

OBSERVATIONS ON THE ECOLOGY AND BEHAVIOR OF MICROCAVIA, GALEA AND CAVIA

Por JON ROOD

RESUMEN

Observaciones sobre la ecología y comportamiento de las Caviinae de Argentina — Se estudió la ecología y el comportamiento de tres especies, *Cavia pamparum*, *Galea musteloides* y *Microcavia australis*, bajo condiciones de cautiverio y seminaturales. Al mismo tiempo se mantuvo una población de *Cavia porcellus* para permitir el estudio comparativo entre su comportamiento y el de *Cavia pamparum*.

En los estudios efectuados en el campo, cada animal, en el área analizada, fue atrapado y determinado su sexo, peso y ectoparásitos. Se anotó su largo y el ejemplar fue marcado, empleando el colorante Nyanzol y cortando los dedos, para permitir su futura identificación.

Las observaciones efectuadas dieron datos sobre la dinámica de la población, reproducción, ciclos de actividad, territorio e interacciones de comportamiento. *Galea* y *Microcavia* son simpátridos en el lugar de observación y las relaciones ecológicas están en vías de estudio. Las dos formas tienen costumbres y hábitos similares, comen las mismas plantas, emplean los mismos caminos y reaccionan amigablemente entre sí.

Todas las especies estudiadas han sido criadas en cautiverio; se consigna datos sobre el comportamiento al aparearse, durante la gestación y el número de crías. Aparte de las descripciones, su comportamiento ha sido filmado y se ha llevado a cabo observaciones sistemáticas para obtener datos cuantitativos, determinar relaciones de dominación y estudiar el comportamiento de los jóvenes. En algunas direcciones hay señales de evolución.

This report summarizes progress made during the first year of a two year study of the ecology and behavior of three Argentine species in the Caviinae: *Microcavia australis*, *Galea musteloides*, and *Cavia pamparum*. The project is supported by the National Institutes of Health, U.S. Public Health Service. The work comprises a field study of the life history and ecology of the three species, and a comparative behavior study of these and the domestic guinea pig (*Cavia porcellus*). Using the comparative approach to behavior may

reveal evolutionary trends which can help to show the course evolution has taken in the group. Comparative behavior studies also can indicate how forms adapt their behavior to their environment.

In the field work animals are live-trapped, weighed to the nearest gram, and the total length measured to the nearest millimeter. Their sex and reproductive condition are recorded and they are checked for ectoparasites and marked in distinctive patterns with Nyanzol dye and by toe clipping. Field observations are made with binoculars from a car or canvas blind. For behavioral studies under semi-natural conditions, colonies of the four forms studied are maintained in outdoor pens five meters x five meter x two meters high. All animals in the colonies are weighed and their total length measured each month. The principal behavior patterns are described and filmed and regular behavioral watches made to obtain quantitative data on behavior patterns and dominance hierarchies. The captive colonies also yield data on reproduction and behavioral development of the young.

The principal field study area, La Cristina, is located in southern Buenos Aires province approximately 40 kilometers northeast of Carmen de Patagones. The area has been laid out in a strip of monte using 100 stakes placed in a grid at 15 meter intervals covering an area of 18,225 square meters (4.5 acres). The dominant bush is *Condalia microphylla* which provides cavies with shelter and food in the form of leaves and berries. The study area is visited for approximately one week each month. Since April, 1966, when work was begun, we have trapped 103 *Microcavia* and 16 *Galea* on the area. I have observed several other areas, in La Pampa, Santiago del Estero, and Santa Fe, where these two genera are sympatric and in each the *Microcavia* outnumbered the *Galea* in a ratio of between five to one and ten to one. Relations between the two genera are nearly always amicable. They use same runways, and frequently feed and sit together. In our *Microcavia* pen, introduced *Galea* are quickly accepted and integrated into the group whereas strange *Microcavia* are attacked and frequently killed by the residents.

To study home range the squares on the study area in which each animal is trapped or seen are recorded daily. Home ranges of male *Microcavia* are approximately twice the size of female ranges. The largest male home range thus far recorded is 6975 square meters, based on 87 observations. The largest female range is 3150 square meters from 61 observations. Social interactions between adult male *Microcavia* are nearly always hostile. Home ranges overlap and may approximately coincide, but the males appear to recognize other males within their home range and respond to them according to their position in the dominance hierarchy. A subordinate usually retreats from a dominant before contact is made. The presence of an estrus female causes a

striking increase in male aggression and several males frequently congregate chasing and sometimes biting one another on the back and rump.

