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The occurrence of cuticular lesions (cicatrices) of Glossina species in the field

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Résumé

RYAN (L.). Fréquence des lésions cuticulaires (cicatrices) pour certaines espèces de glossines sur le terrain. Rev. Elev. Méd. vét. Pays trop., 1984, 37 (N° spécial) : 211-217

L'auteur met en évidence des différences dans le taux de cicatrisation et le taux d'usure des ailes qui sont confirmées par la corrélation avec l'âge ovarien utilisé comme échelle de temps. Ces variations concernent Glossina morsitans submorsitans, G. medicorum, G. fusca fusca, G. palpalis gambiensis, G. longipalpis et G. tachinoides en Côte-d'Ivoire ; G. morsitans morsitans et G. pallidipes au Zimbabwe ; G. morsitans morsitans au Malawi ; G. morsitans centralis en Zambie ; G. longipennis et G. pallidipes en Somalie.

Cette communication est la première concernant le taux de cicatrisation. Celui-ci indique, de même que l'usure des ailes, l'activité de la tsé-tsé mais peut aussi refléter la pression des prédateurs. Les lésions cuticulaires offrent une échelle grossière pour la diagnose de l'âge similaire à celle de l'usure des ailes.

Les cicatrices dues à l'accouplement et celles dues à des blessures diffèrent en fonction des espèces et de leur habitat.

Mots-clés : Glossina spp. - Tsé-tsé - Cicatrices - Usure des ailes - Accouplement - Blessures - Âge -(diagnose) - Prédation.

Summary

RYAN (L.). The occurrence of cuticular lesions (cicatrices) of Glossina species in the field. Rev. Elev. Méd. vét. Pays trop., 1984, 37 (N° spécial) : 211-217

Differences in rate of cicatrizing and rate of wing fray, as shown by correlation with ovarian age as a time scale, are shown between Glossina morsitans submorsitans, G. medicorum, G. fusca fusca, G. palpalis gambiensis, G. longipalpis and G. tachinoides in Ivory Coast ; G. morsitans morsitans and G. pallidipes in Zimbabwe ; G. morsitans morsitans in Malawi ; G. morsitans centralis in Zambia ; G. longipennis and G. pallidipes in Somalia.

This is the first record of variations in rate of cicatrizing which alike wing fray indicates tsetse activity, but which may also reflect predator pressure. Cuticular lesions offer a coarse age-scale similar to wing fray. Mating cicatrices and wound cicatrices are shown to differ between species and habitat.

Key words : Glossina spp. - Tsetse - Cicatrices - Wing fray - Mating - Wounding - Ageing - Predation.

21. INTRODUCTION

The occurrence of mating scars of the palpalis group of tsetse is well documented (12,15, 6). Mating scars or mating cicatrices (15) are caused by the superior claspers of males (12). Other cicatrices have been noted by MACHADO of females of the fusca group and males of the palpalis group (p. 255 In : MULLIGAN and POTTS (6)). More recent studies have shown that indeed these cicatrices, also referred to as black spots and cuticular lesions, are healed wounds. They are not infectious, nor a symptom of a disease (7, 8). Cicatrices have been noted in Glossina pallidipes, G. swynnertoni, G. austeni, G. fuscipes, G. brevipalpis and G. longipennis in Kenya (14,13), G. morsitans centralis in Zambia, G. morsitans submorsitans in Nigeria and Ivory Coast, G. palpalis s.l. and G. pallicera in Ivory Coast ; G. morsitans morsitans in Zimbabwe and Malawi, G. pallidipes in Zimbabwe and Somalia ; G. longipennis and G. brevipalpis also in Somalia (8). The occurrence of cicatrices has been shown to be age related and with variable incidence over small distances (8).

In this paper, studies on the rate of cicatrizing of a number of Glossina species are reported using ovarian age as the time scale. Simultaneous measurements of rate of wing fray were also made. This is the first documentation of the prevalence of cicatrices and rate of cicatrizing.

2. MATERIALS AND METHODS

Study sites

Area I - Glossina pallidipes and G. morsitans morsitans were sampled between September and October 1981 at the Rekomitjie Research Station (16°10'S, 20°25'E) in the Zambesi Valley, Zimbabwe, with a recorded mean monthly temperature of 24°C.

Area II - Glossina morsitans centralis were sampled during September 1981 in the Mumbwa Game Management Area, Kafue National Park (15°S, 27°E), Central Province, Zambia, with a recorded mean monthly temperature of 18°C.

Area III - Glossina morsitans morsitans were sampled during October 1981 in the Kasungu National Park (13°S, 33°E), Malawi, with a recorded mean monthly temperature of 26°C.

Area IV - Glossina pallidipes and G. longipennis were sampled between October and November 1981 on the River Shebeli (2°16'N, 45°12'W), Somalia, with a recorded mean monthly temperature of 26°C.

