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Embrapa Agrienergy oil palm research platform focuses in developing biotechnology and bioinformatics to assist breeding

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Embrapa Agrienergy research efforts focuses in four different platforms related to bioenergy. One is intend to solve the problems related to biodiesel production, and to its widespread use as liquid fuel. The rationale is that, by developing new and efficient ways produce biodiesel and using native and potential oil producing species, the country´s dependency on petroleum diesel will be reduced. The Northern region of Brazil, i.e., depends heavily on diesel to run stationary power generators, river crafts and others. The same region holds some plant species which can produce tons of oil per hectare. Because of that, these species are being seen as potential plant species to meet the requirements of the National Program for Production and Use of Biodiesel, launched by the Federal Government, which links the reduction of petroleum diesel dependency to the regional development. Oil palm (Elaeis guineensis) is the largest contributor (30%, 48 million t, 2008) at global production of oils and fats stood (soybean oil was second, 23%).

What is interesting about this species is that it is not only well adapted to the Northern, but is possess a native relative known as "Caiaué" (Elaeis oleifera), which is resistant/tolerant to bud rot, an abnormality that is decimating entire Oil palm plantations in the southern hemisphere. By intercrossing Oil palm and Caiaué, one can produce a hybrid that closely resemble the Oil palm in terms of oil production, but that retains the tolerance of the Caiaué to this abnormality. In order to assist and improve the Oil palm Breeding Programs (OpBPs) currently conducted by Embrapa ´s units, as well as seeds offer and the national production of Oil palm, Embrapa Agrienergy leads several RD&I projects which aims the development of biotechnological and bioformatics tools. Among these projects the main ones are Prodendê, Bioelaeis, Fenomics, OPGP and Dendepalm. The Prodendê project goals include: to assist cultivars development through conventional and biotechnological methods; to develop a reference system for genetic transformation; and to build an Caiaué ESTs´ database. The Bioelaeis project main goal is to develop and multiply interspecific hybrids, incorporating specific traits of interest from Caiaué into the commercial genotypes, i.e. tolerance and/or resistance to bud rot, reduced vertical growth and high oil productivity, by means of in vitro multiplication, assisted selection and plant transformation. The Fenomics project main goal is to characterize genetic resources (plants and microorganisms) through the use of high precision phenotyping and reverse genetics, including photosynthetic efficiency and abiotic stress analysis. Embrapa Agrienergy also participates in the OPGP, an international consortium that aims to obtain the genome sequencing of Elaeis guineensis and a transcriptome of both E. guineensis and E. oleifera. Finally, it is under final phase of evaluation the Dendepalm project, with the main goal of enabling in the medium-term RD&I of Sustainable production of Oil palm at Embrapa and SNPA (National System of Agricultural Research). It includes Oil palm germplasm and microbiota characterization (phenomics, genomics), in vitro multiplication process, and a draft of E. oleifera genome.Since all these projects are going to generate huge amounts of data - from phenotypes of the plants that compose the germplasm banks, to high-throughput sequencing reads - bioinformatics is undoubtedly a key field, to help transform raw data into applied knowledge and technologies. The Embrapa Agrienergy´s Bioinformatics Lab aims to do this transformation, working together with partners and through bioinformatics analysis, in construction and maintenance of databases, development and availability of tools and providing technical support to Oil palm RD&I. Supported by: Embrapa Agrienergy