

***Theobroma grandiflorum* (WILLD. ex SPRENG.) SCHUM.: Production Factors in Agro-ecosystems**

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One long term objective of the field experiments conducted on a former terra firme rain forest site near Manaus is to evaluate the feasibility of sustainable agroforestry in Amazonia, paying special attention to the potential to recultivate degraded areas. For this purpose different mixed cultivation systems are being tested and compared to monocultures designed according to common practices. Study groups of various SHIFT-projects are working on this experimental site, each group dealing with particular aspects of the different agro-ecosystems.

There are manifold aspects which need to be considered, one of these being the cultivated species itself. It needs to be studied with respect to its behavior within particular field environments in order to come to a kind of agro-ecological profile of the species and its varieties. In addition, the economic potential of a crop plant is important as well, considering that an ecologically sound cultivation system will only be put into practice if it promises to be profitable. One of the species being part of the field experiments is *Theobroma grandiflorum*. This species is attracting

particular interest because of the following facts:

- It is native in the Amazon region;
- The livestock of cultivated plants represents a primary selection with a high degree of variability, thus, still offering the opportunity to combine economic criteria with agro-ecological criteria for selection and breeding;
- *T. grandiflorum*. is economically attractive because of the high market value of the fruit flesh;
- The species is closely related to cocoa, hence offering an use option in addition to pulp-production, namely the use of the seeds for the preparation of a chocolate like product.

Our poster sketches some main lines of research with respect to the species *Theobroma grandiflorum* which have been done within the frame of the SHIFT experimental site at the EMBRAPA Amazônia Ocidental near Manaus. This includes aspects of eco-physiology, biotic interactions, plantation management, infra-specific variability and the utilization of the seeds.

***Bactris gasipaes* H.B.K.: Production Factors in Agro-ecosystems**

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Bactris gasipaes H.B.K. (also called peach palm, pupunha, pejobaye and chontaduro) is a monoecious multistemmed palm tree which is native in southwestern Amazonia. The palm was planted for the production of palm fruits or heart of palm as part of the SHIFT-polycultural area near Manaus. As fruit trees they reached up to 20 m in height, with 15-25 pinnate fronds in the crown. The fruit bunch contains 50-1000 single seeded fruits. The drupe fruit contains high quantities of starch (30-80% dry weight), oil (2-60% dry weight), protein (1-14% dry weight), fiber (3-13% dry weight) and carotene (0-70 mg/100 g fresh mesocarp). Therefore it could play an essential role in food supply for the local people.

B. gasipaes forms a dense root system in the upper soil horizons. Together with its unique root surface structure this allows an efficient soil exploitation and thus high nutrient

uptake.

The N content of its litter is high thus enabling a rapid decomposition. However, due to the small amount of litter and the efficient N uptake by *B. gasipaes* this does not result in a increased N content of the soil organic matter.

The litter from *B. gasipaes* contributes with only 110 kg/ha or 0,1 % of total soil C to the C budget of the system. On the other hand *B. gasipaes* produces high quantities of root exudates. About 16500 kg/ha C or 15% of total soil C respectively are released into the soil. Taking into account the C loss by microbial respiration and root respiration *B. gasipaes* contributes with 10700 kg/ha or 10% of total soil C respectively to the C budget of the system. Compared to C from root exudates the quantity of C from microbial biomass under *B. gasipaes* is low. Only 45 kg/ha or 0,0004% of the total C originate from the microbial biomass.