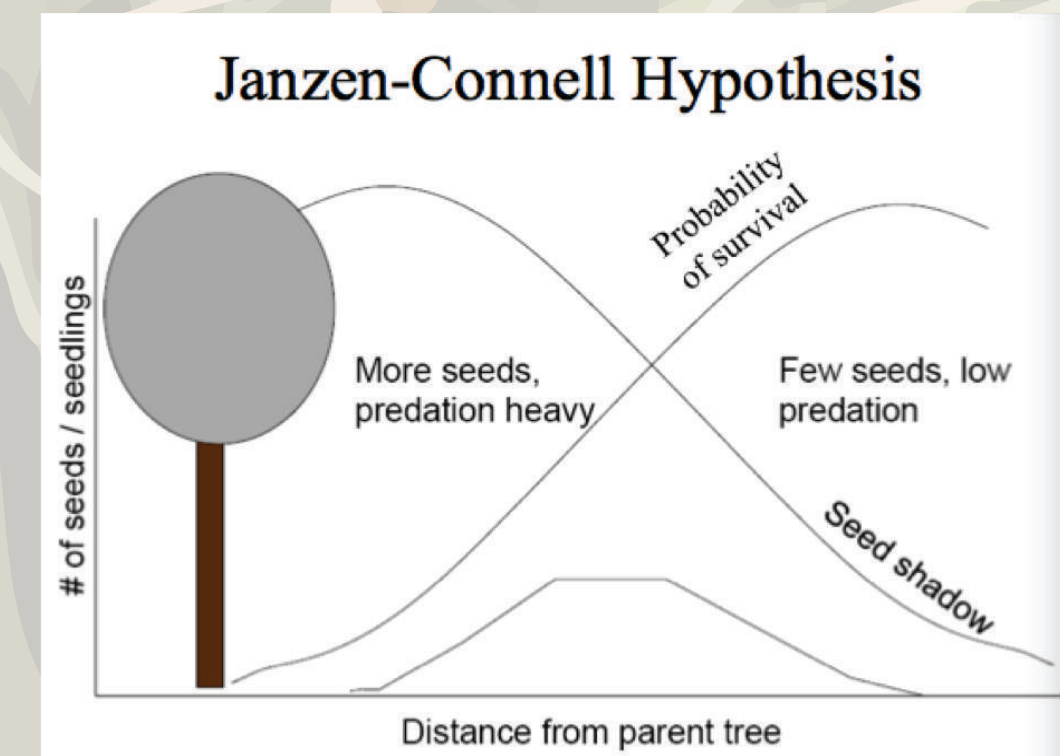


Why?

The Janzen Connell hypothesis posits that specialized plant enemies drive plant species diversity (Janzen 1970; Connell 1971). By killing conspecific seeds and seedlings in a density- and distant- dependent manner around the parent plant, predators open up space for recruitment by heterospecifics, thus increasing diversity. Recent evidence has demonstrated that plant enemies can drive patterns of distance- dependent mortality and determine the diversity of tree seedlings. (Bagchi et al., 2014; Fricke et al., 2014), but additional questions such as the role of small and medium bodied mammals in inducing seed and plant mortality are yet to be answered in Central African forests.



What?

The goal of our project is to evaluate the relative importance of plant enemies, from fungus and insects to medium sized mammals, for seed and seedling mortality. We predict that all plant enemies will induce distance dependent mortality but their effects will vary across different plant stages. To be more precise, we predict:



