

The extention of those areas in North Togo, that are exposed to the phenomenon of reinvasion: A mathematical approach to the rate of dispersal of the flies in the savanna.

Most of the fly-catching points of the OCP are situated at those places, where the biting rates and transmission potentials were presumed to be the highest, i.e. near S. damnosum breeding sites. Therefore, they provide only limited information, if one would like to know the respective biting rates and transmission potentials for an human population, living at a given distance inland from the river. From our experience in Cameroon, two formulae have been derived (RENZ, 1981), that describe the proportion of all flies or of the parous flies only, that come to bite inland at a given distance from the breeding site:

$$1) \quad ABR_{(d)} = ABR_{(0)} \frac{1}{1+3d} ; \quad ABR_{(d)} : \text{Annual Biting Rate at the distance } d \text{ (km) from the } S. \text{ damnosum breeding site}$$
$$ABR_{(0)} : \text{Annual Biting Rate, measured at the breeding site (d=0)}$$
$$2) \quad APBR_{(d)} = APBR_{(0)} \frac{1}{1+3d} \frac{2}{d+2} ; \quad APBR_{(d)} : \text{Annual Parous Biting Rate at the distance } d.$$

Here we assume, that the ATP is correlated rather to the APBR than to the ABR, due to the differential dispersal of nulliparous and parous flies in the savanna. Then, formula (2) gives the decreasing amount of the ATP at increasing distance from the river:

distance from the river on- land (km)	ABR (%)	APBR (%)	ATP (%)
0	100	100	100
0.5	40	36	36
1	25	20	20
2	14	10	10
4	8	4	4
8	4	2	2
16	2	1	1

On two occasions, we were able to test these formulae against the experience at Landa Pozanda:

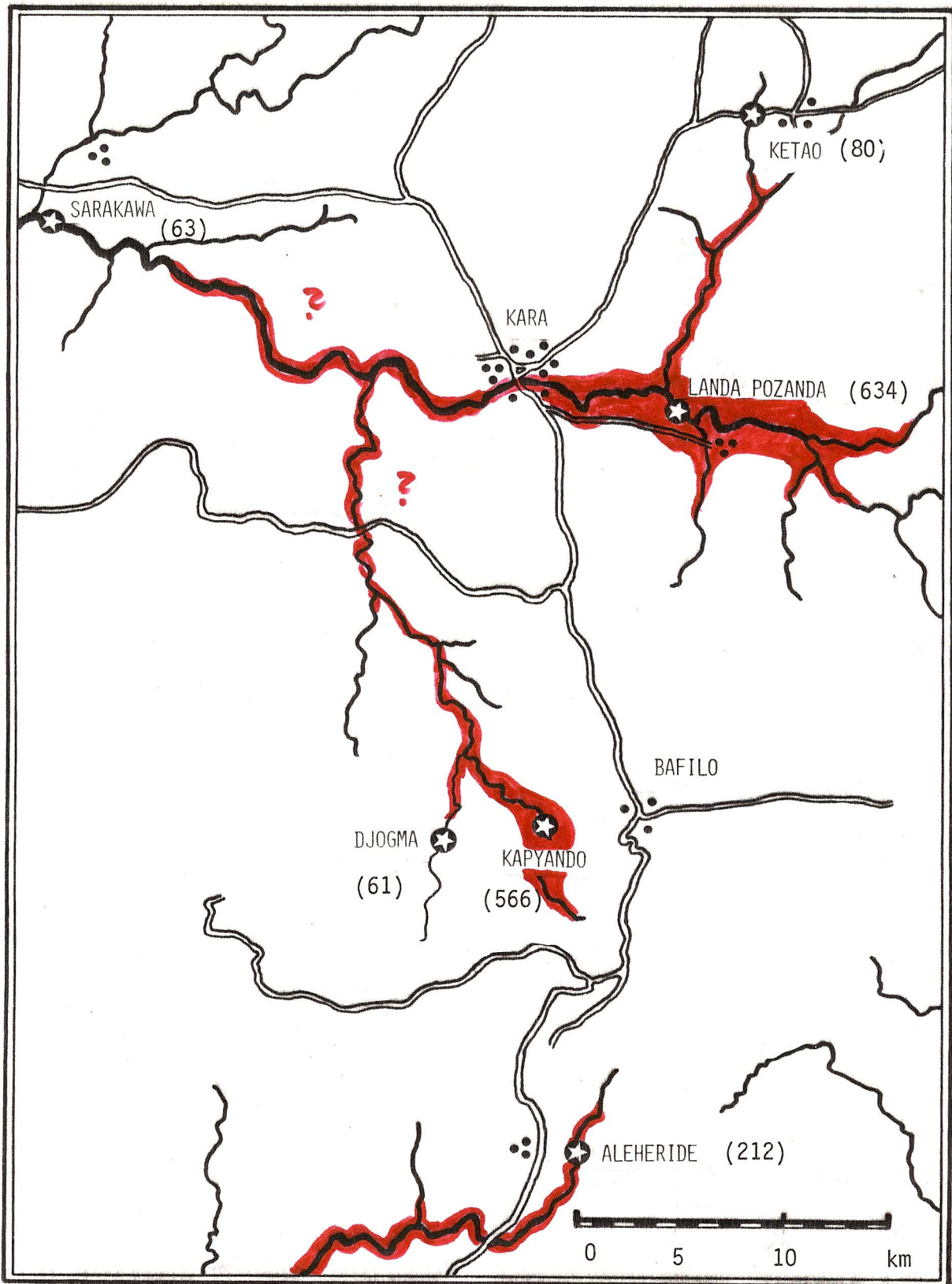
2.7.82: (cf. report Somé):

