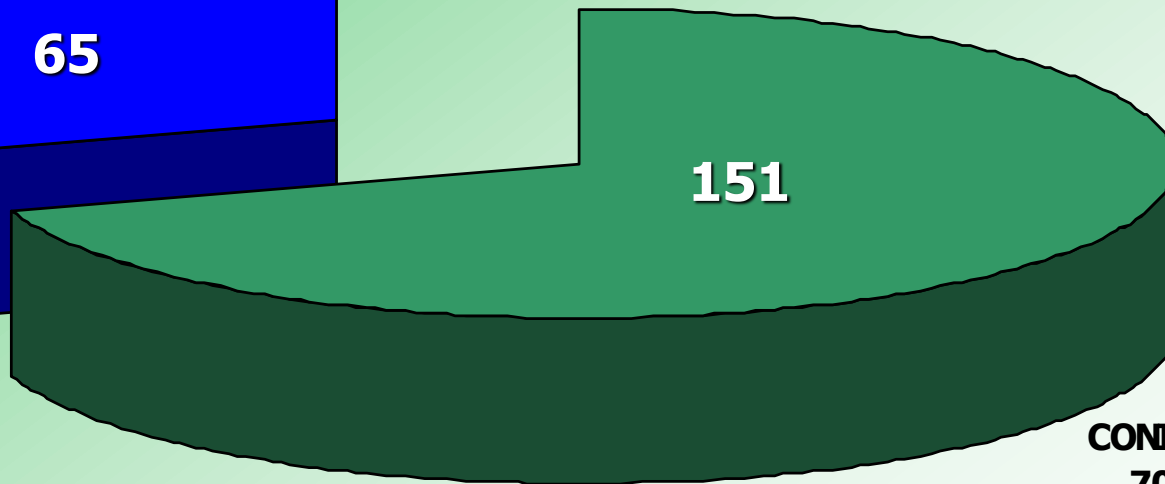
TOTAL NUMBER OF SEED STANDS IN SERBIA 216

**DECIDIOUS
30%**

65



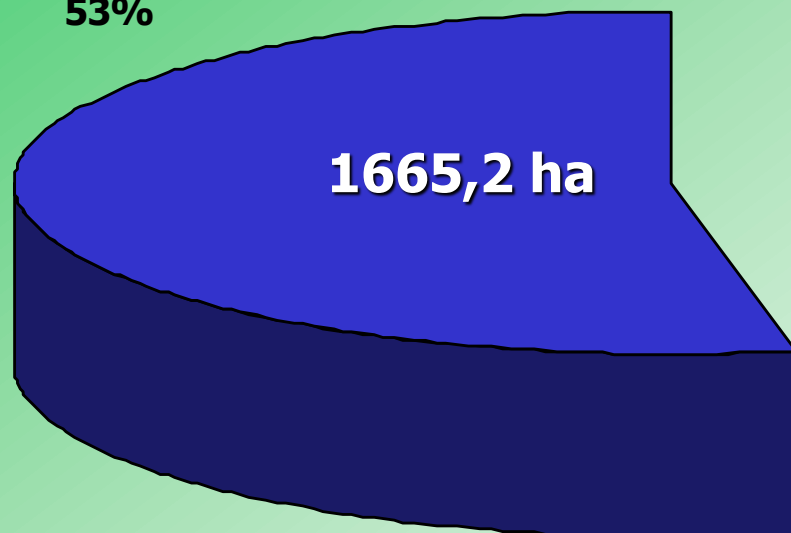
151



**CONIFERS
70%**

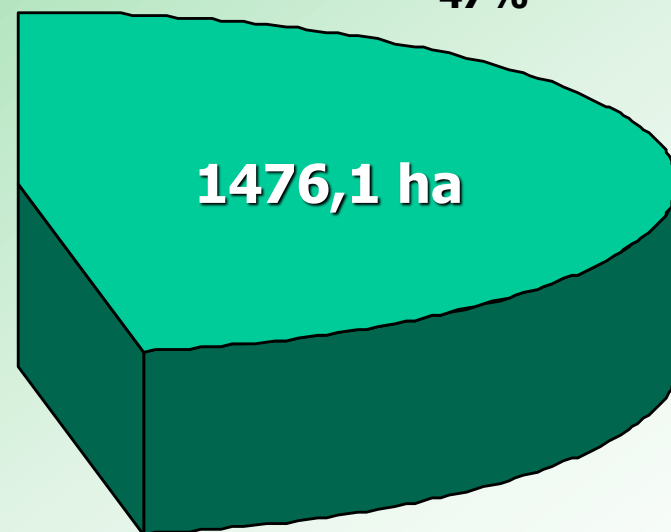
TOTAL AREA OF SEED STANDS IN SERBIA 3141,3 ha

