PENDUGAAN VOLUME KAYU DENGAN MODEL TAPER KLON JATI UNGGUL NUSANTARA (JUN) DI KPH YOGYAKARTA DAN JATI MEGA DI HUTAN WANAGAMA

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Abstrak

Pengelolaan hutan memerlukan informasi mengenai potensi tegakan hutan yang akurat agar dapat menunjang perencanaan produksi. Pendugaan volume batang pohon menggunakan model taper masih sangat jarang digunakan sehingga belum tersedia informasi mengenai potensi tegakan hutan menurut sortimen kayu. Berkaitan dengan hal tersebut maka diperlukan penyusunan model taper yang akurat dan fleksibel yang mampu menduga volume batang pohon pada berbagai limit diameter dan ketinggian tertentu.

Penelitian ini dilakukan di RPH Menggoro, BDH Paliyan, KPH Yogyakarta; dan Hutan Pendidikan Wanagama untuk menyusun persamaan taper untuk pendugaan volume kayu klon JUN dan Jati Mega. Model taper terbaik yang dipilih dalam penelitian ini telah melalui tahapan evaluasi model dengan kriteria berupa nilai koefisien determinasi (R^2), *Standard Eror of Estimate* (SEE). Model terpilih kemudian dilakukan uji validitas dengan kriteria *Root Mean Square Error* (RMSE) dan Simpangan Agregat (SA).

Hasil penelitian menunjukkan model penduga volume terbaik dengan variabel independen tinggi total dan tinggi bebas cabang secara berurutan untuk klon JUN adalah $v = \frac{1}{4}\pi D_{bh}^{\,2}\left[1{,}057\left(\frac{h_i}{H_t}\right) - 0{,}490\left(\frac{h_i}{H_t}\right)^2 - 0{,}299\left(\frac{h_i}{H_t}\right)^3 + 0{,}131\left(\frac{h_i}{H_t}\right)^4 + 0{,}060\left(\frac{h_i}{H_t}\right)^5\right]_0^{H_t}$ dengan nilai R^2 0,979; SEE 0,046; RMSE 0,046; SA -0,001; dan $v = \frac{1}{4}\pi D_{bh}^{\,2}\left[1{,}313\left(\frac{h_i}{H_{bc}}\right) - 1{,}389\left(\frac{h_i}{H_{bc}}\right)^2 + 1{,}771\left(\frac{h_i}{H_{bc}}\right)^3 - 1{,}620\left(\frac{h_i}{H_{bc}}\right)^4 + 1{,}072\left(\frac{h_i}{H_{bc}}\right)^5 - 0{,}588\left(\frac{h_i}{H_{bc}}\right)^6 + 0{,}158\left(\frac{h_i}{H_{bc}}\right)^7\right]_0^{H_{bc}}$ dengan nilai R^2 0,934; SEE 0,043; RMSE 0,042; SA 0,000; untuk klon Jati Mega adalah $v = \frac{1}{4}\pi D_{bh}^{\,2}\left[1{,}402\left(\frac{h_i}{H_t}\right) - 2{,}940\left(\frac{h_i}{H_t}\right)^2 + 5{,}158\left(\frac{h_i}{H_t}\right)^3 - 6{,}438\left(\frac{h_i}{H_t}\right)^4 + 5{,}704\left(\frac{h_i}{H_t}\right)^5 - 3{,}447\left(\frac{h_i}{H_t}\right)^6 + 0{,}999\left(\frac{h_i}{H_t}\right)^7\right]_0^{H_t}$ dengan nilai R^2 0,933; SEE 0,083; RMSE 0,083; SA 0,017; dan $v = \frac{1}{4}\pi D_{bh}^{\,2}\left[1{,}293\left(\frac{h_i}{H_{bc}}\right) - 1{,}123\left(\frac{h_i}{H_{bc}}\right)^2 + 0{,}747\left(\frac{h_i}{H_{bc}}\right)^3 - 0{,}253\left(\frac{h_i}{H_{bc}}\right)^4\right]_0^{H_{bc}}$ dengan nilai R^2 0,895; SEE 0,093; RMSE 0,071; SA 0,014; untuk gabungan kedua klon adalah $v = \frac{1}{4}\pi D_{bh}^{\,2}\left[1{,}313\left(\frac{h_i}{H_t}\right) - 2{,}252\left(\frac{h_i}{H_t}\right)^2 + 3{,}406\left(\frac{h_i}{H_t}\right)^3 - 3{,}844\left(\frac{h_i}{H_t}\right)^4 + 3{,}073\left(\frac{h_i}{H_t}\right)^5 - 1{,}805\left(\frac{h_i}{H_t}\right)^6 + 0{,}545\left(\frac{h_i}{H_t}\right)^7\right]_0^{H_t}$ dengan nilai R^2 0,935; SEE 0,082; RMSE 0,082; SA -0,023; dan $v = \frac{1}{4}\pi D_{bh}^{\,2}\left[1{,}272\left(\frac{h_i}{H_{bc}}\right) - 1{,}078\left(\frac{h_i}{H_{bc}}\right)^2 + 0{,}785\left(\frac{h_i}{H_{bc}}\right)^3 - 0{,}297\left(\frac{h_i}{H_{bc}}\right)^4\right]_0^{H_{bc}}$ dengan nilai R^2 0,892; SEE 0,091; RMSE 0,071; SA -0,014.

