
AN INVESTIGATION INTO A FAST SPREADING PARASITIC PLANT (MISTLETOE: *TAPINANATHUS GLOBIFERUS*.) ON AN ECONOMIC TREE, LOCUST BEANS TREE: *PARKIA BIGLOBOSA*) IN BAUCHI STATE COLLEGE OF AGRICULTURE, FARM LANDS, YELWA, BAUCHI STATE.

Dr.(Mrs.) Nanyi J.I. Dutse

Department of Crop Production Technology,
Bauchi State College of Agriculture, Bauchi, Bauchi State.

ABSTRACT

Mistletoe scientifically referred to as *Tapinanthus globiferus*. Is a specie of hemi=parasitic plant in the family *Loranthacea* It may contain up to 40 species with 30 being accepted. Mistletoe as parasitic plants are found in a wide range of forests ecosystems, where they obtain their nutrition from their host. They are parasitic yet slow growing an persistent. Mistletoe as parasitic plants are found in a wide range of forests ecosystems, where they obtain their nutrition from their host. They are parasitic yet slow growing an persistent. Parasitic plants anchor themselves to their host's plant using a specialized structure known as "haustoria", with this structure it anchors itself to the host roots or stem, depending on the parasitic plant species. The species *Tapinanthus globiferus* in Ghana the leaves are used to treat guinea worm infection, while in Nigeria the leaves are used to treat various disorders including cancer and liver ailments, in Senegal the leaves are used for the treatment of leprosy. (Wikipedia, 2023) This is the species affecting most Angiosperms in Nigeria. The species *Tapinanthus globiferus* in Ghana the leaves are used to treat guinea worm infection, while in Nigeria the leaves are used to treat various disorders including cancer and liver ailments, in Senegal the leaves are used for the treatment of leprosy. (Wikipedia, 2023) This is the species affecting most Angiosperms in Nigeria. The experimental site is farm lands within Bauchi State College of Agriculture, located in Yelwa- Bauchi, in Bauchi local government area of Bauchi State, Nigeria. Within the School farm lands have distinct foot parts that demarcate one piece of farm land from the other. The locust bean trees which are plant specimen of interests' are located in these farm lands within the college premises. The areas that carried the highest number of the specimen is located between the school lecture area, students hostel, some staff residential areas to the south and Sabon Kaura village to the north, Abubakar Tafawa Balewa University old campus to the west and

school stream to the east, except for the other farm land which is east of the school Library quite distinct from the others which contained very few locust bean trees. Distinct foot paths within the farm lands helped in serving as dividing lines within the main farmlands which served as the study area that was divided into three, the fourth part being the area behind the school library. This distinct demarcation makes it easy for one to count the Locust bean trees imbedded in each section. Locust bean trees infected by the parasitic plant mistletoe were counted and recorded under a subtopic 'Infected' while those Locust bean trees that have not been infected by the parasitic plants mistletoe were recorded under a subtopic 'Not Infected'. From these obtained percentage infected and non infected plants were worked out and recorded for each category. The percentage infected and none infected are as presented in a bar chart with Classification 'A' to 'I' on "X" axis and percentage (%) 1 to 100 on "Y" axis. As presented above it can be clearly seen that the level of parasitic infection of Mistletoe of the specie *Taphinanthus globiferus* on *Parkia biglobosa* in the study area was very high in some groups such as groups: A and E reaching up to 90%, while group B was 80%, Group F, 70%, lowest level of infection was observed in plants grouped as D, and G, with 0% infection and group H. Non infected trees ranked up to 80% and group I had up to 70% non infected trees. Considering the economic importance of this economic tree especially in the study area of which the seeds are highly priceable in the market, they are used for the local soup ingredient called 'daddawa', and the pulp serve as feeds for pigs, while the burnt fruit waal minus the seeds is used in some communities in preparing a local potash as local soup ingredient called 'tokan snayi', the matured trees are now an expensive source of ply wood for roofing, and parts not used for roofing serve as energy source that is fire wood. With all these economic importance and many more which differ with geographical location, it is needless to say the *Parkia* trees in this area need urgent and immediate action for treatment

INTRODUCTION AND LITERATURE REVIEW

Mistletoe scientifically referred to as *Tapinanthus globiferus*. Is a specie of hemi-parasitic plant in the family *Loranthaceae* It may contain up to 40 species with 30 being accepted (Wikipediaa, 2023) It is native to the tropics of western and sub Saharan Africa. It is endemic to Africa. (Wikipedia, 2023) Mistletoe as parasitic plants are found in a wide range of forests ecosystems, where they obtain their nutrition from their host.