DECIDIOUS
53%



1665,2 ha

CONIFERS
47%



1476,1 ha

DISTRIBUTION OF NATURAL SEED SOURCES IN SERBIA



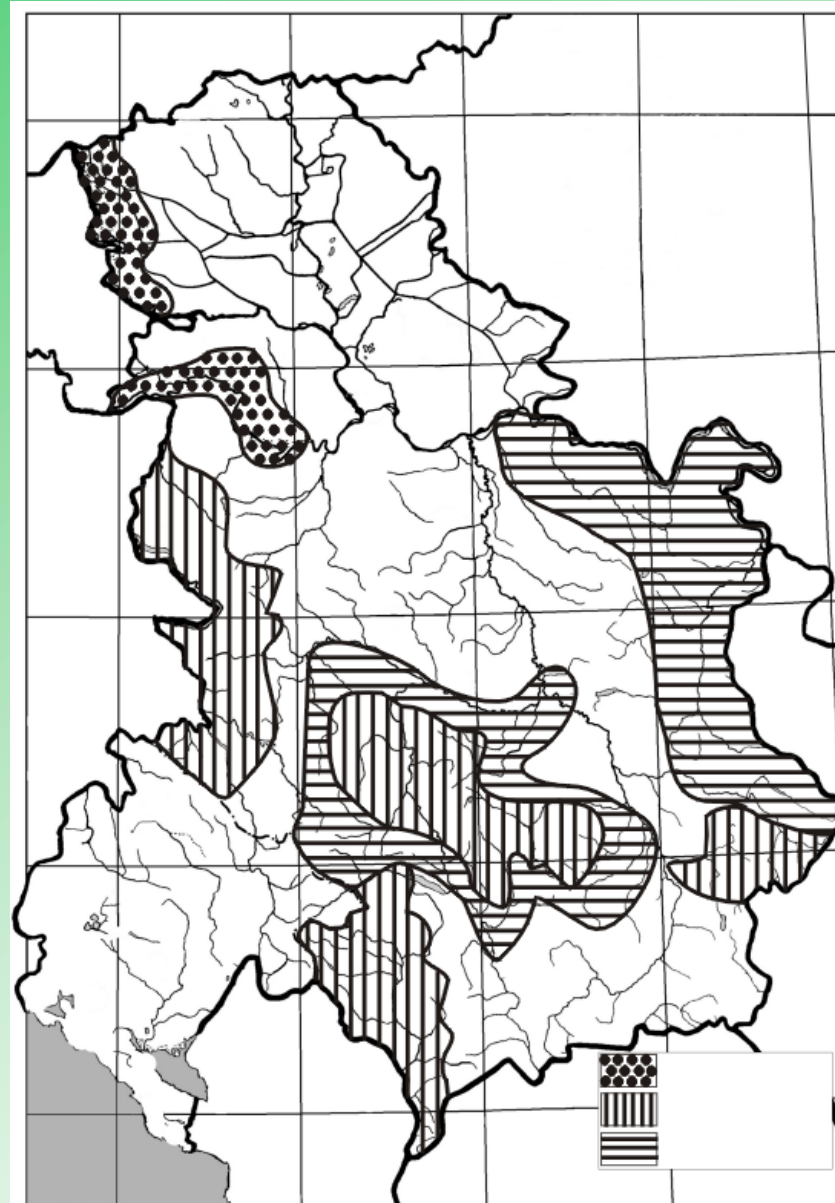
**Seed stands
pedunculate oak**



**Seed stands
mostly conifers**



**Seed stand mostly
beech and oak
species**



SEED STANDS OF FOREST TREE SPECIES IN SERBIA

Gymnosperms species		Angiosperms species	
Species	number of seed stands	Species	number of seed stands
<i>Picea abies</i> (L.) Karst	37		
<i>Picea omorika</i> Panč.	4	<i>Quercus robur</i> L.	11
<i>Pinus nigra</i> Arn.	5	<i>Quercus petraea</i> Liebl.	7
<i>Pinus sylvestris</i> L	22	<i>Fagus moesiaca</i> (Domin.) Czezcott.	8
<i>Abies alba</i> Mill.	16	<i>Acer pseudoplatanus</i> L.	9
<i>Pseudotsuga menziessi</i> (Mirb.)Frnaco	14	<i>corylus colurna</i> L.	6
<i>Pinus strobus</i> L.	13	<i>robinia pseudoacacia</i> L.	5
<i>Larix decidua</i> Mill.	14	<i>other species</i>	19
<i>other species</i>	26		
total number area in ha	151 1476,1	total number area in ha	65 1665,2

Seed stand natural:
Scots pine (*Pinus
sylvestris* L.)