Kata Kunci : potensi tegakan, JUN, jati mega, model taper

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LOG VOLUME ESTIMATION USING TAPER MODEL FOR UNGGUL NUSANTARA TEAK (JUN) IN KPH YOGYAKARTA AND MEGA TEAK IN WANAGAMA FOREST

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Abstract

Forest management requires accurate information about stand potential of forest to help in production planning. The use of taper model for estimating log volume is still rare therefore information of stand potential according to lumber is not available. Related to unavailability of detail stand potential information, it is essential to construct accurate and flexible taper model for estimating log volume at any diameter limit and height.

This research was conducted in RPH Menggoro, BDH Paliyan, KPH Yogyakarta and Wanagama Forest. The purpose of this research was to construct taper model integration for estimating log volume of Unggul Nusantara Teak (JUN) and Mega Teak clones. Coefficient of determination (R^2) and Standard Error of Estimate (SEE) were used to select the best taper model, while Root Mean Square Error (RMSE) and aggregate deviation (SA) were used to validate the best taper model.

The best taper model with total tree height and clear-bole height as independent variables obtained for JUN clone in this research were $v = \frac{1}{4}\pi D_{bh}^2 \left[1{,}057\left(\frac{h_i}{H_t}\right) - 0{,}490\left(\frac{h_i}{H_t}\right)^2 - 0{,}299\left(\frac{h_i}{H_t}\right)^3 + 0{,}131\left(\frac{h_i}{H_t}\right)^4 + 0{,}060\left(\frac{h_i}{H_t}\right)^5\right]_0^{H_t}$ with R^2 value 0,979; SEE 0,046; RMSE 0,046; SA -0,001; and $v = \frac{1}{4}\pi D_{bh}^2 \left[1{,}313\left(\frac{h_i}{H_{bc}}\right) - 1{,}389\left(\frac{h_i}{H_{bc}}\right)^2 + 1{,}771\left(\frac{h_i}{H_{bc}}\right)^3 - 1{,}620\left(\frac{h_i}{H_{bc}}\right)^4 + 1{,}072\left(\frac{h_i}{H_{bc}}\right)^5 - 0{,}588\left(\frac{h_i}{H_{bc}}\right)^6 + 0{,}158\left(\frac{h_i}{H_{bc}}\right)^7\right]_0^{H_{bc}}$ with R^2 value 0,934; SEE 0,043; RMSE 0,042; SA 0,000; for Mega teak clone were $v = \frac{1}{4}\pi D_{bh}^2 \left[1{,}402\left(\frac{h_i}{H_t}\right) - 2{,}940\left(\frac{h_i}{H_t}\right)^2 + 5{,}158\left(\frac{h_i}{H_t}\right)^3 - 6{,}438\left(\frac{h_i}{H_t}\right)^4 + 5{,}704\left(\frac{h_i}{H_t}\right)^5 - 3{,}447\left(\frac{h_i}{H_t}\right)^6 + 0{,}999\left(\frac{h_i}{H_t}\right)^7\right]_0^{H_t}$ with R^2 value 0,933; SEE 0,083; RMSE 0,083; SA 0,017; and $v = \frac{1}{4}\pi D_{bh}^2 \left[1{,}293\left(\frac{h_i}{H_{bc}}\right) - 1{,}123\left(\frac{h_i}{H_{bc}}\right)^2 + 0{,}747\left(\frac{h_i}{H_{bc}}\right)^3 - 0{,}253\left(\frac{h_i}{H_{bc}}\right)^4\right]_0^{H_{bc}}$ with R^2 value 0,895; SEE 0,093; RMSE 0,071; SA 0,014; for combination both clones were $v = \frac{1}{4}\pi D_{bh}^2 \left[1{,}313\left(\frac{h_i}{H_t}\right) - 2{,}252\left(\frac{h_i}{H_t}\right)^2 + 3{,}406\left(\frac{h_i}{H_t}\right)^3 - 3{,}844\left(\frac{h_i}{H_t}\right)^4 + 3{,}073\left(\frac{h_i}{H_t}\right)^5 - 1{,}805\left(\frac{h_i}{H_t}\right)^6 + 0{,}545\left(\frac{h_i}{H_t}\right)^7\right]_0^{H_t}$ with R^2 value 0,935; SEE 0,082; RMSE 0,082; SA -0,023; and $v = \frac{1}{4}\pi D_{bh}^2 \left[1{,}272\left(\frac{h_i}{H_{bc}}\right) - 1{,}078\left(\frac{h_i}{H_{bc}}\right)^2 + 0{,}785\left(\frac{h_i}{H_{bc}}\right)^3 - 0{,}297\left(\frac{h_i}{H_{bc}}\right)^4\right]_0^{H_{bc}}$ with R^2 value 0,892; SEE 0,091; RMSE 0,071; SA -0,014.

Keywords : stand potential, JUN, jati mega, taper model

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