They are parasitic yet slow growing and persistent. (Britanica, 2023) In West Africa Mistletoe is found on many indigenous trees and several tree crops of economic importance. These host trees include; Shea, Neem, Sweet orange, Cocoa, Rubber and the African locust bean tree. (Raji et al., 2022) Mistletoe *Tapinanthus globiferus* as parasitic plants affects great number of plant population dynamics, diversity and distribution of the plants, as well as birds and mammals. The geographical distribution of mistletoe *Tapinanthus globiferus*, their unique flowering and fruiting period, make them an attractive resource for wild life. Its fruit and nectar are foods for birds which also nest and roost on the plant. These birds also provide pollination and seed dispersal services to the plant *Tapinanthus globiferus* (Raji et al., 2022). These parasitic plant mistletoe on locust bean trees (*Parkia biglobosa*) are important sources of food to birds in times of food scarcity. (Raji et al., 2023) The seeds germinate on limbs of susceptible hosts forming an attachment disk at the bark of the infested locust bean tree. The sticky berries are disseminated throughout the tree by birds and wind. (Raji et al., 2023)

Tapinanthus globiferus a species of mistletoe is a woody aerial shrub that is attached to the host plant by haustoria. It has a pendulous stem of up to 2 meters long and the branches are abundantly covered with lenticels. The leaves are geographically variable in size and thickness. (Wikipedia, 2023). Mistletoe as parasitic plants are found in a wide range of forests ecosystems, where they obtain their nutrition from their host. They are parasitic yet slow growing and persistent. (James, 2023) Parasitic plants differ from plants such as climbing vines, lianas, epiphytes, and aerophytes. The latter category is not parasites they only use other plants as structures on which they grow on, but not as their direct sources of water or nutrient. (James, 2023)

In order to survive and reproduce parasitic plants must be able to recognize the presence of a neighbouring plant and have mechanisms to ensure that their seeds encounter appropriate hosts. At the point at which a parasitic plant seed detects a chemical signal exuded from the host root which triggers germination of the parasitic seeds. (James, 2023)

All parasitic plant species are angiosperms. Some species attack the roots while some attack the stem of their hosts. The best studied categories are parasites of the Family Orobanchaceae such as *Orobanche phylelipanche* and *Striga* spp. (Williams and Boehm, 2023)

An investigation into a Fast Spreading Parasitic Plant (mistletoe: tapinanthus globiferus.) On an Economic Tree, Locust Beans Tree: Parkia Biglobosa) in Bauchi State College of Agriculture, Farm Lands, Yelwa, Bauchi State

Although most parasitic plant species are considered as wild flowers or botanical curiosities. Several species are weedy and capable of inflicting substantial losses on agricultural crops among which is the most harmful witch weed (*Striga spp.*) Which attacks cereal crops such as Corn (Maize), *Guinea corn or sorghum*, millet and rice in Africa, (Williams and Boehm, 2023)

Parasitic plants could be categorised as **(a)** Hemi-parasites. These are the category of parasitic plants that are non photosynthesising, They primarily rely on their host for water and mineral nutrient. They do injure their host plants absorbing water and mineral nutrients from them. However they have chlorophyll and can manufacture their own carbohydrate by photosynthesis. (Westwood, 2023, Williams and Boehm, 2023). **(b)** Holo-parasites These category of plant parasites are non photosynthetic they depend on their hosts for all nutrition. (Westwood 2023). Parasitic plants could also be classified on their life cycle. They could classify as: **(i)** obligate parasitic plants. These are parasitic plants which have an absolute requirement to survive and complete their life cycle from their host. **(ii)** Facultative plant parasites These category live and reproduce in the absence or presence of the host. (Westwood 2023).