Area V - a. Glossina morsitans submorsitans, G. tachinoides, G. longipalpis, G. medicorum, G. fusca fusca, G. palpalis gambiensis were sampled during April 1982 on the river Marahoue (8°13'N, 6°39'W) and the former two species in Area Vb on the River Comoe (9°17'N, 4°11'W), Ivory Coast, with a recorded mean monthly temperature of 29°C.

Female tsetse were sampled using biconical traps (2,9) and examined for ovarian age (11,1), wing fray (4) and the degree of cicatrizing. Categories for degree of cicatrizing were as reported earlier (8) although these were increased to 1 to 5 to allow category 1 to be uncicatrized flies. External mating scars were recorded but excluded from calculating mean cicatrice category (MCC). Ovarian age (OA) category intervals were calculated taking account of mean temperatures using formulae given in : MULLIGAN and POTTS (6) p. 440. MCC, mean wing fray category (MWF) and mean ovarian age (MOA) were calculated for each OA category and this information was used to calculate regression equations and their corresponding regression lines (Figures 1 and 2).

Figure n° 1 - The relationship between mean ovarian age (MOA) and mean cicatrice category (MCC) for :

a[1] G. m. submorsitans, Area Vb ; y = 0.029 x + 1.79 (93)

b[12] G. m. submorsitans, Area Va ; y = 0.02 x + 1.72 (82)

c[12] G. medicorum, Area Va ; y = 0.018 x + 1.63 (95)

d[12] G. f. fusca, Area Va ; y = 0.02 x + 1.72 (51)

e[12] G. p. gambiensis, Area Va ; y = 0.019 x + 1.46 (87)

f[2] G. longipalpis, Area Va ; y = 0.016 x +1.44 (226)

g[1] G. m. morsitans, Area I ; y = 0.023 x + 1.02 (225)

h[1] G. longipennis, Area IV ; y = 0.025 x + 0.81 (38)

i[1] G. m. morsitans, Area III ; y = 0.024 x + 0.99 (101)

k[3] G. pallidipes, Area I ; y = 0.018 x + 1.13 (642)

l[3] G. pallidipes, Area IV ; y = 0.016 x + 0.94 (235)

m[4] G. tachinoides, Area Va & b ; y = 0.008 x + 1.3 (62 & 94)

o[4] G. m. centralis, Area II ; y = 0.009 x + 1.07 (162)

Correlation coefficients are significant ($p < 0.01$) for all regression lines. Number in (brackets) is sample size. Letters followed by the same number(s) are not significantly different at the 5 p.100 level of confidence.

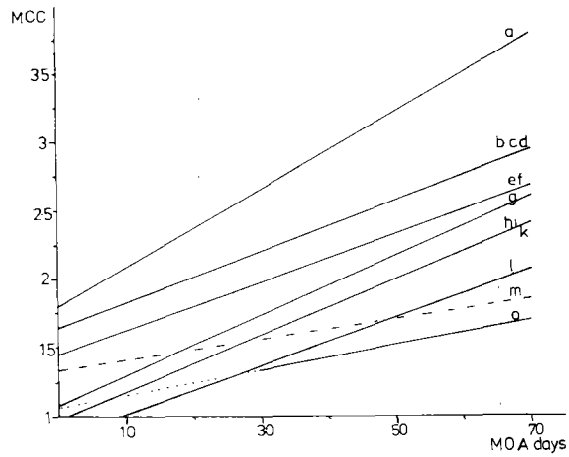


Figure n° 2 – The relationship between mean ovarian age (MOA) and mean wing fray category (MWF) for :

a[1] G. m. submorsitans, Area Vb ; y = 0.06 x + 2.77

b[12] G. m. submorsitans, Area Va ; y = 0.043 x + 2.58

c[12] G. medicorum, Area Va ; y = 0.037 x + 2.7

d[12] G. f. fusca, Area Va ; y = 0.04 x + 2.63

e[23] G. p. gambiensis, Area Va ; y = 0.03 x + 2.42

f[2] G. longipalpis, Area Va ; y = 0.035 x + 2.33

g[2] G. m. morsitans, Area I ; y = 0.038 x + 1.96

h[23] G. longipennis, Area IV ; y = 0.029 x + 1.5

i[1] G. m. morsitans, Area III ; y = 0.056 x + 0.87

k[2] G. pallidipes, Area I ; y = 0.034 x + 1.47

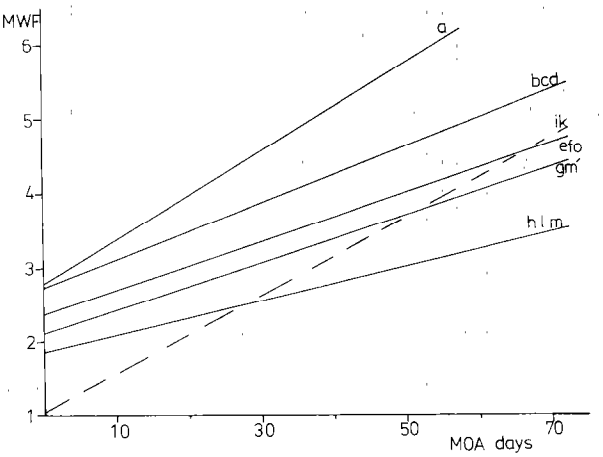
l[23] G. pallidipes, Area IV ; y = 0.031 x + 1.24

