An oil extracted from the leaves of a tropical shrub Ocimum suave was found to repel as well as kill all stages of the tick Rhipicephalus appendiculatus. In an in vitro bioassay for the larvae, the LC50 of the oil in liquid paraffin was 0.024%. A 10% solution was found to kill all immatures and more than 70% of adults feeding on rabbits. Rabbits were protected for 5 days against attaching larvae using a 10% solution. Preliminary experiments undertaken with cattle kept in the field suggest that the oil may have potential in tick control, and a role in integrated tick management.