Tanzania Biotech Product Ltd is a state-of-art Biolarvicides factory that promises to wipe out Mosquito Vector Borne Diseases in Africa such as Malaria, Dengue, Zika etc.

TBPL Ltd is a subsidiary company under Tanzania National Development corporation (NDC). The plant is located along TAMCO Industrial Estate at Kibaha Coastal. The factory is a main producer of biolarvicides which are Griselesf (Bs) and Bactivec (Bti).
What are Biolarvicides?

Are biological products whose active ingredient are entomopathological spore forming bacteria used for controlling mosquitoes larval stages. Among the most commonly used bacteria for mosquitoes Biological Control are:

- *Bacillus sphaericus*, strain 2362.
- *Bacillus thuringiensis*, var. *Israelensis* SH-14, strain 266/2 (Bti)

Bacillus sphaericus

Bacillus thuringiensis
OUR PRODUCTS

BIOLARVICIDES

BACTIVEC
Bacillus thuringiensis SH-14 strain 266/2

GRISELESF
Bacillus sphaericus strain 2362

In liquid form
Our Products

- Bactivec is quick in action that kills 100% of the mosquito larva within 24–48 hours. It is used in clean water.

- Griselesf is slow in action, kills 100% of mosquito larva within 48–72 hours. Effective in polluted water.

- These biolarvicides are innocuous, highly specific and very restricted.
30mL Pack

It is a small family pack size, 30 mL flasks. It can be used outdoor as well as indoor for applying in the indoor water storage tanks.

The application dose is 1mL for 50 Litres of water
20lt Pail Pack

**Bactivec** and **Griselesf** are biological products used to control the breeding of different types of mosquito species. The products are highly efficient with absolutely no effect on human beings and environment.

In the field it can be sprayed either by air or land targeting the surface of mosquito breeding sites.

The application dose is 5 – 10 mls / m².
Other Measurements and Conversions

- 1 Litre = 1000 mls
- 1 ha = 10,000 sqm = 2.2 acres
- 1 sqft = 0.105 sqm
How Biolarvicides work?
How Biolarvicides Work?

- Bacillus thuringiensis israelensis SH 14 (Bti) and Bacillus sphericus 2362 produce Insecticidal Crystal Protein (ICP) during sporulation.
- Spore when ingested by the mosquito larva it dissolve in the larva mid gut, releasing ICP which is protoxin that proteolytically converted into smaller toxic polypeptides in the larva mid gut.
- The activated toxin interacts with the midgut epithelium cells of larva
How Biolarvicides Work?

- The toxins generate pores in the cell membrane, thus disturbing the osmotic balance, consequently the cells swells and lyse.

- The larva stops feeding and eventually die
How Biolarvicides work?

Fig. 1. Mechanism of toxicity of Bt

A. Crystal
B. Dissolving of crystals and activation of toxins
   - δ-endotoxin
   - Pro-toxin
   - Activated toxin
C. Toxins bind to receptors in gut epithelium
   - Epithelium
   - Receptors
   - Toxin
   - Perforation of gut membrane
D. Spores germinate and bacteria proliferate
Unlike adult mosquitoes, larvae cannot change their behaviour to avoid a control intervention targeted at larval habitats.

Chemical larvicides have significant adverse effects on other non target species while biolarvicides selectively kill mosquito larvae with negligible effect on non target organisms.

The efficacy of insecticides based vector control is currently threatened by mosquito
Rationale for using Biolarvicides

resistance particularly to pyrethroid insecticides (WHO 2015a), and this has drastically affected mosquito control programmes like insecticides treated nets in Africa, indoor residual spray in Asia and fogging sprays in Caribbean (Bonnet et al., 2009)
Quality of Biolarvicides in Tanzania

- Our products have quality certificates from Tropical Pesticides Research Institute (TPRI) of Tanzania
- As a way of monitoring quality of the products in the market, National Institute for Medical Research (NIMR) has recently issue a report which affirm the quality robustness of biolarvicides
- As a way towards global marketing, we have started preliminary stages for WHOPES prequalification
Markets

Local
- Ministry of Health
- PORALG
- Private institutions
- Ordinary people

International
- Niger
- Angola
- Mozambique
Prospect Markets

- EAC countries
- SADC countries
- Srilanka
Where do mosquitoes breed?

• Mosquitoes breed only in water! The larvae cannot survive anywhere else, they DO NOT breed in grass or bushes.

• Mosquitoes can breed in any kind of water and therefore ALL kinds of water bodies have to be checked for mosquito larvae in a larval survey.

• Mosquitoes do not breed in fast running water of rivers, but can breed at the edges where the water is not moving fast, in cattle hoof prints along a river and in slow flowing drains.
Mosquitoes breeding habitats

Normally mosquitoes develops in water bodies from the egg stage until is adult. Those water bodies may be man made or natural forces made, which are in form of:

1. Open habitat
2. Closed habitats

**Open habitats**

Are water bodies that are exposed to the open air and light. Means that light can reach the water surface, also plants can grow inside.

**Examples:**

Drains and Ditches, man-made holes, swampy areas, rice field, Ponds, Stream and River beds, Water storage tanks, livestock feeding trays, clay pots, Construction pits, Puddles
Mosquitoes breeding habitats

Close habitats

Are defined as water breeding sites that can be found in closed and dark environments. Mosquitoes lay eggs through small openings. So are difficult and more complicated to reach the water surface especially when it is necessary to identify the types of species on that area.

Examples:
- Pit latrines
- Soakage pits
- Septic tanks
- Others
General Objectives

Reduce the incidence of malaria and other mosquito borne diseases, through elimination of mosquitoes.

Specific Objectives

➢ To apply biolarvicides (Griselesf and Bactivec) in mosquitoes breeding sites.
➢ To lead a battle against malaria and other mosquito borne diseases towards elimination.
➢ To reduce costs of buying medicines, nets, treatments
➢ To have a health and prosperous community
SIGNIFICANCE AND BENEFITS OF BIOLARVICIDING

**Economic**

- To reduce expenditure in antimalarial drugs, primary health assistance and hospitalization of sick people.
- To reduce the costs of controlling other mosquito vector transmitted diseases eg dengue

**Health**

- To diminish significantly the morbi-mortality due to Malaria specially to children under five years and pregnant women.

**Social**

To improve welfare of population while reducing the number of malaria cases and deaths.

**Environmental**

- Is a modern technology to fight against malaria vector and an effective way of eliminating malaria, while preserving our ecosystem.
Larviciding in Tanzania

- Larval Source Management by applying biolarvicides (Bti and Bs) has been widely practised in different ecological settings in Tanzania since June 2017.

- Operational and Community Acceptability: This is a community based programme. In Tanzania

  The identification and application in the breeding sites is done by Community Owned Resource Persons (CORPS)
Larviciding in Tanzania

- Results: Entomological data shows the population of both aquatic and adult stages of Culicine and Anopheline mosquitoes was significantly downscaled. There is as well subsequent substantial reduction in malaria transmission from 14% to 7% from 2015 to 2018 suggesting that larviciding have substantially contributed to malaria reduction.

- Conclusion: Larviciding is an effective tool in reducing malaria transmission, especially when integrated with other methods. Larvicides as well circumvent vector resistance.