



**NAMIBIAN
AGRONOMIC BOARD**

Constituted by Act 20 of 1992

Tel office: +264 61 379 513
Fax office: +264 61 22 5371
E-mail: research1@nab.com.na
Website: www.nab.com.na

Physical address:
Agricultural Boards' Building
30 David Hosea Meroro Road
Windhoek

Postal address:
PO Box 5096
Ausspannplatz
Windhoek

Creating a marketing environment that is conducive to growing and processing crops in Namibia

AGRONOMY AND HORTICULTURE MARKET DEVELOPMENT DIVISION

RESEARCH AND POLICY DEVELOPMENT SUBDIVISION

QUELEA BIRDS CONTROL MEASURES IN NAMIBIA: TRIAL USING AGRI-FREQUENCY METHOD



2019

TABLE OF CONTENTS

1.	BACKGROUND	2
2.	OBJECTIVES	2
3.	METHODOLOGY	2
4.	DESCRIPTION.....	2
5.	BREEDING	3
6.	HABITAT	4
7.	FEEDING	4
8.	POPULATION	5
9.	QUELEA DISTRIBUTION IN NAMIBIA.....	5
10.	MIGRATORY SEQUENCE	5
11.	DESTRUCTION IN THE CROP SECTOR.....	6
12.	CONTROL MEASURES	6
–	12.1. Chemical control method	6
–	12.2. Physical and Mechanical control method	6
–	12.3. Traditional control methods	7
–	12.4. Agronomical control method	8
–	12.5. Biological control method	8
–	12.6. Buddle strap control method	8
–	12.7. Advanced technology – Agri-frequency {AGRIONICS}.....	8
13.	RECOMMENDATIONS.....	9
14.	CONCLUSION.....	9
	REFERENCES:	10

1. BACKGROUND

Quelea birds are problematic pests that feed on grains and grass seeds. They can destroy the entire Mahangu {*Pearl millet*} yield if control measures are not promptly taken during their feeding period. Quelea birds are the most abundant bird species on Earth with an estimated population of 1.5 billion birds (Cheke, 2016). They have been destructive to local cereal crops, accounting for over 20% to 30% loss of Mahangu or even the entire total expected harvest. This has been a disastrous situation for local Mahangu producers.

Mahangu is a staple food crop for almost half the Namibian population especially in the Northern and Central regions, yet its production is drastically affected by these problematic pests. The chemical Quelea control methods which seem to be effective in controlling these birds are too expensive and detrimental to the environment and have secondary poisoning on non-target organisms including secondary feeders such as human beings, cats, and other carnivores. Currently, most local producers are using human bird-scaring methods which are too costly. Thus, the necessity of finding an alternative Quelea bird control measure was raised.

Therefore, this study analyses affordable and eco-environmentally friendly controlling measures suitable to the Namibian environment at both communal and commercial levels.

2. OBJECTIVES

This research study assesses alternative bird control measures that are effective, efficient, and economically friendly, therefore a practical experimental trial is carried out against Quelea bird using Agri-frequency technological method.

3. METHODOLOGY

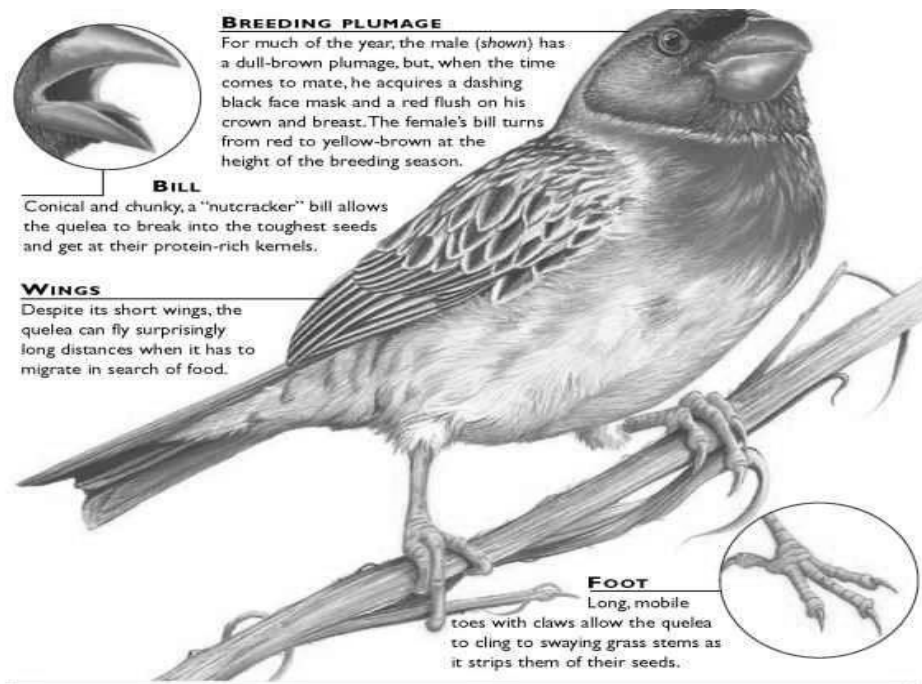
AGRI-FREQUENCY treatment was used; Quelea birds have energy and vibrate at specific unique frequencies like any other organisms. When the quelea's frequency is transmitted to its area it influences the bird with immediate effect. The frequencies are species-specific. When the birds' energy is enhanced with its frequency it will enhance the vitality of that organism.

