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**COS 99-5: Ensuring tropical forest sustainability by defining species-specific logging prescriptions: The case of *Hymenaea courbaril***

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#### **Background/Question/Methods**

This study explores the sustainability of current forest management systems in place in the Brazilian Amazon through modelling ideal harvesting cycles and the related impacts on the genetic diversity and the ecology of *Hymenaea courbaril*. Using extensive field data on genetics, ecology, growth and reproduction collected from a 500ha plot located in the Tapajós National Forest (2001-2005), Pará, Brazil, and the Eco-gene modelling software, we define sustainable practises for that species considering different harvesting scenarios. The scenarios were selected based on current practices in the tropics and allowed us to determine an ideal logging cycle and related felling parameters, namely intensity of logging (% of trees logged – LI) and minimum cutting diameter (MCD). The following questions were raised: i) What is the cutting cycle, minimum cutting diameter and cutting intensity that results in a sustainable management system for *H. courbaril*? ii) What is the impact of different logging scenarios on the species' genetics, demography and basal area?

#### **Results/Conclusions**

The results show that in order to ensure sustainable logging practises for *H. courbaril*, logging cycles should be approximately 110 years as opposed to the 30-year cycle currently used in Brazil. The results also show that LI and MCD can be combined to reach a sustainable cycle within the proposed period. In general terms, scenarios with larger MCD and lower LI intensities had reduced impacts on Basal Area (BA) and demography (number of trees, number of reproductive trees) as opposed to scenarios with smaller MCD and more intense felling levels. Additionally, the results showed that logging had a much stronger impact on BA than on demography. Finally, the results showed that logging may have more significant effects on the species' demography and basal area than on the species' genetic structure (number of alleles, number of effective alleles, heterozygosity). As a conclusion, the results showed that current practises in Brazil (30-year cycle, LI 90% and MCD 50cm) are unsustainable for *H. courbaril* and ideal practises should consider cycles of approximately 110 years and a combination of larger MCD (75-100cm) and lower LI (10-50%). Our results demonstrate that the current practice of general prescriptions applied to all species do not deliver sustainable forest management in the Amazon. Therefore, Brazilian forest harvesting regulations need to move towards species-specific prescriptions to ensure real sustainable forest management.

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