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Arbors and cuttings: New trials for Green Corridor Project at Bossou-Nimba

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Since 1976, wild chimpanzees have been studied at Bossou, Guinea, in West Africa^{1,2}. The Bossou group itself is extremely endangered. Since the beginning of our study more than 30 years ago, no female chimpanzee immigration has been recorded, whereas all of the female chimpanzees born at Bossou disappeared around sexual maturation³. As a result, the percentage of aged individuals is increasing in the group. To make matters worse, the number of Bossou chimpanzees suddenly decreased to 12 in 2003, due to an epidemic of respiratory disease⁴. For the group's survival, individual immigration from the nearest groups is essential.

About 10 km away from Bossou, at least one chimpanzee group lives in the Nimba Mountains⁵. In order to promote individual interchange between the Bossou and Nimba groups, we started in 1997 the "Green Corridor Project", which has involved planting trees along a 4 km long expanse of savanna area separating Bossou from Nimba⁶. Owing to this effort, we can see today small forest patches growing in this area⁷.

During a decade, we have grown saplings in a tree nursery at Bossou, and transported them into the savanna. During transplantation, the environment around the saplings is drastically changed. The saplings are forced to receive strong sunshine in the savanna. For this reason, the saplings often died within a few days. To minimize damage caused by solar insolation, we started to make arbors in the savanna to protect young saplings. The arbors were constructed from natural materials, as local people do for their temporal ceremonies: we used bamboos as columns, leaf stalks of *Raffia* as beams, and palm leaves as roof. The roof allows the passage of water, whilst providing shade.

On September 2007, we constructed 3 arbors and transplanted 25 *Uapaca heudelotti* saplings under each of them (i.e., 75 saplings in total). One year later, we checked the condition of the *Uapaca* trees under the arbors. Whereas 13 trees were damaged by termites, the other 62 trees survived and thrived (82.7%). Some trees grew to 3 cm in diameter and 130 cm in height (Fig. 1). The arbor itself was small, but it proved to be a useful approach for creating patches of forest in the center of the savanna, compared to direct transplantation without protection which was often challenging. We continued to construct arbors in 2008 after the first trial, and a total of 23 arbors are now protecting young trees against strong sunshine of the savanna.

In 2007, we tested another planting method using tree cuttings. When we checked fences around villages, we noticed that some sticks were sprouting. We identified the sticks used for fences in 3 villages, including Bossou, and checked which species had shoots. Our study led us to investigate 8,998 sticks; 176 sticks were found to have new buds or leaves (Table 1). We counted 579 sticks of *Uapaca heudelotti*, but they did not have any shoots. When we transported saplings from tree nursery into the savanna, *Uapaca* was one of the most successful ones⁷. However, the *Uapaca* may be unbecoming in the tree cutting method. On the other hand, fifty one out of the 176 sprouting sticks were *Spondias cytherea*. We collected 1,523 cuttings of *Spondias cytherea* from forest, and directly planted the cuttings around gallery forest and small forest patches in savanna. Only 3 weeks later, 891 out of the 1,523 (58.5%) cuttings were found to have produced new shoots (Fig. 2). We



Fig. 1. *Uapaca heudelotti* trees under the arbor. They grew up to 130 cm in height.



Fig. 2. Cutting of *Spondias cytherea* planted around patchy forest.

still need to monitor growth development of these tree cuttings over time, but this method may be useful for enlarging the forest patches adjoining the savanna.

These new attempts sparked great interest in the local people, because they consist of using techniques already familiar to them and applied to a conservation oriented reforestation project. Some villagers repaired the arbors voluntarily, while others started to plant cuttings including other species voluntarily. Changing savanna to forest by using the local methods is expected to increase environmental awareness of local communities and increasing their participation in conservation efforts.

Table 1. Germination rate of cuttings. We identified the sticks used for fencing in three villages, including Bossou, and checked which species had produced shoots.

Scientific name	The number of sticks used in fencing	The number of sprouting sticks	Germination rate (%)
“Kouyako” in local name	41	29	70.7
<i>Aspilia africana</i>	10	7	70.0
<i>Spondias cytherea</i>	87	51	58.6
<i>Spathodea campanulata</i>	16	8	50.0
<i>Newbouldia laevis</i>	18	8	44.4
<i>Dracaena perrottetii</i>	16	7	43.8
<i>Spondias mombin</i>	76	29	38.2
<i>Nauclea latifolia</i>	105	8	7.6
<i>Sterculia tragacantha</i>	20	1	5.0
<i>Mareya micrantha</i>	57	2	3.5
<i>Coffea arabica</i>	58	1	1.7
<i>Craterispermum caudatum</i>	155	2	1.3
<i>Craterispermum laurinum</i>	1,351	16	1.2
<i>Albizia lebbeck</i>	17	0	0.0
<i>Albizia sasa</i>	35	0	0.0
<i>Albizia zygia</i>	8	0	0.0
<i>Alchornea cordifolia</i>	1,049	0	0.0
<i>Allophylus africanus</i>	21	0	0.0
<i>Amphimas pterocarpoides</i>	13	0	0.0
<i>Anthonotha macrophylla</i>	14	0	0.0
<i>Blighia welwitschii</i>	9	0	0.0
<i>Bridelia ferruginea</i>	57	0	0.0
<i>Carapa procera</i>	124	0	0.0
<i>Dichrostachys glomerata</i>	48	0	0.0
<i>Elaeis guineensis</i> (leaf stalks)	1173	0	0.0
<i>Ficus exasperata</i>	7	0	0.0
<i>Ficus sur</i>	30	0	0.0
<i>Funtumia elastica</i>	91	0	0.0
<i>Harissonia abyssinica</i>	66	0	0.0
<i>Harungana madagascariensis</i>	270	0	0.0
<i>Lecaniodiscus cupanioides</i>	5	0	0.0
<i>Macaranga hurifolia</i>	11	0	0.0
<i>Manihot esculenta</i>	412	0	0.0
<i>Morinda germinata</i>	24	0	0.0
<i>Myrianthus libericus</i>	35	0	0.0
<i>Phyllanthus discoideus</i>	430	0	0.0
<i>Phyllostachys</i> sp.	1,873	0	0.0
<i>Premna hispida</i>	7	0	0.0
<i>Pseudospondias microcarpa</i>	18	0	0.0
<i>Raphia gracilis</i> (leaf stalks)	385	0	0.0
<i>Terminalia glaucescens</i>	42	0	0.0
<i>Terminalia superba</i>	8	0	0.0
<i>Tetrorchidium didymostemon</i>	20	0	0.0
<i>Uapaca heudelotti</i>	579	0	0.0
<i>Vismia guineensis</i>	15	0	0.0
Others (28 species)*	61	7	11.5
Unknown	31	0	0.0
Total	8,998	176	2.0

* We compiled some species here, when the number of sticks was less than 5.

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