But if an organism's energy is distorted by transmitting it out of phase the organism will become sick and die or feel lifeless and rather move out of the area, making it a 'no-go zone'.

In this study, the AGRI-FREQUENCIES treatment was transmitted out-of-phase against quelea birds on the demarcated mahangu field area using GPS as per coordinates collected.

4. DESCRIPTION

Quelea birds are characterized by a black face mask, red-billed with upper parts mainly brown to grey with dark brown wings and a brown tail (Cardboard box Travel shop 2016). The adult Quelea quelea bird can be 12 cm body length size and weigh 20 grams (Cardboard box Travel shop, 2016).



Source: <https://vimeo.com/51049882>

Fig.1: Descriptive features of Adult *Quelea quelea* Bird

5. Breeding



Source: <https://vimeo.com/51049882>

Fig.2: Nests of *Quelea quelea* birds

These birds build their nest with grass strip at a height of up to 6 m above ground, their nests are small oval-ball shaped with a side-top entrance. Breeding season starts in February to March and 1 to 5 eggs are laid and incubated for 12 days (Cheke, 2016). After two weeks young are fledged and ready to leave the nest and become independent. Breeding starts at 1 year and they have a lifespan of about 3 years (Cardboard box Travel shop, 2016).

6. HABITAT

Quelea habitat on bush-grassland, dry thornveld, and semi-arid regions. They roost on a variety of trees but most preferably on thorn-bush trees (*Acacia species* and *Ziziphus mucronata*). The places with abundant water sources attract *Quelea quelea* birds, as they eat and roost near water points (Cheke, 2016).



Source: <https://vimeo.com/51049882>



Source: <https://vimeo.com/51049882>

Fig.3: *Quelea quelea* bird roosting on Thorn-tree. **Fig.4:** *Quelea quelea* Nesting on Acacia tree

7. FEEDING

The *Quelea quelea* bird feeds mainly on grass seeds or cereal grains. A drawback of their diet is the damage done on cereal crops such as Mahangu, Wheat, Sorghum, Rice, and Oats. Although the *Quelea quelea* birds also feed on small insects such as termites and beetles etc., the cereal grains constitute a bigger portion of their diets. They can travel at an average of 30-kilometer distance per day in search of food if the food is not plentiful enough. They do not live in a vast number where food is scarce, meaning the flock sizes are much smaller with a limited food source, but the flock increases when food is plentiful enough (Safari Ecology, 2013).

Quelea birds feed during early cool morning hours of the day and break off immediately before midday, before hotness start and resume eating again for dinner at cool hours of late-afternoon. An adult *Quelea quelea* bird can eat about 3.3 to 10 grams per day depending on the sizes (Safari Ecology, 2013, IRIN, 2009). At a minimum daily consumption rate of 3.3 grams multiplied by one thousand flock size of *Quelea quelea*, it will result in 3.3 kilograms of grains consumed per day, multiplied by 30 days of feeding length on Mahangu crops starting at the growth stage of; Milky stage to Dough Growth Stage is equal to approximately 100 kilograms. At an average Mahangu production yield of 600 kilograms per ha in Namibia, the destruction it has is equivalent to a minimum yield loss of 20% up to a maximum yield loss of 60%. It can be over 30% average yield loss per ha (IRIN, 2009).

8. POPULATION

Queleas are a highly populated bird species with an estimated population of 1.5 billion. The flock size can vary from 1 to 32 birds up to thousands of birds per flock or even millions of birds per flock. However, it is very rare for a single *Quelea quelea* bird to travel on its own as they always feed, roost, breed, and travel in large numbers as means of predatory protection. A tightly packed flock is a good defense against hawks and any other aerial predators. However, due to their flying ability and flying flock size, *Quelea quelea* has a few predators that cannot easily reduce *Quelea quelea* bird's population (Lazarus, 1979).

