Diurnal drop-off rhythms of *R. appendiculatus* and *A. variegatum* engorging on Zebu cattle were studied under range and zero grazing conditions by monitoring detachment at 2-hr intervals. Effects of seasons, site and vegetation cover on rate of development of ticks were investigated. Pre-oviposition and pre-eclosion periods, number of eggs laid and hatchability, and moulting periods were recorded. To determine longevity of unfed ticks, newly moulted and hatched ticks were released in different seasons in open and shaded habitats. Survival was monitored twice a month for larvae and once a month for nymphs and adults. Host-seeking ticks were collected from pasture three times daily for 3 years to determine their diurnal activity and seasonal abundance. Seasonal population changes were also investigated by collecting parasitic ticks from cattle once a month for 4 years.

Diurnal detachment rhythms were exhibited by ticks feeding on Zebu cattle under range conditions. Maximum drop-off occurred between 1400 and 1800 hrs but no ticks dropped at night. Under Zero grazing, ticks dropped throughout the day and night with no obvious peak drop-off time. Cattle movement after a period of quiescence influenced the drop-off rhythms. Detachment and duration of feeding were not affected by husbandry regime and season.

Ticks in the shaded habitats took longer to develop but females laid more eggs. In open habitats, high ambient and soil temperatures caused desiccation of eggs particularly during the dry seasons. Desiccation of eggs was considered to be a limiting factor in the drier margins of *R. appendiculatus* distribution. Oviposition was, however, not affected by dry season. Pre-oviposition and pre-eclosion periods were longer during cool and rainy seasons, but ticks did not enter into diapauses. Moulting was less affected by weather. More than two life-cycles of *R. appendiculatus* can be completed in one year, whereas only one generation of *A. variegatum* is possible.

Unfed adult ticks survived longer than nymphs which in turn lived longer than larvae. *R. appendiculatus* adults survived longer than adults of *a. variegatum*. All developmental stages lived considerably longer in shaded habitats but mortalities were high during the dry months. Adults released during or immediately before the dry seasons survived longer, but immatures released during these seasons survived for short periods.

Ticks engage in host-seeking activities mostly during evening hours followed by morning hours. This pattern was consistent over years, seasons, locations, and sites. Ticks were most abundant in pasture or Rusinga Island from July to September and at KRFS from May to August. At both locations, host-seeking ticks were prevalent throughout the year.

High infestations of *R. appendiculatus* adults on cattle on Rusinga Island were observed from September to March followed by a sharp decline at the start of rains. Females were well synchronized with males at ratios of 2:5:1 (males to females). Immature population steadily built up from May to September preceding peaks of adults. *A. variegatum* patterns were similar but their peaks were preceded by those of *R. appendiculatus*. At KRFS, the population built up at the start of rains reaching a peak in August.

The present study provides information on understanding population dynamics of ticks as a prerequisite for adoption of integrated tick management packages. Engorged ticks could be
allowed to drop in areas unfavourable for their development and survival. The results indicate that rotational grazing for management of ticks is possible.

Restriction of animal grazing during peaks of diurnal activity of host-seeking ticks could reduce their numbers in pasture and on animals. Habitats modification including reduction of bushes and prescribed burning offer best promise of success. The study also provides information for building tick population prediction models for the purpose of control. The information is also expected to be entered into geographical information system (GIS), which can be used in close association with population models.