The effect of fly abundance on the catch index of traps and that of rain as a source of variation in fly abundance were investigated for Glossina fuscipes fuscipes Newstead around Lake Victoria, western Kenya, using odor-baited and color-improved traps. There was a significant inverse relationship between the catch index of experimental traps and abundance of flies; the catch index being the ratio of catch in the experimental trap per catch in a reference trap. At low tsetse abundance (< 10 flies per trap per day) there was a 3-fold increase of the catch of females in the experimental trap compared with the control. Rainfall alone explained 22-87% of the total variation of fly abundance. It is suggested that fly abundance should be considered in evaluating baits for G. f. fuscipes or when using traps for monitoring. The relative depression of the catch index at high abundance may be related to avoidance of conspecifics. Flies entered standard traps in an inverse proportion to the number observed at the trap. Females approached traps in greater numbers when fewer decoys (dead flies) were placed on traps.