National park "Tara"
– western Serbia





Seed stand natural:
Austrian pine
(*Pinus nigra* Arn.)

National park "Tara"
– western Serbia

Seed stand natural:
Norway spruce
(*Picea abies* L.)

Management unit:
"Zlata 1", comp.
68a



Seed stand natural: Silver
Fir (*Abies alba* Mill.)

Management unit:
"Zlata 1", comp. 89a

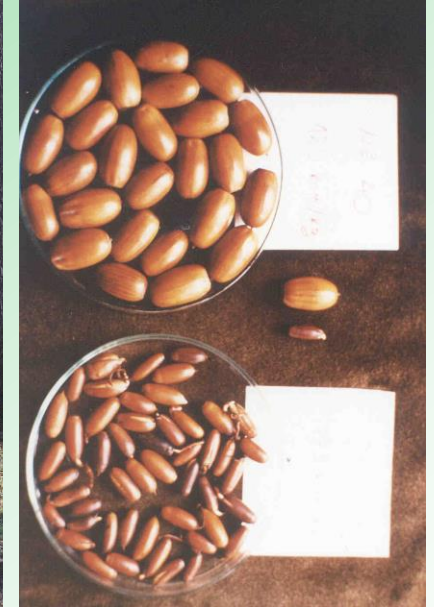


SEED STANDS PLANTED OF DOUGLAS FIR MU "ZELJIN" comp. 35f



PEDUNCULATE OAK SEED STANDS

S 02.02.01.06



MU Vinična- Žeravinac Puk, 14 a

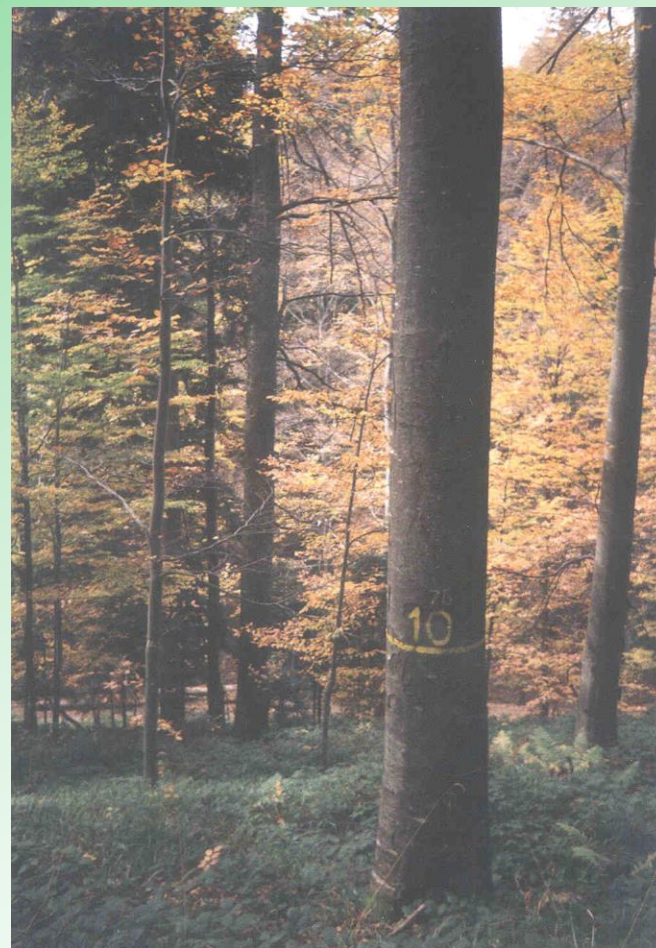
BEECH SEED STANDS MU "KUKAVICA II", comp. 54



