Close to nature silviculture applied to cork oak stands

Joana Namora1, Ana Cristina Gonçalves2

1 Departamento de Engenharia Rural, Escola de Ciências e Tecnologia, Universidade de Évora, Apartado 94, 7002 – 554 Évora, Portugal. E-mail: joananamora@gmail.com
2 Departamento de Engenharia Rural, Escola de Ciências e Tecnologia, Instituto de Ciências Agrárias e Ambientais Mediterrânicas (ICAAM), Instituto de Investigação e Formação Avançada, Universidade de Évora, Apartado 94, 7002 – 554 Évora, Portugal. E-mail: acgon@uevora.pt

Introduction

In literature many references can be found about close to nature silviculture as well as terms to define it. This multifunctional silviculture should be understood in a broad sense where the functions of production, protection, conservation, recreation, aesthetic or other are part of the forest system and the management is directed towards more than one production. Though a consensus definition is not found in literature all the different definitions stress the idea of continuity of the woodland conditions, emphasising a silviculture of uneven aged and/or mixed stands, with species adapted to the sites, with shelterwood or selection systems and the maintenance of a continuous cover. From the existing terminology in literature close to nature silviculture was chosen as it is the most frequently used. This concept was developed at the end of the nineteenth century, due to the necessity of developing sustainable woodlands and minimising the potential negative effects of timber harvesting, especially in even aged stands. The main goal of this study is the development of a conceptual approach of close to nature silviculture applied to cork oak stands, as the assumptions and management are different from the stands where the main product is timber, while for cork oak is bark.

Conceptual approach

The guiding principles of close to nature silviculture applied to stands of cork oak:
1) population adaptation to the site, in order to respect the ecological processes and their variations, rather than imposing an artificial uniformity, achieving a high degree of stability and flexibility within the ecosystem;
2) population perpetuity and production, where the upperstorey is essential to influence the amount of light in the vertical stand profile, limiting the ground vegetation, enhancing the natural regeneration and controlling its development;
3) habitats conservation present in the forest ecosystem, which are promoted by structural differentiation, contributing to the high levels of biodiversity maintenance;
4) biological rationalisation or natural automation, through self-regulation and self-regeneration, conciliating ecology with economy;
5) adopting a holistic, multi-functional, integrated approach that promotes the management of the entire forest ecosystem as “productive capital”; and
6) renewal by natural regeneration, although the artificial may also be considered.

Application of the methodology

GROUND COVER
• Between 60% and 70% in adult stands.

INTERVENTION WITH THINNING CHARACTER
• As function of crown cover.
• Schadelin thinnings.
• 1º Thinning – heavy/moderate, should match the first cork extraction (desbóia), and should be done prior to natural regeneration recruitment in the uneven aged stands.
• Cohorts should have the following proportions:
  2 cohorts – 4:2: 40% of the crown cover belongs to the older cohort and 20% for the youngest;
  3 cohorts – 3:2:1: 30% of the crown cover belongs to the older cohort, 20% to the intermediate and 10% to the youngest cohort;
  4 cohorts – 2:2:1:1: 20% of the crown cover belongs to each of the two older cohorts and 10% to the two younger.

REGENERATION
• Regulated by the number of desired cohorts.
• Recruitment occurring in a few years after thinning and/or cutting the older cohort.

Results

• Consecutive production cycles with temporal continuity, in biomass cork production amadila and ground covers.
• Median Value of Crown cover, Ricob (per cycle):
Even Aged Structure = 49% / Close to nature = 62%.
• Cork productivity, Wc (per cycle):
Even Aged Structure = 3194 @/ha / Close to nature = 5460 @/ha.

Conclusions

• The close to nature silviculture applied to cork oak stand is expected to give cork extraction periodic, approximately constant, returns, continuous cork production in time and to reduce the management costs using the natural regeneration.
• As cork oak stands are multiple use systems, associated frequently to grazing, 2 or 3 cohorts seem to be more suitable both with the short/medium term regeneration cycles and their protection.
• As adult cork oaks are shade intolerant thinnings have to be done early.