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Study of the competitiveness of allochtonous sterile males during the tsetse eradication campaign in Senegal

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Since 2007, the Government of Senegal launched an eradication campaign against the only species present in the Niayes area *(Glossina palpalis gambiensis* Vanderplank). The fly occupies an isolated pocket of 525km2 but keeps transmitting animal trypanosomoses to livestock with a high incidence, thus hampering the intensification of cattle production systems. An area-wide integrated pest management strategy was selected that targets the entire infested area and combines control methods efficient at high density of the target population (insecticide-treated targets and cattle) with the sterile insect technique (SIT) that shows inverse density dependent properties. The sterile male insects will be released as chilled adults from gyrocopters by air, using a newly developed automatic release machine.

One of the principal prerequisites for successful SIT, apart from the availability of sterile males in adequate numbers, is to make sure that the laboratory strain is competitive with the wild males in the target area. This is all the more important as in Senegal, the local target populations are genetically isolated from the *G. p. gambiensis* populations of the main tsetse belt, and they have a more xerophylous behaviour (the annual rainfall in the Niayes area is below 500mm). The mating compatibility of the strain maintained at the CIRDES, Burkina Faso for more than 40 years (named BKF) with that of the target area in the Niayes was confirmed at the FAO/IAEA Insect Pest Control Laboratory in Seibersdorf, Austria. Thereafter, we released more than 140,000 sterile male flies (BKF) in 4 sites to study their dispersal, survival and competitiveness (recapture rate of 5%). The latter parameter was measured using Fried's index (F), thanks to availability of data on natural abortion rates for more than 3 years in all the release sites before these mark-release-recapture experiments. The BKF strain performed well in 3 out of the 4 sites (daily mortality rates of 15-16%, daily displacement of 420-705m and F of 0.37±0.29), but underperformed in the park of Hann inside Dakar city where pollution is high (mortality rates of 24%, $p<0.05$). An introgressed strain, constructed using a crossing schedule with BKF female flies and local SEN male flies (5 generations) will be tested soon in this site. Interestingly, the males from the BKF strain performed better in Senegal than in Burkina Faso recently, suggesting some degree of satyrism in this species.