BEECH SEED STANDS MU "GOČ - GVOZDAC", comp. 11a



SELECTED BEECH TEST TREES MU "GOČ-GVOZDAC", 11 a, IN T.B. GOČ



SEED ORCHARD OF FOREST TREES IN SERBIA

Clonal seed orchards:

species: **Quercus robur**
YEAR OF ESTABLISHING: **1988**
total area: **7 ha**
number of genotypes: **86**
number of ramets: **2520**

species: **Picea abies**
YEAR OF ESTABLISHING: **1986**
total area: **1,5 ha**
number of genotypes: **30**
number of ramets: **2300**

Generative seed orchard:

species: **Picea omorica**
YEAR OF ESTABLISHING: **1987**
total area: **3 ha**
number of half-sib lines: **50**

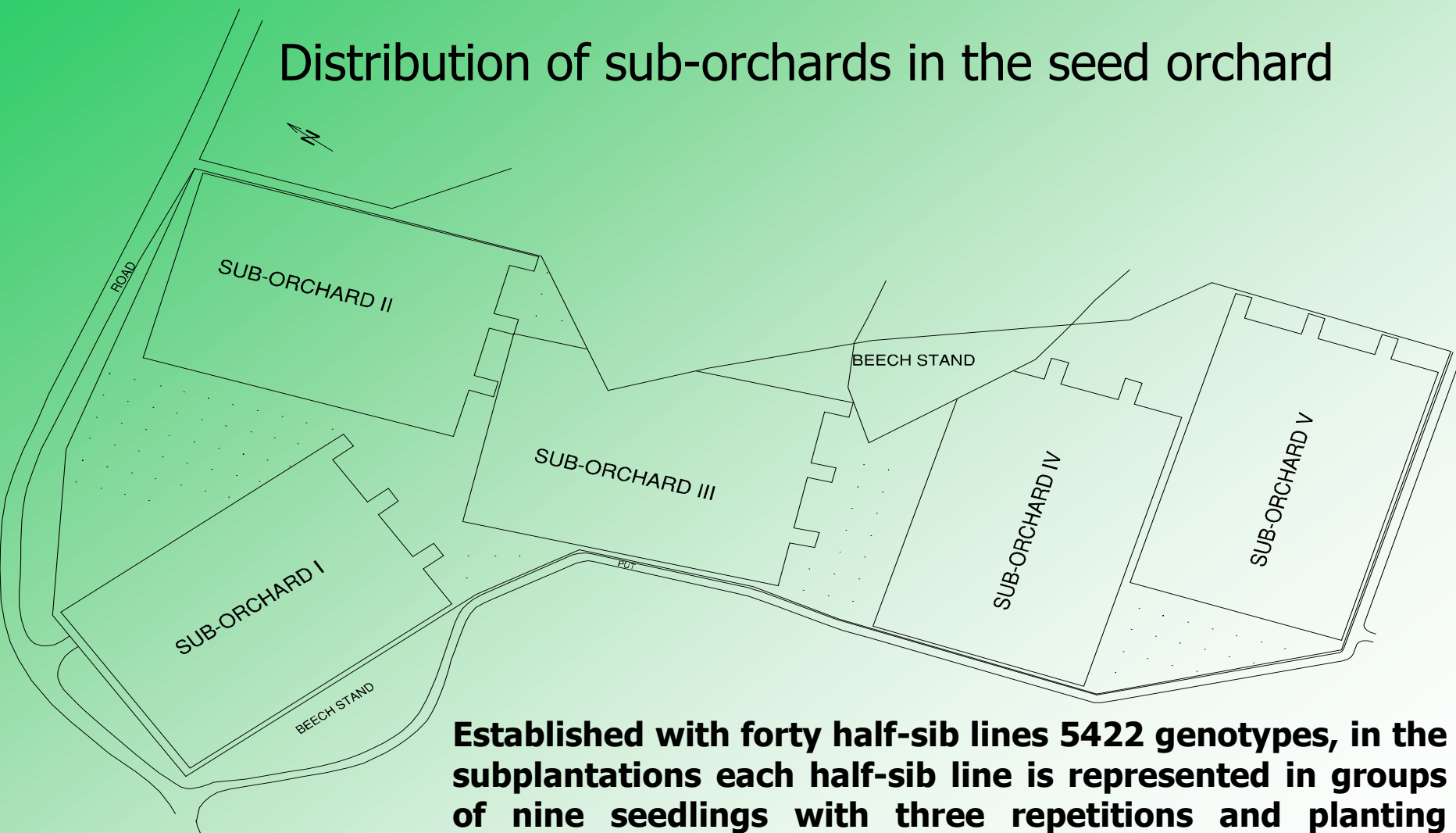
species: **Pinus nigra**
YEAR OF ESTABLISHING: **1991**
total area: **3 ha**
number of half-sib lines: **40**

species: **Balkan maple**
YEAR OF ESTABLISHING: **1992**
total area: **2,5 ha**
number of half-sib lines: **30**

