Optimization of silvicultural treatments in *Pinus halepensis* Mill. stands for reducing wildfire hazard

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Greece is a Mediterranean country in which the problem of fire is great, due to the climatic conditions prevailing in summer (high temperatures and drought). This problem is major in the zone of the evergreen broadleaves where mostly pyrophilic species of the genera Pinus, Quercus, Erica and Cisrus appear. These species are known to be highly flammable and big areas are burnt every year. The increased wildfire characteristics, emanating from fuel accumulation in conjunction with the xerothermic conditions prevailing in these environments, set suppression actions inefficient, thus threatening human life and property. Having encountered the high cost demanding for the suppression actions, the efforts had now concentrated to the modification of fuel stratum characteristics based on silvicultural interventions. The research was conducted at the forests of Kassandra Peninsula which occupies an area of about 35000 ha and where *Pinus halepensis* reaches its optimal growth. In the current research an attempt is being made to quantify the optimum combination of silvicultural treatments in order to efficient reduce wildfire's potential spread and intensity. The quantification is based on the establishment of 52 experimental plots of 500 m^2 and the estimation of the silvicultural characteristics of a sample of n=1488 individuals of *Pinus halepensis* Mill. In all sample plots the silvicultural parameters measured for all individuals, were: the number of stems per plot, the diameter (DBH, cm) at breast height for trees with diameter > 4 cm, basal area (G, cm^2), total height (H, m), crown length (L, m) and canopy cover (%). In addition, slope and aspect topographic parameters were estimated for each sample plot. Critical wildfire hazard indicators such as Torching and Crowning Index estimated before and after the establishment of silvicultural treatments via the NEXUS wildfire simulator software. NEXUS incorporates the most commonly used models of surface and crown fire behavior to simulate its full range possible in a forest stand. It offers the possibility to modify canopy characteristics independently in order to assess the effects of silvicultural treatments on fire behavior. In the current study several surface fuel models were used as inputs covering a wide range of the typical Mediterranean vegetation. The analysis clearly showed that silvicultural intervations reduced wildfire hazard in all cases without exposing the ground under the canopy layer in a large extend, thus minimizing the disturbance level. The ratio between efficiency and implementation cost of these treatments is high, constituting a compatible solution to the limited available financial resources for wildfire suppression.

Key Words: Mediterranean Ecosystems, *Pinus halepensis* Mill., Wildfire Severity, Silvicultural Treatments, Nexus.