

FEEDING BEHAVIOUR AND SOCIAL BEHAVIOUR OF THE MARINE IGUANA

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During my 18 months stay in Galapagos, I collected data on the feeding and social behaviour of marine iguanas (*Amblyrhynchus cristatus*); this report summarises the preliminary results.

FEEDING BEHAVIOUR

Marine iguanas are the only reptiles feeding almost exclusively on marine algae. Besides algae they were found to feed frequently on the faeces of conspecifics and more rarely on the faeces and afterbirths of sea lions.

I studied the feeding behaviour of marine iguanas in detail on Fernandina (Cabo Hammond) and on Caamano (the little island in Academy Bay, Sta. Cruz).

Marine iguanas of different sizes search for food in different ways. To analyse the kind of differences, about 100 animals were caught on Fernandina (C. Hammond), their weight and length measured, and they were then released after having been marked individually with little plastic tags. The animals were followed and their behaviour recorded in detail during the subsequent 3 weeks.

Independent of sex, animals below 1.2 kilograms body weight left the colonies only during low tide to feed in the intertidal. Animals below 0.5 kg body weight (yearlings?) always kept close to the high tide line and fed there on algae in cracks or below boulders. Animals with body weights between about 1.2 and 1.6 kg feed during low tide in the intertidal, but swim also out to sea and dive during high tide. They usually do so between 10.00 and 15.00 hours, preferentially with the rising tide. Animals above 1.6 kg feed exclusively by diving outside the intertidal zone. They prefer the noon hours and/or incoming tide.

Weather conditions permitting, almost all animals go feeding every day. The time when the peak number of animals feeds in the intertidal shifts from day to day about one hour, well correlated with the regular shift of the lowest low tide. Every fourteen days the animals change over from feeding at the evening low tide to the next morning's low tide. Obviously the animals have a way of predicting the hour of low tide; however, the way in which they measure the lunar periodicity of the tides is unknown.

In bad weather (strong wave action) the number of animals going out to feed during low tide drops drastically and the animals stay in the intertidal for much shorter periods. They try to compensate for this by making more feeding excursions. Under conditions of very strong wave action (intertidal almost constantly covered with breakers) the marine iguanas stay in their colonies all day. In this way they may go without food for more than a week.

Observations on about 40 marked adult males of more than 1.6 kg on Caamano and C. Hammond over a period of about 5 weeks show that these animals return 2-3 times during their feeding excursions to the shore where they heat up on sun exposed rocks, often well away from the colony. Very big old males tend to swim out to sea to feed only every other or every third day. Territorial males (during the reproductive season, see below) starve for up to 6 weeks, losing 15-25% of their body weight.



Marine Iguana. *Photo by Fritz Pölking.*

SOCIAL BEHAVIOUR

Marine iguanas sit together in colonies of about 20-500 (rarely up to 1000) animals. Colony site and membership are almost constant. It only rarely happens that a whole colony shifts (presumably in adaptation to external factors, e.g. sunshine, wind direction, currents close to the shore). Colony composition may change during the reproductive season.

The distribution pattern of individuals inside the colony has been studied on C. Hammond (Fernandina) and Caamano. Individuals show clear site preferences, i.e. they tend to return every day to exactly the same spot or rock in the colony. A nearest-neighbour analysis of a colony on Fernandina showed a clear preference of animals belonging to the same size class to sit together. This is true at least outside the reproductive season when the sex of the animals does not at all influence their grouping tendencies. As males grow to bigger size than females, one frequently encounters all-male groups.

TERRITORIAL BEHAVIOUR AND REPRODUCTION

On Caamano in October/November (on Fernandina about one month earlier) the males begin to establish territories either inside the colonies or on nearby areas. At this time large males often appear in the colonies. Such immigration of males has been observed on C. Hammond and on Caamano. They leave again at the end of the reproductive season. The males immigrating into the colonies on Caamano came from Sta. Cruz as proven by recoveries of marked males.

The territories serve exclusively for reproduction and are vigorously defended against all other adult males.

A territory may comprise one or several big blocks or a flat area of lava. Therefore, territory size varies between 1 and about 10 m².

The establishment of a territory frequently involves violent and sometimes bloody fights for hours on end. The boundaries of almost all territories change slightly until the end of the reproductive season: but normally short boundary displays between neighbours known to each other are sufficient to maintain the boundary of established territories.

The period of actual copulation extends only over about 3 weeks. On Caamano these were the first 3 weeks of January; on Fernandina reproduction takes place about one month earlier, on Espanola one month later. Normally only territorial males copulate successfully. They copulate with the females while the latter are on their territories. Attractive resting places for females or areas crossed frequently by many females on their way back and forth from the feeding grounds, therefore lead to high reproductive success of males able to hold territories on such areas.

The territorial males test with a stereotyped behaviour sequence the readiness of the females to copulate. Successful rapes by territorial males have never been observed. Adult females appear to copulate only once. Courtship and copulation will be analysed from protocols and films.

To analyse the total activity of territorial males, 10 males were observed on Caamano at regular intervals over a period of 2 months (Dec. 1977 and Jan. 1978). They differed with respect to their size, origin (some had immigrated from Sta. Cruz) and the structure and size

of their territories. This material will give an idea about individual differences in activity, the course of activity over the whole reproductive season, correlations of activity with size and type of territory, number of other animals inside the territories, and the reproductive success of the respective male.

Observations of the marine iguana females during the period of egg laying show that egg laying occurs about 5 weeks after copulation. Clutch size depends on the size of the female. Clutches consist of 1-3 eggs. Although the size of the oviducts of really big females seems to provide enough space for four eggs, four egg clutches have not been found.

Observations on marked females over a two week period on Caamano and C. Hammond prove that the females on these islands guard and defend their nests for up to about 10 days against other females just as described before for the Espanola females. The duration of guarding depends on several factors like number of other females present, distance of the nest from the nearest look-out rock, how much females are endangered by the hawk etc.

