

Experimental aerial release of sterile males of Glossina palpalis gambiensis and of Glossina tachinoides in a biological control operation

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Résumé

POLITZAR (H.), MEROT (P.), BRANDL (F.E.). Lâchers aériens expérimentaux de mâles stériles de G. p. gambiensis et G. tachinoides dans un programme de lutte génétique. Rev. Elev. Méd. vét. Pays trop., 1984, 37 (N° spécial) : 198-202

Des lâchers expérimentaux par voie aérienne de mâles stériles de Glossina p. gambiensis et G. tachinoides ont été expérimentés dans une zone de savane guinéenne de plus de 3 000 km². L'U.L.M. à deux places utilisé pour ces lâchers a donné d'excellents résultats. Le coût de cette méthode de lâcher se compare favorablement à celui des lâchers par voie terrestre. Cette méthode peut donc être recommandée pour des programmes futurs.

Mots clés : Lutte génétique - Lâchers aériens - Mâles stériles - Glossina palpalis gambiensis - Glossina tachinoides.

Summary

POLITZAR (H.), MEROT (P.), BRANDL (F.E.). Experimental aerial release of sterile males of Glossina palpalis gambiensis and Glossina tachinoides in a biological control operation. Rev. Elev. Méd. vét. Pays trop., 1984, 37 (N° spécial) : 198-202

In the context of a sterile male release project to eradicate Glossina palpalis gambiensis and Glossina tachinoides from more than 3 000 km² of Guinean savannah experimental aerial releases of sterile males of these two species have been carried out. The double seated trike, used for these releases, gave an excellent performance and met all the requirements. The economic calculation of the costs of this release method compared with releases from the ground permits to recommend it for the use in future SIT projects.

Key words : Genetical control - Aerial - Releases - Sterile males - Glossina palpalis gambiensis - Glossina tachinoides.

INTRODUCTION

In the agro-pastoral zone of Sideradougou (Burkina*), which covers more than 3 000 km² of Guinean savannah the eradication of two riverine species of glossina (G. p. gambiensis and G. tachinoides) was achieved within one year by a combination of trapping and the sterile insect technique (SIT) (1). During and entomological evaluation by an independent expert no wild flies could be detected in April 1984 (2). However releases of sterile males of these two species will be continued for several months for security reasons. To assure these releases even during the wet season 560 km of roads had to be constructed during one year of preparatory work with total costs of 175 000 \$. In order to reduce these considerable expenditures in eventual future SIT projects the release of sterile males from the air was tested using a two seated trike (Ultra light aircraft). The present paper deals only with the feasibility of this very cheap aircraft for daily release operations and its cost effectiveness and not with the different possible forms of release procedures.

MATERIALS AND METHODS

1. Technical details

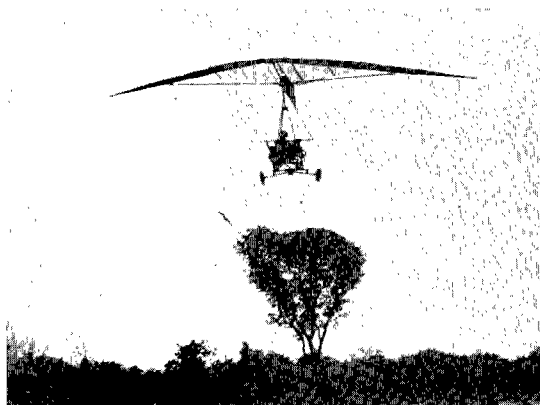
Kind of aircraft	: double seated trike
Manufacturer	: Danis et Fils/France
Unladen	: 130 kg
Pay load	: 240 kg
Engine	: 2 cylinder, 500cm ³ , two stroke, 50 hp
Energy source	: 2 p.100 mixture
Consumption	: 7 l/h at 50 km/h
Speed	: 40 - 65 km/h
Distance necessary	:
for take off	: 70 - 100 m
Technical equipment	: variometer, speedometer, setimeter, radio.

2. Release procedure

In order to follow easily the experiments with different speeds of the aircraft, winddrift, height and to localize the cages after landing, small parachutes of 60 cm diameter were used. Two Roubeaud cages were attached to each parachute alternately one with 30 sterile males of G. p. gambiensis and 30 sterile males of G. tachinoides or two cages with 30 sterile males of G. p. gambiensis.

* ex Upper Volta.

All flies had been marked with acrylic paint on the thorax. Immediately before descending them the mosquito netting at the bottom of the cages was removed to assure that the flies could leave the cages. After promising results in a preliminary trial the regular release operation due for that day on 30 km of the river Koba was carried out by trike. 1 500 sterile males of G. p. gambiensis and 500 G. tachinoides were thus released in intervals of about one km, which resulted in the release of 50 G. p. gambiensis and 17 G. tachinoides per km. For comparison of performance, additional 500 G. p. gambiensis, marked with a different colour were released from the ground at the usual release points.



