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Testing of potentially alternative crops to verify attractiveness to elephants

Awely

3, Place de la République
45000 Orléans
France

www.awely.org

Synthesis

Awely, wildlife and People is an international organisation based in France. For more than 10 years, this NGO has been working to protect endangered wildlife and to improve the lives of local communities in Africa and in Asia…
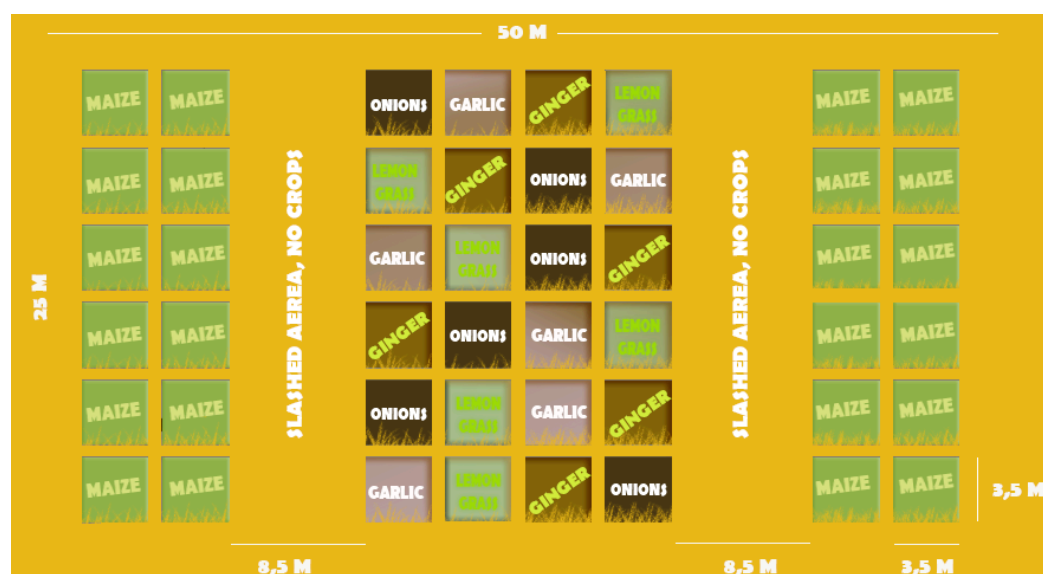For example, by reducing conflicts between humans and animals.

Objective:

Field invasion and crop destruction are frequent sources of Human/Animal conflicts. The elephant is the most often involved, but not the only species causing trouble. Compromised crops can have severe consequences for communities, with their livelihoods destroyed and their vulnerability increased. Crop loss also often leads to retaliation towards the animals or herds held responsible. One of the solutions to implement is to promote alternative crops who however must be tested in order to identify which ones attract elephant, even other herbivores, or not.

Methodology:

Set up a test plot with the crops to test and a control (attractive crop). Then expose it to wildlife without any guarding or other anthropogenic measures.

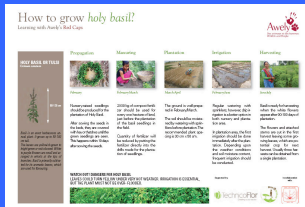*Example of test-plot set-up with 4 crops to test*

For a test plot with **four test crops** and **one control crop,** set up experimental design like this:

- Measuring 50 m in length and 25 m in width, the test plot is set up of 48 squares measuring 3.5 by 3.5 meters. Paths of 50 cm are left open between the squares.
- The center is made up of 24 squares of potentially alternative crops. Each variety of the test crops appears once in each row, being distributed in a randomized block-design.
- On the right and left edges of the test plot two rows of 6 squares of maize are located. Between the maize and the test crops a space of 8.5 m is left open and cleared.

This design was developed to avoid accidental destruction of alternative test crops by elephants when approaching attractive control crops. The total area of potentially alternative crops (24 squares) is the same as of the attractive control (2 x 12 squares). All crops are planted preferably at the same time. Depending on germination success the numbers of crop plants per square may vary.

For monitoring, each square, each type of damage is recorded:.

The counting of the plants is done square by square. The test plot is visited for monitoring every three days; weeding is done at the same time. Besides this human presence of about one hour every three days during day time, the test plot needs to be abandoned. Neither watering nor plant treatment takes place.

Monitoring is under the responsibility of trained field staff. During each monitoring visit, it is observed whether wildlife has shown presence on the plot or not. This is determined by animal foot prints, feeding marks or droppings. Further, it is observed whether tracks of elephants can be found within 500 meters to the test plot.

Any presence of wildlife is captured in a standardized form. If any crops were damaged by wildlife, a second detailed form is used. The number of damaged plants is enumerated on each square and the type of damage is specified for each plant. All data are then entered into an excel sheet and the total number of damaged plants, mean number of damaged plants, and standard deviation are calculated.

Statistical analyses are done by Kruskal–Wallis chi-squared tests and by Kruskal–Wallis chi-squared tests followed by post hoc tests (asymptotic Wilcoxon Mann–Whitney rank sum test).

Results

The results will determine the existence of statistical significant differences of damages on test crops and control crops.

In our test, elephants visited both the test crops (ginger, onion, garlic, and lemon grass) and the control crops of maize and completely destroyed the maize 6 weeks prior to its harvest time.

In contrast, the test crops were only slightly damaged, mostly through trampling. Yields that have been obtained from the test crops exceeded those that would have been obtained from the maize.

The selection of crops which are less attractive to large herbivores such as elephants needs to be considered as a strategy to reduce conflicts between farmers and endangered wildlife species.

Sources

Gross EM., McRobb R., Gross J. (2015) Cultivating alternative crops reduces crop losses due to African elephants. J Pest Sci. DOI 10.1007/s10340-015-0699-2

See more about Human-wildlife conflict toolkit on
awely.org

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