Optimum Oil Palm (*Elaeis guineensis* Jacq.) Planting Density for West Africa

Xavier Bonneau[1], Reinout Impens[2], Maxwell Buabeng[3], Patrick Van Damme[2]

[1] *Agricultural Research Centre for International Development (CIRAD), Performance of Tropical Production & Processing Systems (Persyst), France*
[2] *Ghent University, Dept. of Plant Production - Lab. for Tropical Agronomy, Belgium*
[3] *Presco Plc, Plantation Management, Nigeria*

Abstract

The African oil palm (*Elaeis guineensis* Jacq.) is the highest yielding oil crop and the major source of vegetable oil worldwide. As a perennial crop with a typical life cycle of 25 years, establishment costs are high but potential yields of up to 8 tons of oil per hectare can be achieved under favourable environments and with best agricultural practices making it one of the most profitable land-uses in the humid tropics.

Due to the radial symmetry of the foliage and their fasciculate root system, oil palms are typically planted in an equilateral triangle design. Spacing between palms determines planting density, a major contributor to oil yield. With a spacing that is too large, resources such as incident radiation are underutilised; on the other hand, too low a spacing excessive competition between palms will have a depressive effect on yield. As leaf mass and span increase over the first 12 years after planting, optimum density decreases with age. As a result of all these issues, the optimum planting density is the one that will achieve the highest cumulative yield over the 25 years cropping cycle.

This study presents the results from a 12 year old spacing trial in Nigeria. The highest cumulative yields per palm are recorded for the lowest density but the highest cumulative yield per hectare are still observed on the higher densities. However, the gap between both is shrinking with time as the competition for incident radiation increasingly affects the higher densities. While optimum density for cumulative yield at 12 years after planting is still 190 palms ha^{-1}, extrapolation and simulation indicate an optimum between 143 and 160 palms ha^{-1} over the entire cycle, corresponding to a spacing of 8.5 to 9 m.

Keywords: Nigeria, oil palm, planting density, West Africa

Contact Address: Reinout Impens, Ghent University, Dept. of Plant Production - Lab. for Tropical Agronomy, Ghent, Belgium, e-mail: Reinout.Impens@UGent.be