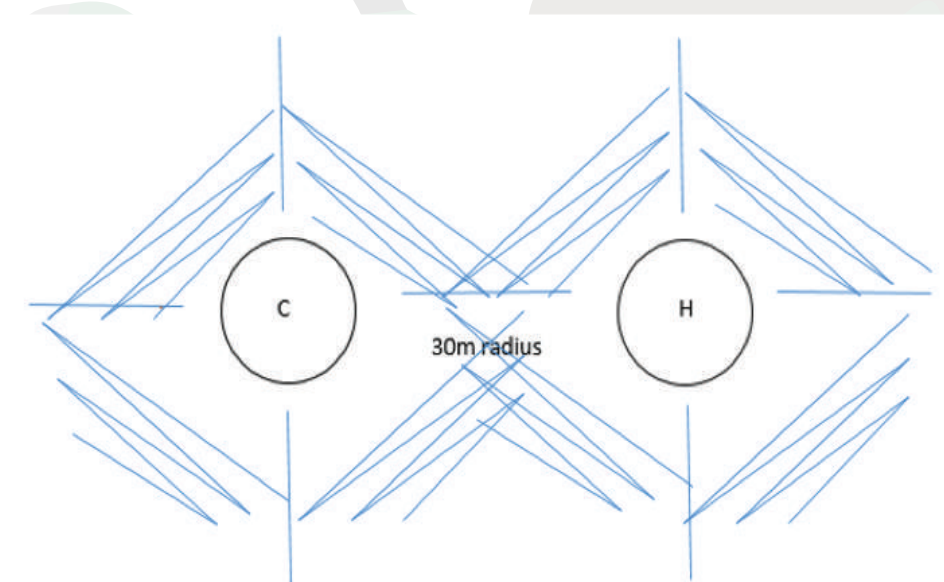
- rodents will be the main agent of mortality at the germination stage
- fungi and insects will cause the highest mortality at the seedling stage
- medium sized mammals will prey mostly on large seedlings

Objective 1: Measure the relative effects of different mammals on seed germination for three abundant tree species (in progress)
