

**Metadata form of the Silva Fennica article** Manner J., Lundström H. (2024). The effect of forked trees on harvester time consumption in a *Pinus contorta* final-felling stand. Silva Fennica vol. 58 no. 4 article id 24039. <https://doi.org/10.14214/sf.24039>

This form is designed for writing the elements of metadata, which are used in the description of research materials such as data and codes. The form is based on the work done in the Work Group “Description of research materials” under the Finnish Open Science Coordination.

Item	Description	Responsible
<i>Name of the data / code</i>	SAS language	Author
<i>Author &amp; ORCID</i>	Manner, Jussi <a href="https://orcid.org/0000-0002-4982-3855">https://orcid.org/0000-0002-4982-3855</a> Lundström, Hagos (no ORCID available)	Author
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<i>Owner of the material</i>	Manner, Jussi <a href="https://orcid.org/0000-0002-4982-3855">https://orcid.org/0000-0002-4982-3855</a> Lundström, Hagos Skogforsk, <a href="https://ror.org/00q qx3790">https://ror.org/00q qx3790</a>	Author
<i>Publisher</i>	Skogforsk, <a href="https://ror.org/00q qx3790">https://ror.org/00q qx3790</a>	Author
<i>Funder</i>	Skogforsk, <a href="https://ror.org/00q qx3790">https://ror.org/00q qx3790</a>	Author
<i>Description</i>	The materials focus on analysing the impact of codominant stems and double crowns on harvester productivity in forestry operations. The aim is to quantify how these tree characteristics affect harvester time consumption and provide insights for optimizing forestry practices. The study involves data on harvester time consumption, divided into the work elements crane-out and processing. The data were collected in a 45-year-old <i>Pinus contorta</i> stand in Sweden using two harvesters and two operators. The unit of observation is a tree, specifically noting the presence of codominant stems and double crowns, and the time consumption (s tree <sup>-1</sup> ). This dataset supports further research on forest management and harvester efficiency.	Author
<i>Methods</i>	In this study, we analysed the impact of codominant stems and double crowns on harvester productivity in a 45-year-old <i>Pinus contorta</i> stand in Sweden. The research was conducted using two large John Deere harvesters (24-ton operating mass) and two experienced operators. The data collection was facilitated by handheld computer, which recorded harvester time consumption for each tree. The time consumption data were divided into two main work elements: crane-out and processing.  The study utilized a linear mixed model (LMM) analysis to assess the effects of tree characteristics on harvester time consumption. Diameter at breast height (DBH) was consistently measured for all trees, and the presence of codominant stems and double crowns was specifically noted. The stand was divided into four blocks to account for variability, with two blocks operated using a newer machine equipped with an Intelligent Boom Control (IBC) system, and the other two blocks using an older machine.  Statistical analyses were performed using the SAS language. The results were used to evaluate the time efficiency of harvesting trees with varying characteristics, providing actionable insights for optimizing forestry operations.	Author

	We will provide a link to our article in Silva Fennica, if the article will be accepted.	
<i>Variables</i>	Time consumption in seconds per tree (s tree <sup>-1</sup> ) Diameter at breast height (DBH) in cm The presence of codominant stems, yes/no The presence of double crowns, yes/no The presence of a driving event, yes/no Block, levels: 1, 2, 3, 4	Author
<i>Author keywords</i>	Lodgepole pine, cut-to-length logging, double stem, forking, productivity, stem defect, stem quality	Author
<i>Vocabulary keywords (community standard)</i>	Not applicable	Author
<i>Discipline</i>	Field(s) of study to which the material is related. This is generally given by the repository as they use specific classifications.	Archive/Repository/Publisher
<i>Type of material</i>	The research material deposited includes detailed research data collected during the study. This data encompasses the harvester time consumption for each tree, divided into two main work elements: crane-out and processing. The dataset also includes measurements of diameter at breast height (DBH) for all trees, and notes on the presence of codominant stems and double crowns.	Author
<i>Language</i>	Eng	Author
<i>Time range covered</i>	2022-05-24	Author
<i>Geographic region</i>	Country: Sweden County: Jämtland Municipality: Hammarstrand	Author
<i>Version</i>	Not applicable	Author
<i>File format(s)</i>	.txt, .csv	Author
<i>Availability of the materials (open, embargo, registration, limited, registration required)</i>	Dataset and SAS codes used for analysing the data can be found at: 10.5281/zenodo.13333124	Author
<i>Justification for access restrictions</i>	Not applicable	Author
<i>Licence</i>	A licence defines the conditions for reuse of the material. Silva Fennica requests the use of <a href="#">Creative Commons licences</a> .	Author
<i>Connections with other research materials</i>	Not applicable	Author
<i>Access to the connected research materials</i>	Not applicable	Author
<i>Codes only: hardware/software requirements for running the code</i>	We used 64-bit operating system, x64-based processor and SAS (9.4) programme. Alternatively SAS studio or SAS Enterprise Guide is required to read the codes. SAS release: 9.04.01M8P01182023 SAS platform: X64_10PRO WIN Copyright © 2012-2023, SAS Institute Inc., Cary, NC, USA. All Rights Reserved.	Author
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<i>Confidential or secret data</i>	Not applicable	Author

<i>Publication date</i>	Date of publication in an archive or repository.	Archive/Repository/Publisher
<i>Preservation policy</i>	Not applicable	Author
<i>Permanent identifier (PID)</i>	Unambiguous, permanent identifier of the material. The identifier may be DOI, URN or accession number.	Archive/Repository/Publisher