3. Recapture

24 hours after the releases 30 biconical traps were placed at intervals of one km in order to monitor survival and dispersion.

RESULTS AND DISCUSSION

1. Performance of the aircraft

All river bends, even up-turns with or against the wind, were perfectly performed even only a few meters above the canopy. Either the early morning or the late afternoon, when inversion conditions are prevailing, can be used for flying, i.e. 3-4 h/day. As soon as turbulences start the flight height has to be increased for security reasons to about 25 m above the gallery forest. If parachutes are used a minimum height of about 10 m has to be kept to allow all parachutes to open in time. The flight time to release the sterile males along the 30 km of river amounted to 35 minutes.

2. Release operation

From 34 parachutes 32 landed in the gallery forest and only two about

30 m outside in the flood plains due to sudden wind squalls. The winddrift acting on the parachute at the moment of landing made the cages come to rest on their long sides allowing the flies to leave the cages freely. Some parachutes got caught in the tree canopy and the cages were hanging in the air. A control effected from the ground some minutes after the landing of the parachutes showed that all flies had left the cages either on the ground or in the canopy.

3. Recapture

15 sterile males of G. p. gambiensis released by air and 14 released from the ground were recaptured. This corresponds well to the average recapture rate obtained with an equal number of steriles males released from the ground at the time of the year (peak of the dry season).

The sterile males released from the ground were over represented. An obvious explanation explanation for this is that the release and the recapture sites for this batch were identical whilst the aerial release was independent of the access points. Furthermore the releases from the air were executed preferentially at the few existing water points whereas there was no more water at all our regular control points. 9 steriles males of G. tachinoides were recaptured evenly dispersed along the river. This species, more independent of the presence of water, also showed the usual recapture rate we find at the regular controls of our releases from the ground. Three more sterile males of G. p. gambiensis released by air and one G. tachinoides, as well as one sterile male of G. p. gambiensis released from the ground were recaptured in the barrier traps 3 km downstream of the last release point.

4. Comparison of costs

The possible flight time per day considering the meteorological conditions in Burkina has been estimated at a minimum of 3 h/day at an average speed of 50 km/h (= 150 km/day). The daily release operations of between 30 and 40 km of river, necessary to cover our project area every two weeks necessitate at the moment releases 5 days per week. By aircraft they could be carried out in two days per week only. To cover the 560 km of riverine vegetation twice a month would require 10 days of release along 130 km per day resulting in 360 flight hours per year. The price for buying the aircraft being at 5 000 \$, adding a spare engine for 1 375 \$ repairs and maintenance of 25 p.100 would amount to a total of 7 625 \$. Assuming a life span of 5 years equal to 1 800 flying hours, fixed costs would be 4,25 \$/h and petrol 5,25 \$ per h giving a total of 9,50 \$ without pilot. At a speed of 50 km/h this would cost 0,19 \$ per km, compared to the costs of a 4 wheel drive care of 0,5 \$ per km.

CONCLUSION

This simple comparison of costs per km shows considerable advantage for aerial release. Even more important is the fact that most of the costs for road construction could be saved if aerial release was chosen. The initial survey of an area and the setting of insecticide impregnated screens for the population reduction prior to the releases can be done during the dry season with bicycles or motor bikes. Additionally, a slow and low flying aircraft like the trike can be very useful in survey programs specially for areas of difficult access. The rapid development of new models of these ultra light aircraft that may even be more suitable for this kind of work allows to recommend their use for future SIT projects. Naturally, further experiments are necessary to develop a release procedure that can be applied on a large scale but this was not the subject of the testing described here.

Resumen

POLITZAR (H.), MEROT (P.), BRANDL (F.E.). Sueltas aéreas experimentales de machos esteriles de Glossina palpalis gambiensis y Glossina tachinoides en un programa de lucha genética. Rev. Elev. Méd. vét. Pays trop. 1984, 37 (N° spécial) : 198-202

Se experimentaron sueltas por vía aérea de machos esteriles de Glossina palpalis gambiensis y Glossina tachinoides en una zona de sabana guineana de más de 3 000 km². El U.L.M. (Ultra ligero motorizado) con dos asientos utilizado para estas sueltas dió resultados óptimos. Se compara favorablemente el coste de dicho método de suelta con el de sueltas por vía terrena. Púes se puede recomendar este método para programas futuros.

Palabras claves : Lucha genética - Sueltas aéreas - Machos esteriles - Glossina palpalis gambiensis- Glossina tachinoides.

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