KASTAMONU UNIVERSITY
Faculty of Engineering and Architecture

KASTAMONU 2018
TÜRK DÜNYASI KÜLTÜR BAŞKENTİ

International Ecology 2018 Symposium

ABSTRACT BOOK

19-23 JUNE 2018
KASTAMONU/TURKEY

INTERNATIONAL ECOLOGY 2018 SYMPOSIUM

ABSTRACT BOOK

19-23 June 2018, Kastamonu/TURKEY

ISBN: 978-605-4697-17-5

Editors

Prof. Dr. Savaş CANBULAT

Assoc. Prof. Dr. Nejdet GÜLTEPE

Assist. Prof. Dr. Aydın TÜRKYILMAZ

Published on 05/07/2018

Republic of Turkey
Kastamonu University-2018

International Symposium
Ecology 2018
19-23 June 2018 Kastamonu, Turkey

ORAL PRESENTATION

Predicting the Height to Crown Base in *Pinus brutia* Based on Tree Characteristics

Merih Göltaş[1], Tufan Demirel[2], Ömer Küçük[3]

[1]*Department of Forest Entomology and Protection, Faculty of Forestry, Istanbul University, Istanbul, Turkey.*

[2]*Department of Forest Management, Faculty of Forestry, Istanbul University, Istanbul, Turkey.*

[3]*Department of Forest Entomology and Protection, Faculty of Forestry, Kastamonu University, Kastamonu, Turkey*

Corresponding Author: e-mail: merih.goltas@istanbul.edu.tr

Introduction: Forest fires are an important ecological factor affecting on vegetation dynamics. Forest fires generally initiate as surface fire and turn into crown fires under suitable fuel and weather conditions. In transition from surface fire to crown fire, crown base height (CBH) which is defined as vertical distance from ground surface to live canopy base is a critical parameter. The greater the height of the crown base, the more intense the surface fire must be to induce a crown fire. CBH is rarely measured in the field, because the measurements involved are very time-consuming. It is necessary to estimate CBH depending on the tree parameters which is and easily obtainable (measurable, determinable) and existing in management plans. The aim of this study is to develop models that predict CBH for *Pinus brutia* depending on parameters obtained from management plans like, tree height and diameter at breast height (DBH, 1.3 m above ground).

Material and Methods: The study area is located in Adalar in Istanbul, north-west of Turkey. *Pinus brutia* forest stands were selected in this study, because this species are sensitive to crown fire. 21 plots were taken and 367 trees were measured. For each of the 367 trees, diameter at breast height, tree height and crown base height were measured. Prior to the regression analysis, the normal distribution of the data was tested by Kolmogorov-Smirnov analysis and it was determined that the data distributes as normal. Thereafter, we developed the regression models to estimate CBH for *Pinus brutia and* also the success of the model was tested using root mean square error (RMSE).

Results and Discussion: For *pinus brutia*, determined tree characteristics ranged between 8-39cm for DBH, 3-15m for H, and 0.4-10.10m for CBH. As a result of correlation analysis, we found 74% correlation between CBH and DBH, 90% correlation between CBH and H. When the DBH and H together were used as independent variables, the developed model was able to account for 82.2% (R^2_{adj}=0.822) of variance in CBH and RMSE were found as 1.07 m. We achieved a good correlation between the estimated and measured CBH values for *Pinus brutia*. The regression models developed for predicting CBH explained a high percentage of the observed variability. It is clear that DBH and H parameters provided by forest management plans can be used to predict CBH. Thus, the developed CBH model can be utilized for the prediction of crown fire potential and behavior.

Keywords: forest fire, *Pinus brutia*, crown fire, crown base height (CBH).