Generative seed orchard of Austrian pine (*Pinus nigra* ssp. *gočensis* var. *illyrica*) metapopulation structure

R 1:1500

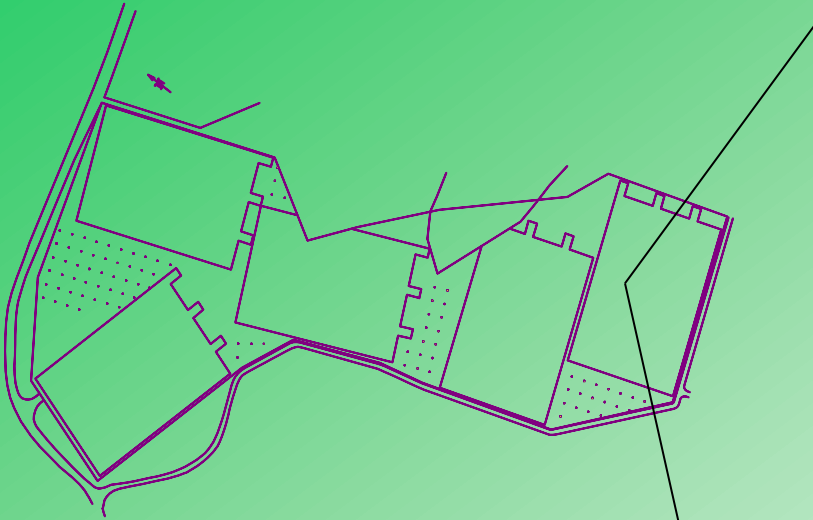
Distribution of sub-orchards in the seed orchard



Established with forty half-sib lines 5422 genotypes, in the subplantations each half-sib line is represented in groups of nine seedlings with three repetitions and planting density 2x2 m

Year of established: 1991, Area: 2,70 ha

Plant pattern in the subpopulation with 40 half-sib lines:



The first repetition

– **I** systematic pattern;

The second one

– **II** reciprocal;

The third one

– **III** random.

	I										II										III									
1	1	1	14	14	14	27	27	27	13	13	13	26	26	26	40	40	40	17	17	17	11	11	11	39	39	39				
1	1	1	14	14	14	27	27	27	13	13	13	26	26	26	40	40	40	17	17	17	11	11	11	39	39	39				
1	1	1	14	14	14	27	27	27	13	13	13	26	26	26	40	40	40	17	17	17	11	11	11	39	39	39				
2	2	2	15	15	15	28	28	28	12	12	12	25	25	25	39	39	39	10	10	10	33	33	33	36	36	36				
2	2	2	15	15	15	28	28	28	12	12	12	25	25	25	39	39	39	10	10	10	33	33	33	36	36	36				
2	2	2	15	15	15	28	28	28	12	12	12	25	25	25	39	39	39	10	10	10	33	33	33	36	36	36				
3	3	3	16	16	16	29	29	29	11	11	11	24	24	24	38	38	38	1	1	1	37	37	37	35	35	35				
3	3	3	16	16	16	29	29	29	11	11	11	24	24	24	38	38	38	1	1	1	37	37	37	35	35	35				
3	3	3	16	16	16	29	29	29	11	11	11	24	24	24	38	38	38	1	1	1	37	37	37	35	35	35				
4	4	4	17	17	17	30	30	30	10	10	10	23	23	23	37	37	37	9	9	9	40	40	40	34	34	34				
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10	10	10	23	23	23	36	36	36	4	4	4	17	17	17	31	31	31	4	4	4	38	38	38	18	18	18				
11	11	11	24	24	24	37	37	37	3	3	3	16	16	16	30	30	30	3	3	3	22	22	22	21	21	21				
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13	13	13	26	26	26	39	39	39	1	1	1	14	14	14	28	28	28	8	8	8	12	12	12	16	16	16				
40	40	40																27	27	27				2	2	2				
40	40	40																27	27	27				2	2	2				
40	40	40																27	27	27				2	2	2				