Parasitic plants anchor themselves to their host's plant using a specialized structure known as "haustoria", with this structure it anchors itself to the host roots or stem, depending on the parasitic plant species. For most parasitic species only "haustoria" that gets imbedded into the plant, but saving to feed the other parts remain externally. however in some parasitic plant species the "haustoria". proliferates in such a way that all vegetative growth occurs within the host, they emerge only to flower., Example *Rafflesia* which grow inside the tropical vine *Tetrastigma* and stem sucker *Pilostylib* which lives within members of the Pea Family Fabaceae. (Westwood 2023). The species *Tapinanthus globiferus* in Ghana the leaves are used to treat guinea worm infection, while in Nigeria the leaves are used to treat various disorders including cancer and liver ailments, in Senegal the leaves are used for the treatment of leprosy. (Wikipedia, 2023) This is the species affecting most Angiosperms in Nigeria. Its usual control, although not very effective is to cut out the Mistletoe branches deep into the tree proximal to the point of attachments. No good herbicidal control has been developed, although a dormant season application of ethephonaal and ethylene releasing material is a possible on some plants. (Raji *et al*:2022)

African locust bean tree (*Parkia biglobosa*) on the other hand is an economic tree that is native to tropical Africa, it occurs in open savannah woodlands, in bush fallow and wooded farmland where cultivation is semi permanent in areas ranging from tropical forests with high and well distributed rainfall to arid zones (Heuze et al 2022). African locust bean tree (*Parkia biglobosa*) is a medium sized legume tree that reaches 20-30 meters high. It has dense widely spreading umbrella shaped crown and cylindrical trunk that can reach 130cm in diameter often branching low. The leaves are alternate and bi-pinnately compound 30-40cm long and 1.5 -10mm wide inflorescence is held on a long drooping peduncle. The fruit is an indehiscent pod, seeds are hard coated and can remain viable for a period of upto 8 years. (Heuze et al 2022)

The African locust bean (*Parkia biglobosa*) is regarded as an important tree crop used for medicine and food. The tree also plays a valuable role on nutrient cycling, by fixing atmospheric nitrogen in soil (Raji et al:2022), Heuz et al (2022) also reported that African locust bean tree (*Parkia biglobosa*) is a multipurpose tree. The seeds, pods, fruit pulp and leaves are edible and used as cooking or drinking ingredients. The wood is used in constructions, of: poles, mortar and many kinds of utensils. It is valuable firewood and provides pulp to make paper. African locust bean tree (*Parkia biglobosa*) is susceptible to mistletoe infection and agro foresters' managers usually eradicate the parasitic plant. *Parkia biglobosa* hosts mistletoe on its stem as a parasite. The commonest parasitic species on African locust bean tree is *Taphinanthus globiferus* (Raji et al.:2022)

MATERIALS AND METHOD

The experimental site is farm lands within Bauchi State College of Agriculture, located in Yelwa- Bauchi, in Bauchi local government area of Bauchi State, Nigeria. Within the School farm lands have distinct foot paths that demarcate one piece of farm land from the other. The locust bean trees which are plant specimens of interests are located in these farm lands within the college premises. The areas that carried the highest number of the specimens is located between the school lecture area, students hostel, some staff residential areas to the south and Sabon Kaura village to the north, Abubakar Tafawa Balewa University old campus to the west and school stream to the east, except for the other farm land which is east of the school Library quite distinct from the others which contained very few locust bean trees. Distinct foot paths within the farm

