

PEMODELAN LUAS PERMUKAAN TAJUK TERKENA CAHAYA PADA JATI KLON PERHUTANI UMUR 3 SAMPAI 8 TAHUN DI KPH SARADAN

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INTISARI

Jati klon stek pucuk merupakan genetik unggul yang diperoleh dari program pemuliaan pohon untuk menghasilkan tegakan jati produktif dengan daur 20 tahun. Penyediaan informasi mengenai luas permukaan tajuk terkena cahaya diperlukan sebagai informasi dinamika pertumbuhan pohon. Sebagai folikel aktif yang melakukan fotosintesis, luas permukaan tajuk terkena cahaya secara langsung berhubungan dengan pertumbuhan dan produktivitas tegakan. Penelitian ini bertujuan untuk menentukan model penduga luas permukaan tajuk terkena cahaya jati klon asal stek pucuk umur 3 sampai 8 tahun di KPH Saradan.

Penelitian dilakukan pada petak dengan kelas pertumbuhan baik. Data pengukuran berasal dari 30 sampel pohon dominan tiap petak pengukuran. Pengukuran tiap sampel meliputi tinggi batang bebas cabang, tinggi radius tajuk, tinggi total, dan diameter tajuk. Perhitungan luas permukaan tajuk terkena cahaya dengan pendekatan matematika. Data pohon sampel yang digunakan sebanyak 1500 pohon dominan berasal dari data sekunder tahun 2015 dan 2016, dan primer pengukuran 2017. Data validasi model berasal dari 360 data pengukuran tahun 2017. Parameterisasi model menggunakan analisis *regresi non linear* dengan variabel dependen luas permukaan tajuk terkena cahaya dan variabel independen yaitu umur. Tiga persamaan yang diusulkan yaitu persamaan *Logistic*, *Richard*, dan *Schumacher*. Model dipilih berdasarkan kriteria signifikansi F, koefisien determinasi (R^2), dan *Standard Error of Estimation* (SEE). Model terpilih divalidasi dengan kriteria nilai *Root Mean Square Error* (RMSE), Simpangan Agregat dan Simpangan Rata-rata.

Hasil penelitian menunjukkan bahwa ketiga model yang digunakan memiliki nilai signifikansi F sebesar 0,00. Model *Logistic*, *Richard* dan *Schumacher* menghasilkan nilai *R-squared* dan *SEE* masing-masing yaitu 0,385; 0,393; 0,381 dan 15,5291; 15,379; 15,4794. Model yang dipilih adalah Model *Richards* dengan nilai *R-squared* dan *SEE* terkecil. Persamaan model ditulis sebagai $UCL = 62,756(1 - 5,237e^{-0,558 \times Umur})^{\frac{1}{1-0,589}}$; Nilai validasi model berturut-turut adalah sebagai berikut $RMSE=23,1231$, $SA=-0,1895$, dan $SR=0,05\%$. Model tersebut layak digunakan untuk menduga luas permukaan tajuk jati klon terkena cahaya di KPH Saradan.

Kata kunci: Pohon Dominan, Regresi Non Linier, Model *Logistic*, Model *Richards*, Model *Schumacher*

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MODELLING UPPER CROWN EXPOSED TO LIGHT OF CLONAL TEAK AGED 3-8 YEARS IN SARADAN FOREST DISTRICT

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ABSTRACT

Teak shoot cuttings shoots are superior genetics obtained from tree breeding programs to produce productive teak stands with a 20-year cycle. Provision of information on the upper crown exposed to light is required as information on forest dynamics, growth and yield. As an active follice conducting photosynthesis, the upper crown exposed to light is directly related to the growth and stand productivity. This study aims to determine the prediction model of upper crown exposed to light for teak clone from shoot cuttings aged 3 to 8 years in KPH Saradan.

This research was carried out on plots with good growth grade. The measurement data were derived from 30 dominant tree samples of each measurement plot. The measurements of each sample were the height of the free branches, the height of the crown radius, the total height, and the crown diameter. Upper crown exposed to light were calculated a mathematical approach. The sample tree data used 1500 dominant trees from secondary data of 2015 and 2016, and primary measurement of 2017. Model validation data from 360 measurement data of 2017. The model parameters used non-linear regression analysis with dependent variables of upper crown exposed to light and independent variable that is age. Three proposed equations are *Logistic*, *Richard*, and *Schumacher* equations. The model was chosen based on significant criterion F, *R-squared* and Standard Error of Estimation (SEE). The selected model was validated by the Root Mean Square Error (RMSE), Aggregat Deviation (SA) and the Mean Deviation (SR).

The results showed that the three models were significant value with p-value lower than 0.05. The obtained *R-squared* for *Logistic*, *Richard* and *Schumacher* models were 0.385, 0.393 and 0.381 and *SEE* values were 15.5291, 15.379, and 15.4794. The selected model was the *Richards* model with the smallest R-squared and SEE values. The equation of *Richards* model was $UCL = 62.756(1 - 5.237e^{-0.558 \times U_{mur}})^{\frac{1}{1-0.589}}$; by validation values for *RMSE* was 23.1231, value for SA was -0.1895 and value for SR was 0.05%. The models were feasible to predicted the upper crown exposed to light of clonal teak in Saradan forest district.

Keywords: Dominant Tree, Non Linear Regression, Logistic Model, Richards Model, Schumacher Model

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