Daily biting rate at the breeding- site (d=0)	Daily biting rate at 0.7 km from the river: observed:	expected
26	6	8

2.9.82: d=0	Daily biting rate at the ONCHO laboratory, 5 km from the river
278	21 17

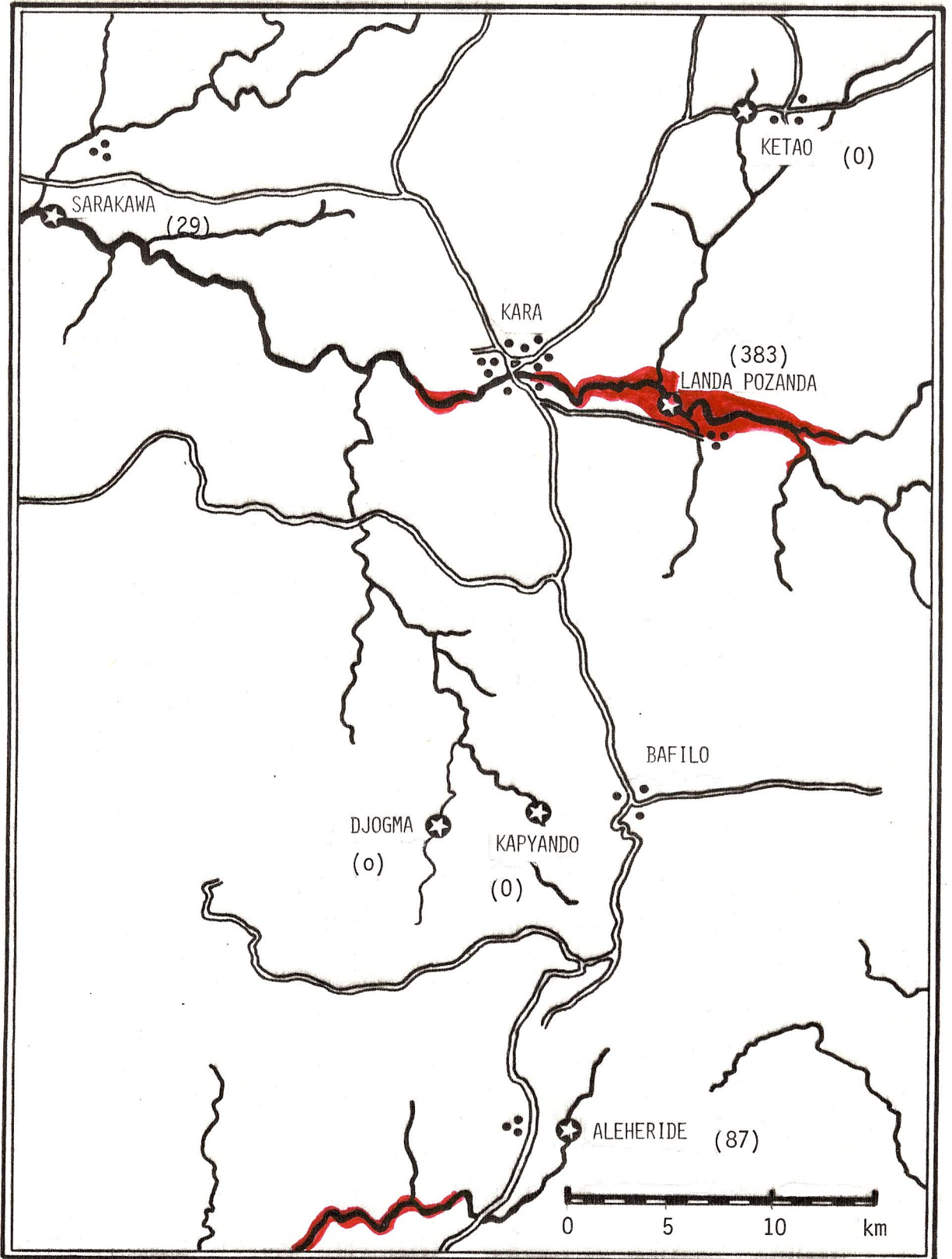
The good accordance between the observed and the expected biting rates should be confirmed by more data from the OCP, and the formulae must be adapted, if necessary.

However, an attempt was made, to estimate the abundance of flies and their corresponding transmission potentials at various distances from the reinvasion sites in Northern Togo in 1979 and 1981, two years representing presumably maximum and minimum values.



1978/79 (maximum ATP's): The extent of reinvasion areas, exposed to an estimate ATP of 100 or more.

OCP fly catching site, measured ATP in brackets.



1980/81: (minimum ATP's): legend see Fig. 1