An investigation into a Fast Spreading Parasitic Plant (mistletoe:tapinanthus globiferus.) On an Economic Tree, Locust Beans Tree: Parkia Biglobosa) in Bauchi State College of Agriculture, Farm Lands, Yelwa, Bauchi State

lands helped in serving as dividing lines within the main farmlands which served as the study area that was divided into three, the fourth part being the area behind the school library. This distinct demarcation makes it easy for one to count the Locust bean trees imbedded in each section. Within the first three section of the farm land about 87 big matured distinct *Parkia* trees were sighted the last section of the school farm which is the area behind the school library: only three *Parkia* trees which was added to group J totalling it up to ten also in number. As per the time of this research total number of *Parkia* trees within the school farm lands ,sighted and noted for this work were 90. These were systematically categorized into group of tens Each group of ten were labelled as A to J. Then within the group of ten: Locust bean trees infected by the parasitic plant mistletoe were counted and recorded under a subtopic 'Infected' while those Locust bean trees that have not been infected by the parasitic plants mistletoe were recorded under a subtopic 'Not Infected'. From these obtained percentage infected and non infected plants were worked out and recorded for each category. The percentage infected and none infected are as presented in a bar chart with Classification 'A' to "I" on "X" axis and percentage (%)1 to 100 on "Y" axis.

RESULTS AND DISCUSSION

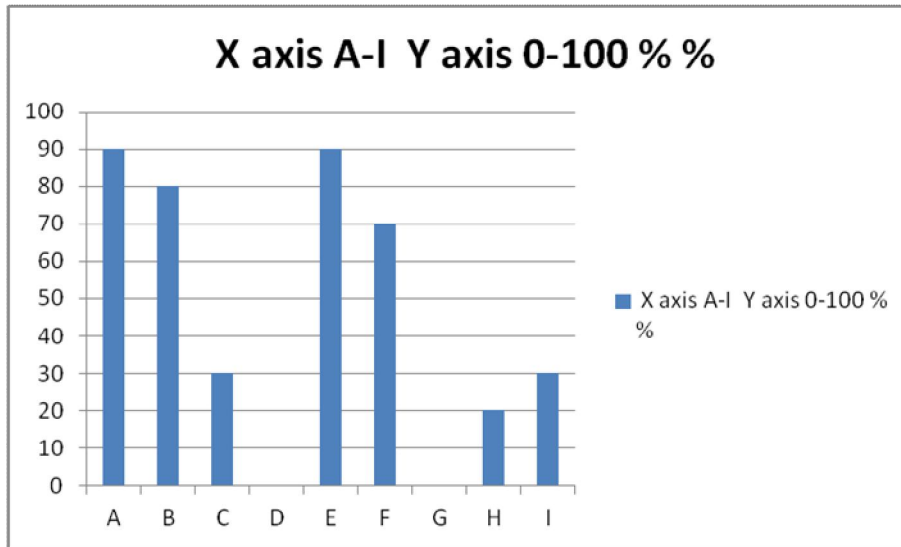
Presented on Y axis is the grouping of the trees in tens (A-I), while on the X axis is percetage (0-100) infected trees.

X axis

A-I

Y axis 0-100 %

Group	%
A	90
B	80
C	30
D	0
E	90
F	70
G	0
H	20



Presented on Y axis is the grouping of the trees in tens (A-I), while on the X axis is percentage (0-100) non infected trees.