Objective 2: Quantify the relative effects of different plant enemies on seedling recruitment and survival for the three abundant tree species

How?

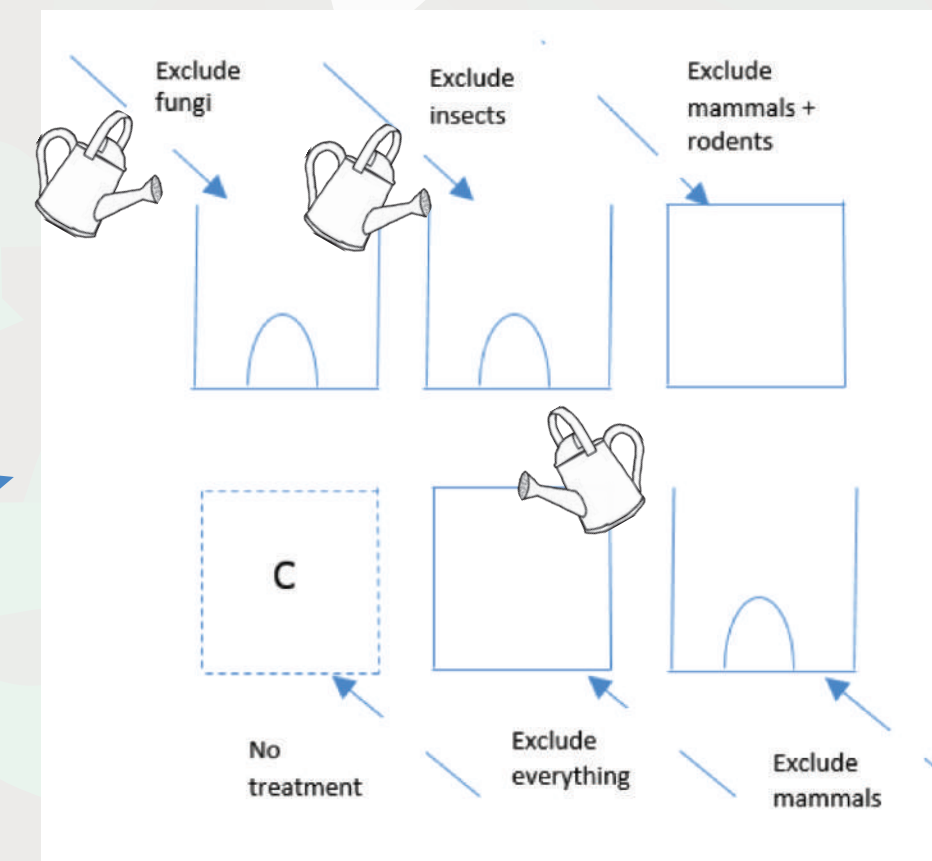
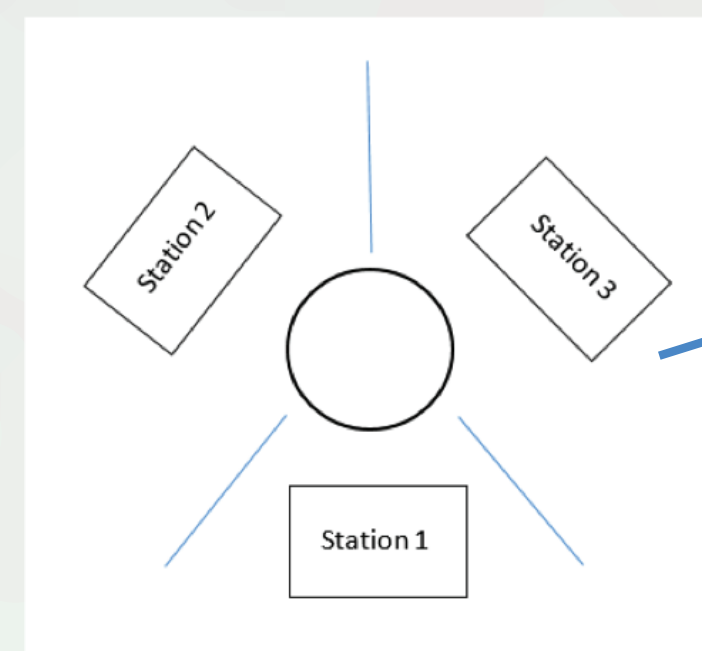
1. Field survey of focal tree species and selection