9. QUELEA DISTRIBUTION IN NAMIBIA

Queleas are commonly distributed in Northern Central Regions of the country including the Zambezi region, Etosha National Park, the Okavango Delta, and Moremi Game reserve (Cardboard box Travel shop, 2016) and rarely found or absent in the Namib desert.

10. MIGRATORY SEQUENCE

Unfortunately, the *Quelea quelea* birds' problem is not one country's problem but a regional problem if not continental, as they affect entire Southern Africa. In Southern Africa, as they migrate from one country to the other; starting in Kenya in January, Zimbabwe in April, Malawi and Tanzania in May, Mozambique, Tanzania, and again Zimbabwe in June and Namibia and Tanzania in July (IRIN, 2009). The *Quelea quelea* birds migratory sequence depends on the availability of food and rainfall pattern.

Country	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Kenya	x											
Zimbabwe				x		x						
Malawi					x							
Tanzania			x		x							
Mozambique						x						
Namibia		x	x		x	x	x					

Source: IRIN, 2009

Figure.5: *Quelea* migratory sequence



Source: <https://vimeo.com/51049882>

Figure.6: *Quelea quelea* distribution pattern on the World map

11. DESTRUCTION IN THE CROP SECTOR

The Quelea is a tiny bird yet causes huge destruction. A typical flock visit of Quelea birds is a disaster outbreak to an African cereal farmer. With the estimated total population of 1.5 billion FAO estimates economical loss by Quelea quelea birds is at approximately US\$ 50 to 79 Million annually (IRIN, 2009).



Source: IRIN, 2009

Fig.7: Quelea roosting

12. CONTROL MEASURES

12.1. Chemical control method

✓ Pesticides

Several pesticides or avicides are developed and available for bird control such as Fenthion, and Organophosphate {Cyanophos, Phoxim, Mevinphos}. Most of these pesticides or avicides are classified as extremely hazardous substances with secondary effects as they kill non-target organisms (Cheke, 2016). Most of the above-mentioned chemical control methods are banned or not registered with many countries such as the United State of America and the European Union, and these avicides have non-biodegradability which poses a huge threat to the environment in the long run.

✓ Birds Repellents

A narcotic agent {Alphachloralose, Mesurol, Ammonium Sulphate, etc.,} is added to bait grains or water and leaves birds so weak that they can be hand-picked or killed.

12.2. Physical and Mechanical control method

✓ Scaring

Bird scaring by humans, drum beats, shouting, scaring with Falcons and commercial bird-scaring devices, Predator-shaped like machines, artificial noisy devices to scare Quelea birds away, however, these devices are too expensive and birds become habituated to the devices (Cheke, 2016).

✓ **Roost Trapping**

Birds are trapped and harvested for consumption as they provide a nutritious source of protein, many several trapping methods are used for this practice such as Basket, Water-drum, Net trapping, etc.,

✓ **Crop Netting**

Covering of Mahangu crop field with nets is also a bird's protective measure although the practice is only effective to a smaller area size due to cost which is attached to its applications.

✓ **Weeding**

Removal of grasses from the Mahangu field reduces *Quelea quelea* bird's infestation as they feed on grasses. Weeds attract *Quelea quelea* birds into Mahangu field whereby they gradually shift their feeding source to the cereal grains as the grains ripen. Therefore, is advisable for the farmers to continuously remove unwanted plants off the Mahangu field all the time.

✓ **Explosion**

The fire-bombs are used to destroy the vegetation where birds are roosting or nesting, skilled personnel is required to handle the explosion and special equipment during transportation and its operation. Flame or fire is set beneath the thorn bush where the birds are roosting which form a mist and then ignites or explode. The method poses danger to the operator and extra precautions are required for the safety of the operator and the surrounding environment.

✓ **Nest destruction and Chick harvesting**

Nests are destroyed using hooks and long poles as well as cutting down the trees and chicks harvesting. The method is only successful if carried after the birds have laid their eggs or otherwise the birds easily repair the nest rebreeds somewhere else. And this method might promote deforestation.

12.3. Traditional control methods

✓ **Catapult/Slingshot {Okafuta}**

The Catapult kills one bird at a time using a single stone per shot. Time-consuming and ineffective techniques. Although traditional methods are a lot, most of them are time-consuming and laborious as well as ineffective and illegal as per environmental law or nature conservancy act.