m[3] G. tachinoides, Area Vb ; y = 0.028 x + 2.16

m[13] G. tachinoides, Area Va ; y = 0.023 x + 1.84

o[3] G. m. centralis, Area II ; y = 0.024 x + 2.69

Correlation coefficients are significant ($p < 0.01$) for all regression lines. Sample sires are as in Figure n° 1. Letters followed by the same number(s) are not significantly different at the 5 p.100 level of confidence.



RESULTS AND DISCUSSION

Mating cicatrices (12,15) were noted on only G. palpalis gambiensis and G. tachinoides in Area Va and G. tachinoides in Area Vb. Table I shows the percentage of mating cicatrices per OA category. There is no correlation of mating scars with age, wich would argue against matings after the first ovulation. However, VATTIER'S (15) results are age related, this may indicate that all cicatrices were recorded, not just mating cicatrices. There is clearly a variability in the occurrence of mating cicatrices between species and habitat. Further studies are needed before a suitable explanation is likely to be forthcoming.

The relationship between OA category and MCC for all species studied is shown in Figure 1 and their rates of WF are shown in Figure 2. The series of

regression lines (a-o) show differences in rates of cicatrizing and rates of WF between species within a habitat, and between habitats.

Clearly MCC increases with age and varies with species and locality, a fact already demonstrated for WF (10), WF indicates tsetse activity ; perhaps so too does the degree of cicatrizing. Cicatrices may result from "natural catastrophe" (8), mites (LEWIS and Mac FARLANE, 1981) or predators. Further studies are needed to investigate possible relationships between preferred resting sites and MCC for different species.

TABLE I-Percentage tsetse with mating scars per ovarian age category.

OA Category	Oc	1	2	3	4	5	6	7	$\bar{x}$
e. *G. p. gambiensis* (Va)	50	67	27	33	75	75	50	(100)	54
m'. *G. tachinoides* (Va)	20	22	0	0	6	0	0	-	7
m. *G. tachinoides* (Vb)	-	47	17	0	11	14	25	44	24
Vattier (1965) Brazzaville	0	1	2	3	4	5	-	-	$\bar{x}$
G. palpalis palpalis	20	55	81	80	80	-	-	-	63
G. fuscipes quanzensis	29	43	35	60	62	94	-	-	54

Sample sizes are as in Figure 1 caption. Va and b, refer to study sites, letters e, m' and m refer to lines in Figures 1 and 2. Numbers in (brackets) refer to small sample size (<4).

Unfortunately, very little is known about predation of adult tsetse (3), further work observing released tsetse could show the nature and degree of predation. Cicatrices show that a large proportion of the tsetse population successfully avoid predation. Another possibility is the use of MCC as a coarse ageing scale, which like WF is simple to record.

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Resumen

RYAN (L.). Frecuencia de lesiones cuticulares (cicatrices) en ciertas especies de Glossina sobre terreno. Rev. Elev. Méd. vét. Pays trop., 1984, 37 (N° special) : 211-217

El autor evidencia diferencias de la tasa de cicatrización y de la tasa de desgaste de las alas en moscas tsetsé demostradas por la correlación con la edad del ovario utilizada como escala de tiempo.

Estas variaciones conciernen Glossina morsitans submorsitans, G. medicorum, G. fusca fusca, G. palpalis gambiensis, G. longipalpis y G. tachinoides en Costa de Marfil ; G. morsitans morsitans y G. pallidipes en Zimbabwe ; G. morsitans morsitans en Malawi ; G. morsitans centralis en Zambia ; G. longipennis y G. pallidipes en Somalia.

Se nota por primera vez variaciones de la tasa de cicatrización que indica, como el desgaste de las alas, la actividad de las tsetsé, pero puede tambien reflejar la acción de los animales de rapiña. La lesiones cuticulares dan una escala aproximada semejante a la del desgaste de las alas. Son diferentes las cicatrices causadas por la cubricion y las causadas por heridas según las especies y el sitio.

Palabras claves : Glossina spp. - Mosca tsetsé - Cicatrices - Desgaste de las alas - Cubricion - Heridas - Edad.

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