**Project Updates: March 2014**

As part of a follow-up to the November 2013 project updates, we aimed at understanding the sort of predators preying on the seeds of *C. kihansiensis* in the Kihansi gorge forest. This 2-week (28th February – 13th March 2014)  fieldwork involved conducting three main activities of the project: (i) investigating the animals predating coffee seeds in the Kihansi gorge forest based on the preliminary information gathered during the November 2013 fieldwork; (ii) repeating seed predation experiments to detect any possible seasonal influence (March is start of peak rainfall vs. November- short rains) on seed predation; and (iii) continuing monitoring of the field experiments installed  in November 2013 to understand  patterns of seed formation and potential premature seed fall.

First, based on the November 2013 fieldwork, we hypothesised that rodents were the main animals preying on the seeds used with the experiment. To investigate this, we used Sherman traps (N = 100) to trap rodents in the study area. A total of 50 traps each were placed at two sites and were then transferred to the other two sites to cover whole area occupied by *C. kihansiensis*.  At each site (Kihansi station, Upper wetland, Lower wetland and Mhalala), Sherman traps were distributed in a 1-ha grid square (10 x 10 x 7 m) forming a total of 49 traps with one extra trap placed in a similar site (n = 50 per site). Sherman traps were baited with peanut butter to attract rodents and other potential predators available in the area. Traps were inspected every morning for a total of three days as recommended for surveying of small mammals (Jones et al. 1996). After 3 days, the experiment was halted and traps transferred to another sites. For each animal captured, we recorded body parameters - body weight, head length, body length, tail length and sex of the animal. The animal was marked by trimming body hairs (spot) at the back to facilitate detection upon recapture and to aid species identification later on in the laboratory. Marked individuals were released back in the wild. Also some rodents that were not easily identified in the field were anesthetised and stored in 10 % formalin for later identification.  Secondly, activities for objectives (ii) and (iii) were conducted following procedures explained in the previous project updates. New data from these field experiments revealed important information.

(i)  Both traps and field observations indicated several predators (snails, slugs, ants and beetles) other than rodents highly preying on the coffee seeds (Fig 1-4). One rodent species (*Mastomys natalensis*) was immediately identified in the field and at least two other species are awaiting identification. Trapping returned 31 individuals captured, 83.8% (n = 26) of which were new captures.

(ii)  The pattern of seed predation in the cages was variable between sites. Although we have not performed solid analysis of the data, it appears that seeds at some sites such as Mhalala and Kihansi station sites experienced much higher predation pressures than other sites (upper and lower wetland sites). The data also show higher diversity of predator species assemblage at Kihansi station, Upper and Lower wetland sites. The predator assemblage included ants, snails, slugs, beetles and rodents while Mhalala was dominated mainly by rodents.  Field observations also,

suggest that predation by these species follows a feeding hierarchy where higher animals (rodents) may be acting at the top by crushing the seeds, where snail and slug follow by preying on seed pieces/residues and lastly beetles. Ants and land crabs were observed feeding on the seeds cached in sand and burrows.

(iii) Data on pattern of seed formation and seed fall revealed another interesting trend. More than 75 % of the coffee stems under monitoring show reduced number of developing seeds suggesting that this species is currently faced with severe premature seed fall. We observed several animals threatening seed formation causing developing fruits to detach from the floral stork prematurely (Fig 2). The majority were aphids (Fig 3) that suck juice from fruit stork making it weak and wilting or fall altogether. Aphids also feed on green coffee berry turning it brown as it dies and falls off. There are also leaf snails that feed directly on green developing coffee fruits which also affect its development negatively.

**What are we going to do next?**

In the first week of April 2014, we will install seed trap experiments on the selected coffee stems to start measuring seed fall and pre-dispersal fruit predation on coffee stems by birds and invertebrates (aphids and leaf snails) as the season for fruit maturity is approaching (May-July). We still need to conduct experiments on post-dispersal seed predation and germination (July/August) to find out the ability of *C. kihansiensis* seed to recruits into seedling.

Fig 1 (plate 1- 4). Seed predator animals observed in the Kihansi forest. Top left = snails found in Sherman trap feeding on peanut butter, top right = rodent (Mastomys natalensis) trapped in Sherman trap, bottom left = slug spp foraging on an experimental seed and bottom right = snail observed feeding on the seeds. Photo courtesy by G. Munga & A. Bugingo



Fig 2. Some of the *C. kihansiensis* seeds falling prematurely



Fig 3. Feeding of *C.kihansiensis* fruit by aphids causes negative effects on fruit development. Photo courtesy by G. Munga & A. Bugingo