- We selected 5 experimental sites (at a minimum of 150m apart), each composed of a paired design of a conspecific tree and a heterospecific tree 30m away. We searched a radius of 30m around both trees to ensure that no other fruiting individuals of the focal species were present.



2. Station set up including enclosure design

- We set up three stations (in randomly chosen directions) under the canopies of each conspecific and heterospecific tree. Each station consists of six physical enclosures excluding each enemy and in addition, fungicide and insecticide is being applied to exclude fungus and insects.



3. Seed collection, preparation and deposition

- We collected over 2000 fruits from 23 random fruiting trees present across the study area. We de-fleshed all the fruits within a week and manually deposited 10 randomly chosen seeds in each enclosure.

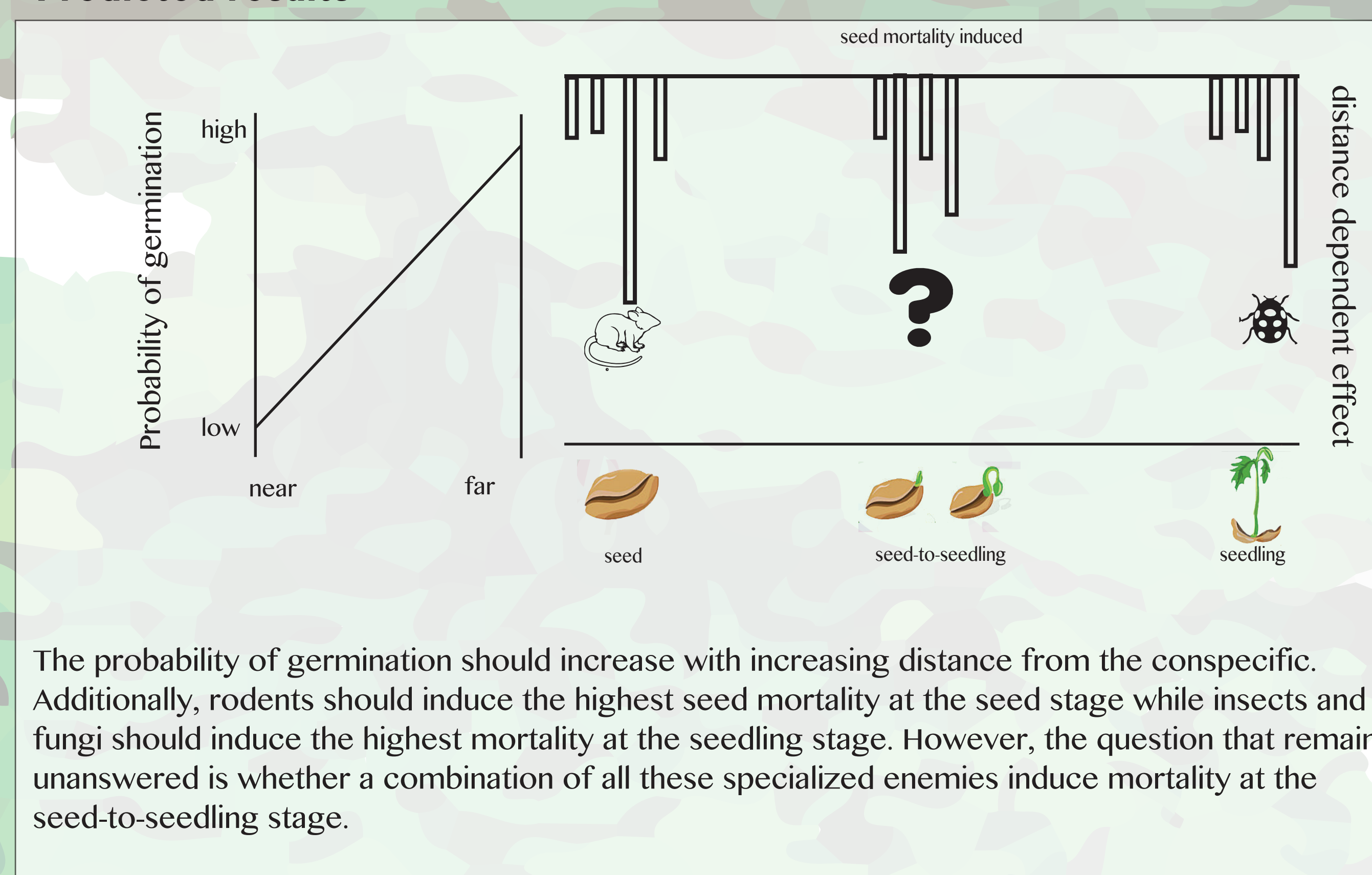


4. Treatments

- The fungicide Amistar (active ingredient azoxystrobin, Sygenta Ltd.) at 0.005g/50ml aqueous solution and insecticide Engéo (active ingredient thiamethoxam, Sygenta Ltd.) at 0.283g/50ml aqueous solution are being applied once a week using hand misters. Physical enclosures are made of hardware cloth and are 0.6m x 0.6m in size.



Predicted results



Who cares?

By determining the sources of mortality over the seed-to-seedling transition we will be able to better understand the various factors that limit recruitment in tropical forest systems. Furthermore, we will shed light on how changes in faunal composition (due to excessive hunting, habitat fragmentation and poaching) can alter forest structure by affecting seedling diversity.

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Do plants have enemies? Their effects on plant recruitment in an Afrotropical forest system

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Where?

We are conducting the study in a lowland tropical forest in northeastern Gabon. Our study site includes a 5 x 5 km area around the Ipassa Research Center in Ivindo National Park. The Ivindo river flows through primary rainforests with a spectacular succession of waterfalls such as Kongou and Djidji. This park is also a haven for gorillas with the highest concentration of gorillas being found in the clearing of Langoue Bai. Also home to forest elephants and a variety of primates including chimpanzees, mandrills and colobus, this park is an important biodiversity hotspot.

