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The conservation of extensive areas formerly occupied by semi-deciduous forest in Sao Paulo State depends on our knowledge of the preservation and restoration of the biological diversity still existing in reduced remnants of this forest. The growth rhythm of *Copaifera langsdorffii* trees - normally found in those fragments - based on environment conditions, wood anatomy, phenological investigations and continuous measurements of trunk girth increment were studied. Six trees from a 38 year old plantation in Agudos, and seven trees of unknown age in two different natural conditions in Porto Ferreira State Park were selected: three specimens in a transition area from a lower vegetation of *cerrado* forest to typical semi-deciduous forest on the higher and well-drained topography zones, and four in denser forest sites of floodplains along to the margins of Moji-Guaçu river. Permanent dendrometer bands were fixed on the trunk in order to evaluate monthly for 33 months the girth increments and the results were compared with precipitation and phenology. Cores from selected trees were taken with an increment bore. All trees showed distinct growth rings formed by marginal parenchyma bands and rhythmical circumference increment closely related to precipitation throughout the year. The cambial activity was reduced or ceased during the dry winter season, inducing leaf fall, probably due to soil water deficiency, lower temperatures and reduced photoperiod. After the first rainfalls of the rainy summer season, expressive growth rates were detected, demonstrating that the largest period of wood formation corresponds to the longer phase of sprouting and permanence of the leaves. Higher mean girth increments and monthly increment of the trunk were observed in trees growing in *cerrado* forest and in plantations. The lowest increment values and the longest growth cessation periods were found in trees subjected to periodic changes in river levels, where temporary anoxic conditions reduced root activity and consequently cambial activity. The formation of annual

and/or seasonal tree rings analyzed on core cross sections confirmed the cambial seasonality. Growth rates and periodicity may change depending on species, specific years, age and vigour of the trees.