Contribution 141 in session “Harvesting technics and working methods for biomass mobilization“

Comparing CTL with WT harvesting in the thinning of Mediterranean pine plantations

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The study compared motor-manual cut-to-length (CTL) harvesting, motor-manual whole-tree (WT) harvesting, mechanized CTL harvesting and mechanized WT harvesting as applied to the second thinning of Mediterranean pine stands in flat terrain. Mechanization increased productivity between 6 and 20 times, depending on process step. It also allowed reducing harvesting cost by a factor 4. Shifting from CTL to WT harvesting resulted in a reduction of harvesting cost between 40 and 50%. Fuel consumption was between 40 and 100% higher for CTL harvesting than for WT harvesting. Mechanization entailed a reduction of fuel consumption between 10 and 40%. Stand damage was generally low, between 1.5 and 6%. Mechanized CTL harvesting resulted in the lowest incidence of wounding, and the difference between mechanized CTL and manual WT harvesting was statistically significant. Soil compaction was absent or moderate, depending on treatment. Mechanized harvesting may produce larger increases of soil bulk density, compared to motor-manual harvesting, but the difference is small, although significant. CTL harvesting leaves a larger amount of biomass on the soil, which relieves possible concerns about soil nutrient depletion. On the other hand, heavy residue loads may increase fire risk especially in sensitive Mediterranean environments. In this respect, mechanized CTL harvesting is the best option, because it allows releasing relatively large amounts of slash while crushing it to the soil as the result of trampling. If soil fertility is not a problem, mechanized WT harvesting is the preferable option.