Project Update: April 2022

1.0 Introduction

Parthenium hysterophorus L. is an invasive species that belongs to the family Asteraceae and is an annual or short-lived perennial herbaceous plant (El-keblawy, 2015). It is native to Mexico and southern United States of America and has become widespread in other part of the world (Campus, 2017a). It can spread through trade as contaminants of crops, farm machinery and grains (Adkins & Shabbir, 2014). In the early 1950s, *P. hysterophorus* was introduced into Africa and Asia through cereal and seed shipment from America (Evans, 1997), and now the weed is widely distributed in many parts of the world including Australia, India, China, West Indies, Ethiopia, Israel, Taiwan, India, and Nepal (Campus, 2017a). In Africa, *P. hysterophorus* is occurring in several countries including Ethiopia, Somalia, Kenya, Tanzania, South Africa, Swaziland, Zimbabwe, Madagascar, and Mozambique (Wabuyele et al., 2014; Worku, 2010). *P. hysterophorus* in Tanzania has been observed mainly in the north (Arusha, Kilimanjaro and Manyara) Wabuyele et al., (2014) and is currently spreading to other areas in the country invading cropland, grazing land, roadsides and settlements (Kilewa & Rashid, 2015).

To control *P. hysterophorus*, several approaches have been used in many parts of the world including cultural, physical and chemical management but no single method has been effective so far (Adkins & Shabbir, 2014). Therefore, integrated weed management has been used as an alternative to combat this invasive weed (Adkins & Shabbir, 2014). While biological control using a leaf feeding beetle (*Zygogramma bicolorata*) has been scientifically tested in South Africa Strathie, (2015), its release in the field in Tanzania was initiated in March 2017 (Ramadhan, K. Personal communication, April 2018) to control *P. hysterophorus*. The leaf-feeding beetle, *Z. bicolorata* has been introduced in some parts of Arusha and Kagera regions by the Tropical Pesticide Research Institute (TPRI) in collaboration with Sokoine University of Agriculture (Ramadhan, K. Personal communication, April 2018). Based on preliminary results, this beetle has proved to be efficient in management of *P. hysterophorus* both in the screen house and in the field due to its sustainability, safety, and user friendly (unpublished materials). Based on our previous study, *Zygogramma bicolorata* and crude extracts from *Cassia auriculata* and *Dovyalis caffra* has shown to be a promising measure to suppress *P. hysterophorus*. Additionally, knowledge on the spread and control of *P. hysterophorus* are still lacking. This project aims at demonstrating and creating awareness to community members on control measures against *P. hysterophorus.*

1.1 Research Objectives

1.1.1 Main objective

To create awareness on the spread and control measures of Invasive species *P. hysterophorus* in Northern Tanzania

1.2.1 Specific objectives

- To conduct outreach programme and capacity building on the spread and control of invasive *P. hysterophorus* in northern Tanzania.

- To demonstrate the use of plant extracts as a measure to suppress the invasive *P. hysterophorus* in Northern Tanzania.
- To impact the community on the use of biological control method (*Z. bicolorata*) in controlling the spread of *P. hysterophorus* in northern Tanzania.

2.0. Activities Covered

2.1 Introduction of the study to village chairmen

Before work commencement, a study was introduced to village chairmen, village executive officers both in Arusha and Manyara region. They were told the purpose of the study and informed that the study originates from the previous study done in 2019. They were told about the results specifically on how *Parthenium* spreads, effect, and possible control measures. They agreed the knowledge to be impacted to community members.

Figure 1: Introduction of the project to village leaders

2.2. Trainings and capacity building

Training and capacity building was conducted with local communities. They were told about *Parthenium hysterophorus* spread, effect to both people, livestock, wildlife, and rangelands which are shared by both livestock and wildlife, possible control measures to this threat.


Figure 2: Trainings and capacity building on Parthenium hysterophorus

2.3 Samples collection and preparation

Samples of *Dovyalis caffra* and *Cassia auriculate* were collected and prepared in every village. This was done after training were communities prepared the samples based on the instruction they were given. All samples were washed with water, air dried at room temperature for 21 days and ground. Material was sieved and a mixture of 20 kg of leaves were immersed in 200 l of water. After 3 days, the solution was filtered. These stock solutions of 20g ml-1 were diluted into concentration 90 g l-1 (90%) (Kanagwa et al., 2020). Furthermore, extracts from fruits of *D. caffra* were collected from the field and washed with water. Samples of 8000 g was soaked in 5 l of water and allowed to ferment for 4 days. Fermented samples were filtered to obtain concentration of 8 g l-1. After the preparation, the extracts were applied to the selected areas that have high infestation using spraying pumps.


Figure 3: Collected samples of *Dovyalis caffra* and *Cassia auriculata*

2.4 Demonstration in the field

After sample preparation, we did demonstration in the field, were we sprayed the highly infested areas with *Parthenium*. After 10 days we were able to see the results. Monitoring is going on in the areas we sprayed.






Figure 5: Demonstration in the field. The last picture right shows the sprayed area after ten days.

3.0. Challenges

Willingness of some community members to participate in the project. They were resistant as they knew they is no method which can be used to control *Parthenium*, as they have tried slashing, burning, uprooting but it did not work. Village leaders helped us to convince them, and majorities participated.

4.0. Upcoming Activities

- Training to primary and secondary school
- *Zygogramma bicolorata* release in the field