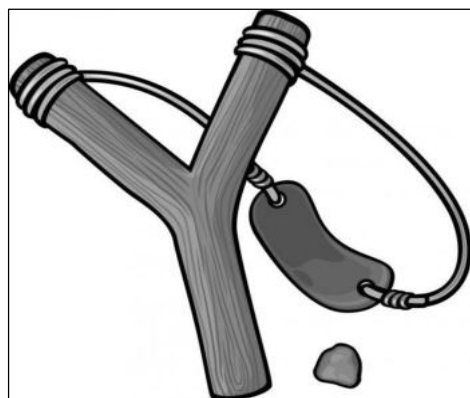


Fig.8: Catapult

12.4. Agronomical control method

✓ Planting and harvesting time Manipulation

Planting early and harvesting before the breeding season of *Quelea quelea* birds as the huge destruction is accorded by young ones after breeding season. This control technique is more effective with the irrigation cultivation method compared to rain-fed. Preferably short duration crop varieties will be favourable for this technique.

✓ Quelea resistant Mahangu cultivars

Improved crop varieties that are resistant to *Quelea quelea* birds, especially Mahangu cultivars with protruding-awns on panicles that have many protruding hairy-like, it becomes difficult for *Quelea* birds to pick the grains from the panicle.

12.5. Biological control method

Biological control methods that might reduce *Quelea quelea* birds' population are currently underway, yet no effective mechanism experiment concluded future research is recommended on this subject (Cheke, 2016).

12.6. Buddle strap control method

The straps control method is the newly identified, recently introduced control method in Namibia which seems to be a bit more effective than the other traditional control methods.

However, the cost obligation and degree of effectiveness are still to be determined before any recommendations. This method uses straps (Nylon rope-like) tied on poles across the entire mahangu field. When the wind blows the straps (Nylon rope) make a continuous sound that scares away the birds.

12.7. Advanced technology – Agri-frequency {AGRIONICS}

The Agri-frequency is the latest advanced sustainable, eco-friendly control method. Agri-frequency uses an organism's frequency or energy and cut-off the energy of the problematic organism then the targeted organism will move out of the specific treated area or eventually die. It directly treats the specific area at a certain period and only the targeted animal or organism is affected. No other harmful effects on non-targeted organisms (Agri-frequency, 2018). Based on the observations established from this study the birds are still seen at the treated site, making it practically ineffective.

13. RECOMMENDATIONS

- ✓ While it is imperative to use sustainable, eco-environmentally friendly control methods against *Quelea quelea* birds, cost implication and effectiveness are of equal importance to the farmer.
- ✓ Due to the migratory ability of *Quelea* birds the AGRI-FREQUENCY method was recorded ineffective as the birds continue to attack mahangu field under the treated area.

14. CONCLUSION

Although the traditional bird-scaring control method by humans is the most popular practiced method in Namibia, it is costly and ineffective, as it drastically leads to an increase in overall production cost. On the other hand, most of the effective *Quelea* birds' chemical control methods are detrimental to the environment and have harmful substances that are non-biodegradable and remain in the soil for a long time, end up killing non-target organisms.

The Agri-frequency treatment method which theoretically possesses both effectiveness and affordability in controlling measures against *quelea* birds; during the practical test trial conducted in Namibia displayed unsatisfactory impact, thus, it is established in this study that the Agri-frequency/AGRIONICS treatment method against *Quelea* birds is ineffective until further review proving contrary to these findings.

REFERENCES:

Agrifrequency About Us. (2018). Agri Frequencies Farm Sustainably Farm With Frequency. <http://www.agrifrequencies.com/about-us/>

Cardboard box Travel Shop. (2016). *Red-Billed Quelea Birds of Namibia*. WildWeb - W
Cheke, R. A., & El Hady Sidatt, M. (2019). A review of alternatives to fenthion for quelea bird control. *Crop Protection*, 116, 15–23. <https://doi.org/10.1016/j.cropro.2018.10.005>

Lazarus, J. (1979). Flock size and behaviour in captive red-billed weaverbirds (*Quelea quelea*): implications for social facilitation and the functions of flocking. *Behaviour*, 71(1-2), 127-144.

Quelea - Africa's most hated bird. (2009, August 19). The New Humanitarian. <https://www.thenewhumanitarian.org/news/2009/08/19#:~:text=For%20thousands%20of%20years%2C%20subsistence,%2C%22%20Clive%20Elliot%20told%20IRIN.>

- Videos: <https://www.youtube.com/watch?v=2q2PPGEqxUE> {2013}
- Video: <https://www.youtube.com/watch?v=nGF9esqI50w> {2013}
- Video: <https://vimeo.com/51049882> {2012}