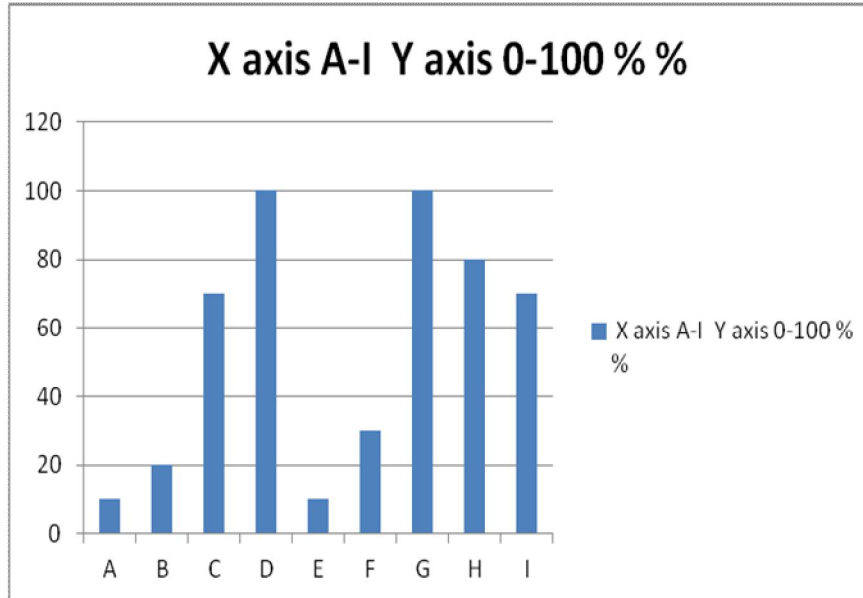
X axis

A-I

Y axis 0-100 %

Group	%
A	10
B	20
C	70
D	100
E	10
F	30
G	100
H	80
I	70

An investigation into a Fast Spreading Parasitic Plant (mistletoe: *taphinanthus globiferus*.) On an Economic Tree, Locust Beans Tree: *Parkia Biglobosa*) in Bauchi State College of Agriculture, Farm Lands, Yelwa, Bauchi State



DISCUSSION

As presented above it can be clearly seen that the level of parasitic infection of Mistletoe of the specie *Taphinanthus globiferus* on *Parkia biglobosa* in the study area was very high in some groups such as groups: A and E reaching up to 90%, while group B was 80%, Group F, 70%, lowest level of infection was observed in plants grouped as D, and G, with 0% infection and group H. Non infected trees ranked up to 80% and group I had up to 70% non infected trees. The practical observation made was that the group of infected or non infected *Parkia* trees were close to each other coffering with the report of Raji et al (2022) that birds which feeds on this parasitic plant mistletoe seeds also helps in its dispersal from one susceptible hosts plant to another of which *Parkia* tree is one. Another physical observation made was that: most of the non infected *Parkia* trees were younger trees compared to the infected trees. And there were some *Taphinanthus globiferus* great distances between infected and non infected trees This shows that the birds prefer settling of eat the matured parasitic fruits though sticky on the branch of a more closer trees than the ones that are further apart. Another physical observation made during the research was that some of the infected limbs the *Parkia* stem has been destroyed what can only be fisibly seen is the parasitic mistletoe flourishing, with no sign of *Parkia* tree.

RECOMMENDATION/ CONCLUSION

From these results it therefore comes a of emergency for the college to sit up and work hard through whatever means possible without much harm to the trees to control this harmful parasitic plant, which if not controlled can with time take over the entire *Parkia* plant community. Considering the economic importance of this economic tree especially in the study area of which the seeds are highly priceable in the market, they are used for the local soup ingredient called 'daddawa', and the pulp serve as feeds for pigs, while the burnt fruit waal minus the seeds is used in some communities in preparing a local potash as local soup ingredient called 'tokan snayi', the matured trees are now and expensive source of ply wood for roofing, and parts not used for roofing serve as energy source that is fire wood. With all these economic importance and many more which differ with geographical location, it is needless to say the *Parkia* trees in this area need urgent and immediate action for treatment of infected ones and protection of un infected ones that are young and just coming up.

REFERENCES

- Heuze V. Thiolet H. Tran G.Eclouard N. Lebas F.(2019) African Locust Bean(*Parkia biglobosa* and *Parkia ficoides*) Feedpedia a Programme by|NRAE CIRAD,AFZ and FAO
<https://www.feedipedia.org/node/268> Pp.1-4
- Raji Islamiat Abidemi, adams Chaskada,oawns Collen T,. and Manu Shiiwua (2022) Mistletoe, locust bean trees and birds work together in Nigeria's forest ecology.theconversation.com>mistletoe-lo Copy wrights © 2010-2023 Pp1-4
- Westwood James H.(2023) Parasitic Plants Botany Edited by The Editors of Eyclopedia Britanica. www.britanica.com Pp1-8
- Williams Sarah and Boechm J.Michael(2023).Parasitic Higher plants| ohioline-The Ohio department of Plant © Eyclopedia Britanica Inc.Pp1-2