Austrian pine metapopulation seed orchard



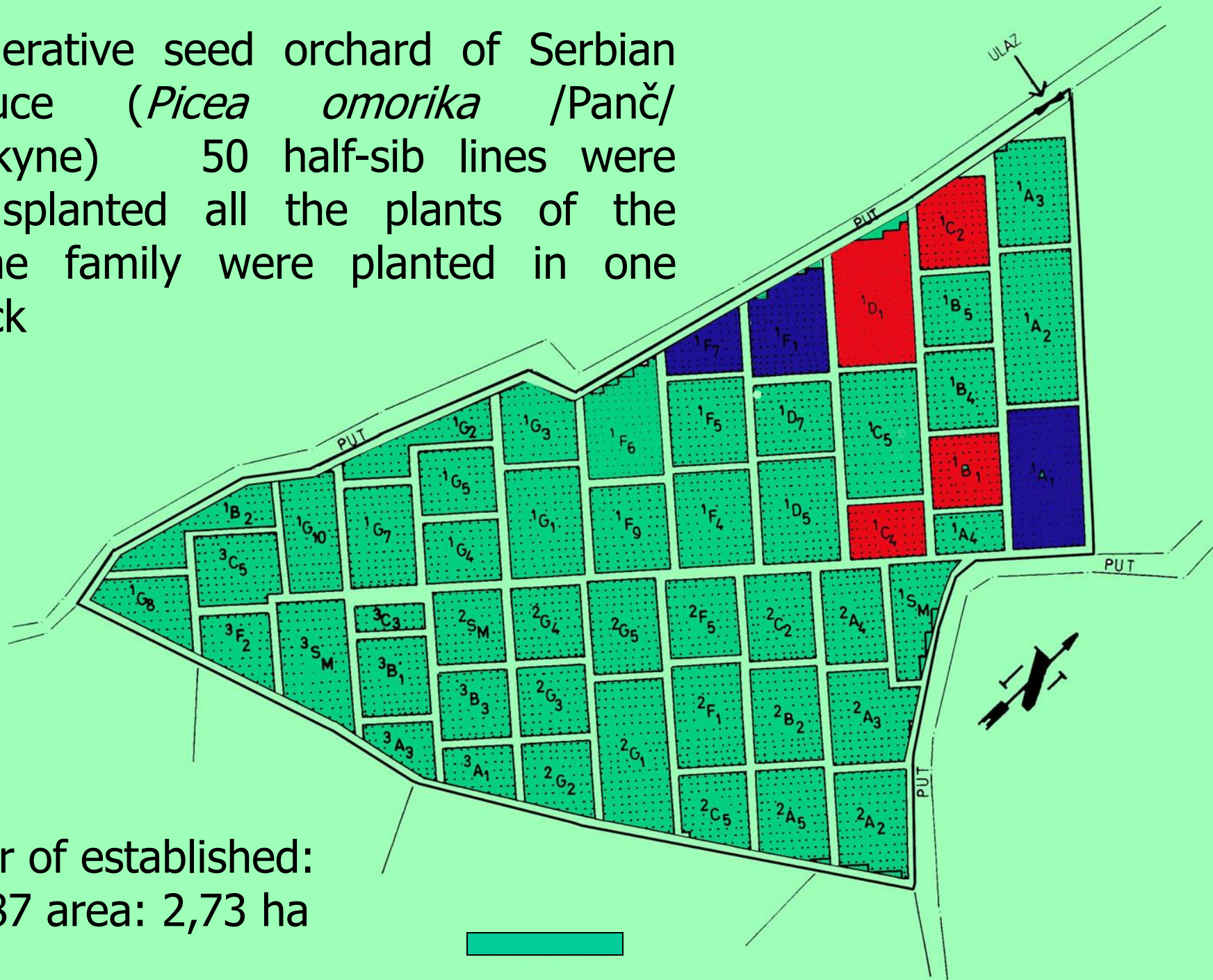
Generative seed orchard of
Serbian spruce (*Picea
omorika*/ Panč/ Purkyne)



Group of trees of Serbian
spruce



Generative seed orchard of Serbian spruce (*Picea omorika* /Panč/Purkyne) 50 half-sib lines were transplanted all the plants of the same family were planted in one block

