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| **Abstract** |
| **Background**  Probability-based observational study design was used to collect the baseline data, data to isolate changes occurring overtime and data on last monitoring in which sampling involved stratified random selection of sampling units, since the surveying area is heterogeneous, at the outset, the area was isolated into subareas (strata) based on vegetation, climate, altitude, land use, distribution of human habitation, etc. into more or less homogeneous. Different trap traps design baited with odor attractants were deployed in a georeferenced locaitons. Then, animals were treated with deltamethrin 1%, using hypodermic syringe, at belly and legs body parts, as 0.06 ml of formulation per 1 kg of body weight which is less by 40% that needed for a whole body treatment regime The data processing was carried out based on quantitative data analyzing methods.  **Results**  The result of subsequent monitoring surveys depicted that the overall tsetse mean catch reduced by 78.6% from a mean catch of 17.3 ± 8.6 flies per trap per day of pre-control to 3.7 ± 2.6 flies per trap per day at last monitoring. And the reduction was found statistically significant; p=0.000. Consequentially, the overall mean trypanosome prevalence was dropped from a peak of 63 cases (11.6% ± 3.2) in November 2017 to the current level of 17 cases (3.9% ± 2.3) in June 2019. This resulted in a 66.4% reduction in which the difference was found statistically significant; p=0.000. The overall mean PCV value has also improved by 1.5% from 24.9%±3.2 of the reference data to 26.4% ± 3.4 at last monitoring and the difference was found statistically significant; p=0.002.  **Conclusion**  As the findings of this field trial have proved, generally, insecticide-based control technique is one of the most reliable simplest techniques to rapidly suppress tsetse flies. Its cost effectiveness greatly enhances when it is applied in restricted application scenario. The technique has got a potential not only to reduce the amount of insecticide needed for the whole body application regimen by 40%, but also a potential to adequately suppress tsetse flies consequentially, trypanosomosis.  **Key words:** tsetse; trypanosomosis; bait technology, deltamethrin 1%; insecticide-treated cattle; RAIC technique; cost-effectiveness |

ABSRACT, paragraph 10-24 has been changed to meet your journal policy asbelow