

Reforestation after disturbances in planted Norway spruce stands – influence of silvicultural techniques on seedlings field performanceMartina Dodan², Sanja Perić²²Croatian Forest Research Institute, Jastrebarsko, Croatia (martinat@sumins.hr; sanjap@sumins.hr)

Reforestation after forest decline can be difficult. Selection of silvicultural techniques used during reforestation is crucial for good reforestation outcome, also lowering costs of labour and reproductive material used. Climate change will add to complexity of silvicultural interventions. Present and predicted disturbance regime points to the increase of areas for reforestation in Europe, thus creating the need for update of knowledge on regeneration methods and seedling types used. Newly gained knowledge acts as a background for national forestry and nursery programmes. Study examines area after bark beetles attack and wind throw in planted Norway spruce stand after it was reforested by seeding and planting of European beech and Silver fir at European beech and Silver fir dominated forest area (placed on the crossroads of Central and Southeast Europe). Analysed data track seedlings field performance (height, basal diameter, quality indices and height increment) during three consecutive years (2010–2013) and again eight year after canopy loss (2017). In addition, we discuss the issues of different silvicultural interventions (direct seeding, planting of different type of seedlings, intensities of canopy loss, site preparation techniques) during reforestation of area after disturbances in hilly and mountain areas. Review includes management and legislative legacy as well as state of the art of contemporary silviculture related to reforestation practices of Southeast Europe, with Croatia as a case study.

C2s: PHYSIOLOGY AND GENETICS**Morphological, environmental and genetic attributes of wolf trees' morphological types in Scots pine (*Pinus sylvestris* L.)**Ekaterina Makrickiene¹, Gediminas Brazaitis¹, Darius Danusevičius¹¹Vytautas Magnus University, Kaunas, Lithuania (ekaterina.makrickiene@asu.lt; gediminas.brazaitis@asu.lt; darius.danusevicius@asu.lt)

Wolf trees are super-dominant trees with wide crowns and thick branches. Usually such trees are undesired in the stand due to their odd morphological characteristics; however, such trees can be valuable as habitat, biomass source or for genetic conservation. In our study we approved the existence of two wolf trees' morphological types in Scots pine (*Pinus sylvestris* L.). With the use of environmental and progeny analysis, dendrochronological and genetic methods we assessed the wolf trees in Scots pine from several points of view. This allowed us to find out the differences both between the regular trees and wolf trees and between the two wolf trees' morphological types. Both morphological types were genetically different from the regular Scots pine trees, what resulted in significant differences between the two wolf tree morphological types and the regular trees in their responses to soil fertility and mezorelief. Comparing the annual increments of wolf trees and regular trees, we could observe faster growth of the wolf trees up to the age of 35 years. Sensitivity to the climatic factors strongly depended on the wolf tree morphological type. The second morphological type exhibited a stronger response to precipitation, while the control trees and the first wolf tree morphological type had stronger responses to temperature. Progeny analysis showed that as early as the first year of growth, the wolf tree progenies had longer branches and a higher branch number, while the progenies of the regular trees had bigger height increment.

Research of morphologic features of up to 10-year-old pedunculate oak (*Quercus robur* L.) in the provenance test in Žepče, Bosnia and HerzegovinaMirzeta Memišević¹, Dalibor Ballian^{1,2}, Hojka Kraigher²¹Forest Faculty University of Sarajevo, Sarajevo, Bosnia and Herzegovina; ²Slovenian Forest Institute, 1000 Ljubljana, Slovenia (mirzeta.mh@sfsa.unsa.ba; balliandalibor9@gmail.com; hojka.kraigher@gozdis.si)

Even though remaining populations of pedunculate oak in Bosnia and Herzegovina are small and scattered, their specific genetic structure makes them significant for preserving varieties of pedunculate oak (*Quercus robur* L.) in Bosnia and Herzegovina and Europe. This was the reason for establishing Bosnia and Herzegovina pedunculate oak provenance test in Žepče in 2009. The test material was used in this research. The test includes 28 provenances. The aim of the research is to use morphologic features of height and root collar diameter of plants to determine variability of the remaining pedunculate oak populations in Bosnia and Herzegovina. Average height of one-year-old plants (2009) in all provenances amounts to 36.41 cm, and average root collar diameter to 5.66 mm, while average height of ten-year-old plants reaches 260.0 cm, and average root collar diameter amounts to 67.7 mm. Jelah provenance stood out from the beginning with the above average height of its plants – 30% above total average of all provenances and 25% bigger average root collar diameter compared to total average size in other provenances. After the plants were eight years old, the lowest average height was recorded in Visoko Muhašinovići provenance – 20% lower height compared to total average, 24% smaller diameter in comparison with the total average. The variance analysis has shown statistically significant differences between populations in all tested features, which has been confirmed by Duncan test.

Phenology of *Pentaclethra macroloba* (Willd.) Kuntze (Fabaceae): hyperdominant tree of the Amazonian estuaryAdelson Rocha Dantas¹, Maria Teresa Fernandez Piedade¹, Marcelino Carneiro Guedes², Ana Claudia Lira-Guedes²¹Instituto Nacional de Pesquisas da Amazônia, Manaus, Brasil; ²Programa de Pós-Graduação em Ecologia, Manaus, Brasil; ²Embrapa, Macapá, Brasil (adelson.dantas@yahoo.com.br; maua.manaus@gmail.com; marcelino.guedes@embrapa.br; ana-lira.guedes@embrapa.br)

Pentaclethra macroloba (pracaxizeiro) is a hyperdominant species of the Amazon estuary floodplain. The oil extracted from its seeds has medicinal properties. The effect of the polymodal flood cycle on the phenology of tree, including the pracaxizeiro, from Amazonian estuary is little known. The hypothesis that the flood pulse is the main factor that directs the phenological processes of the pracaxizeiro was tested. Reproductive and vegetative phenophases of 30 pracaxizeiro were monitored fortnight from September/2017 to September/2018, in the Environmental Protection Area of Fazendinha, Macapá, Brazil. Phenophases were correlated with maximum temperature (°C), precipitation (mm) and flood level (cm), using the Spearman correlation. There was positive correlation with temperature between flower buds ($r_s = 0.57$) and flowers in anthesis ($r_s = 0.63$), already with precipitation (buds: $r_s = -0.50$, anthesis: $r_s = -0.53$) and floods (buds: $r_s = -0.65$, anthesis: $r_s = -0.69$) correlations were negative. The correlation was positive between immature fruit with temperature ($r_s = 0.73$) and negative with precipitation ($r_s = -0.64$) and flood ($r_s = -0.57$). Fruit ripening (rainfall: $r_s = 0.38$, flood: $r_s = 0.50$) and seed dispersal (rainfall: $r_s = 0.76$, flood: $r_s = 0.81$) occur in the rainy season and peak flood Amazon river. Leaf production and fall have low correlation with the abiotic variables tested. Flourish in the dry season prevents loss of floral resources due to torrential rains of the Amazon and maximizes pollination by insects. The flood pulse, together with precipitation, acts as a trigger in fruit ripening and seed dispersal.