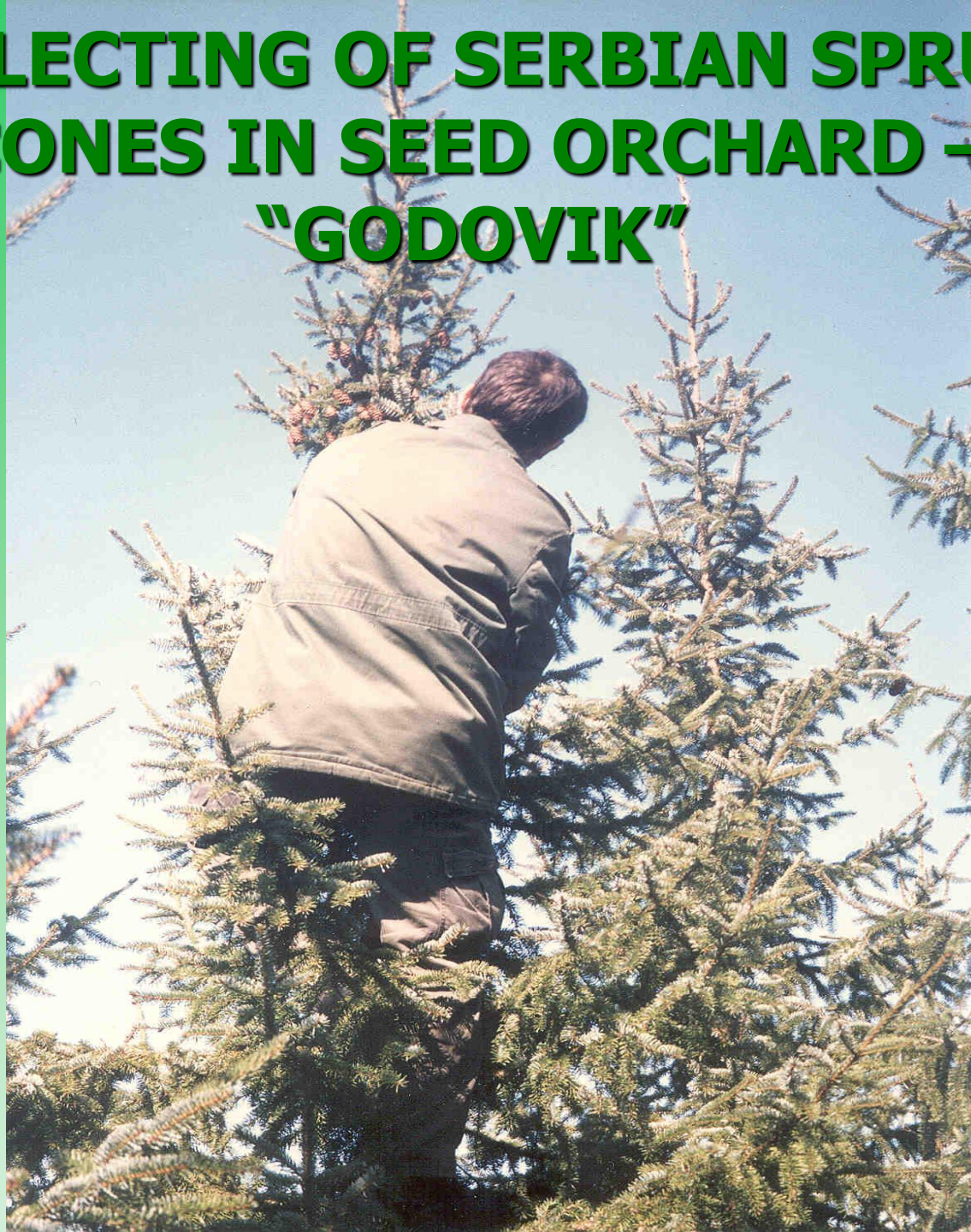


Year of established:
1987 area: 2,73 ha

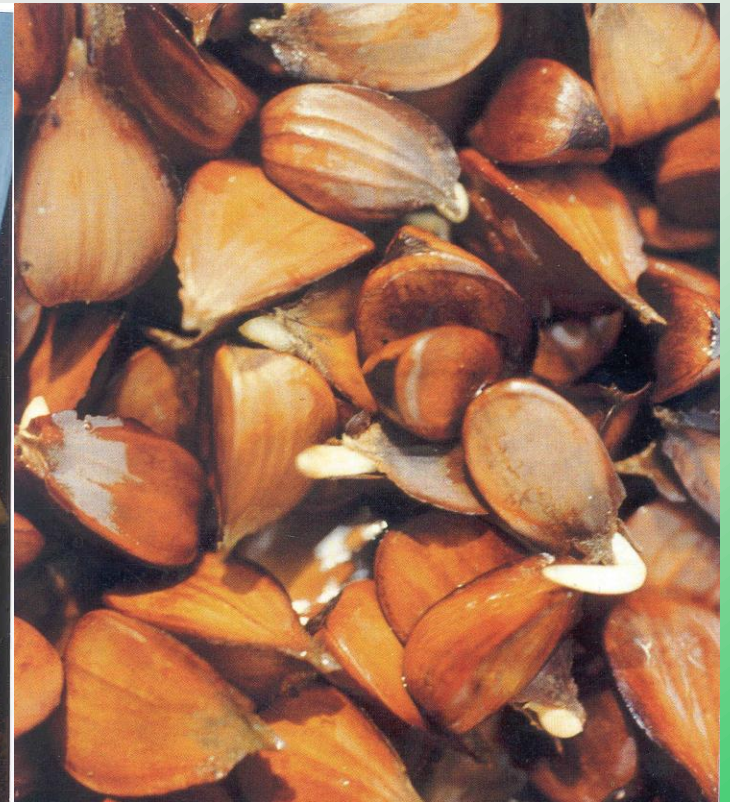
Planting pattern of Serbian spruce half-sib lines in block

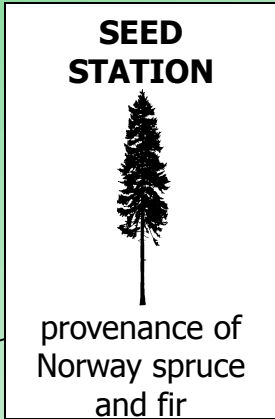
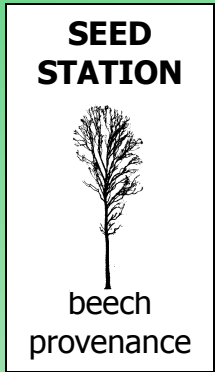
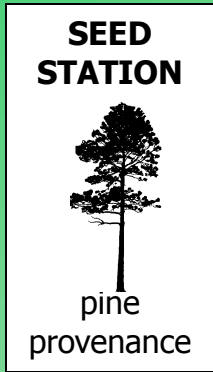
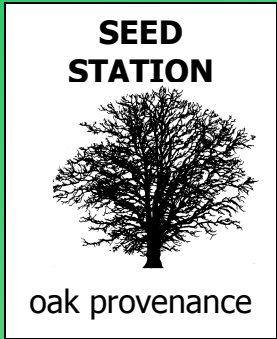


COLLECTING OF SERBIAN SPRUCE CONES IN SEED ORCHARD – “GODOVIK”

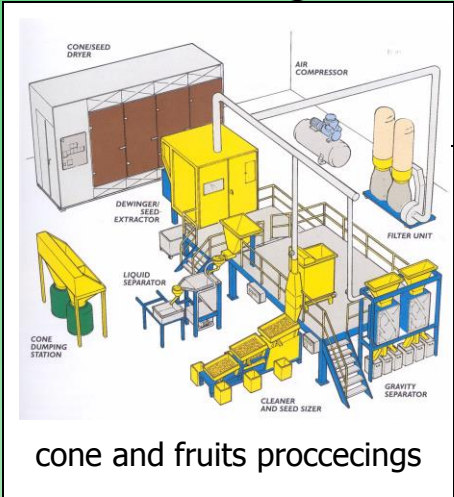


TESTING OF BEECH NUTS





FOREST SEED CENTRE



Tree and shrub gene bank and polen collection

THE ENACTMENT AND APPLICATION OF THE NEW LAW OF FOREST SEED WILL ENHANCE:

The directed utilisation of the genetic potential of natural - seed stands and artificial seed plots – seed orchards, of tree species, which is the base of the transition from the insufficiently programmed and synchronised to the targeted production of forest seeds;

The economic base of producing seed material of tree species, by conserving and using its biological properties, according to international quality standards;

The competitiveness on home and foreign markets by maintaining the quality and quantity of forest tree and shrub seed production;

The conservation of tree and shrub biodiversity.