Relations between females are sometimes friendly but more often hostile. I have several times seen a female attack and drive another female away from a male. Male-female interactions are always amicable and typically involve following or contactual activity. Adult-young social relationships are also amicable. Adult males frequently sit together with young animals and follow them. Young *Microcavia* follow adults and often climb on or over them. Nursing relationships are loosely organized and young animals may nurse from more than one female. They are active soon after birth and sometimes move from bush to bush and join other young of similar age. As many as eight young *Microcavia* have been huddled together.

At La Cristina, in 1966, no newborn young or pregnant females were recorded from May to July. Observations on colonies of *Galea* and *Cavia* living under semi-natural conditions indicate that these have no fixed breeding season and may have their litters in any month.

All forms studied have a post-partum estrus commencing shortly after parturition. Mean litter size of the four *Microcavia* litters thus far born in captivity is 2.5 (Range 2-3). Twenty litters of young *Galea* have been born in the pens and mean litter size of these is 2.4 (Range 1-4). Mean gestation in *Galea*, determined from seven known intervals between litters is 53.1 days (Range 51-55 days). Young *Galea* are sexually mature at two months. One young female produced her first litter when only 115 days old.

Mean litter size of the ten *Cavia pamparum* litters born in the pens is 2.1 (Range 1-3). Gestation periods of 60 and 62 days have been recorded. Goy, Hoar, and Young (1957) analysed over 1000 *Cavia porcellus* pregnancies and found that mean gestation varied from 67 days in litters of 5-6 to 71 days in litters of one. Eight hybrid *Cavia pamparum* male x *C. porcellus* female litters have been obtained. Mean litter size of these is 2.25 (Range 1-4). The mean of four known gestations is 63.0 days (Range 62-65 days), and is thus closer to the mean gestation of *Cavia pamparum* than *C. porcellus*.

Behavioral differences between *Cavia pamparum* and *C. porcellus* are quantitative rather than qualitative. Males exhibit the same behavior patterns and establish dominance hierarchies but the threshold for agonistic patterns is considerably lower in *Cavia pamparum*. In this species the dominant male ordinarily attacks subordinate adult males at every opportunity and sometimes kills them. Differences in aggression are even more striking among the females.

Female *Cavia pamparum* establish straight-line dominance hierarchies whereas I have not been able to determine a dominance hierarchy in female *Cavia porcellus* living under semi-natural conditions. It appears that,

as might be expected, artificial selection has considerably lessened aggression in the domestic form.

Galea have a male and a somewhat weaker female dominance hierarchy of the straight-line type. In contrast, captive *Microcavia* rarely show aggressive behavior unless a female is in estrus or a stranger is added to the colony. Our pen population consists of eight adult animals, two male and three female *Microcavia australis australis* from southern Buenos Aires, and three male *Microcavia australis salinia* from Santiago del Estero. Both *M. a. australis* males attempt to mate with an estrus female and the dominant animal repeatedly attacks and chases his rival. The three *M. a. salinia* males show no sexual interest in the estrus female *M. a. australis*, an interesting example of behavioral isolation.

Behavior evolves in response to selective pressures which tend to adapt the behavior to the environment. Differing behavior patterns within a phylogenetic group can often be explained in terms of adaptations to different environments. Climbing is an adaptation allowing *Microcavia* to inhabit semi-desert environments where it is forced to climb several meters from the ground to obtain food in the form of leaves and fruits. *Cavia*, a non-climber, inhabits environments where it can find sufficient food (grasses and herbs) on the ground. The response to predators differs in the three genera, *Microcavia* and *Galea* tending to race to their holes on the approach of a predator such as a fox or cat. Such behavior has survival value for forms inhabiting open areas with scanty vegetation. *Cavia* ordinarily freeze at the approach of a predator, behavior of survival value to a form living in habitats with abundant ground vegetation.

Comparison of the behavior patterns of the three genera studied suggest an evolutionary trend in which *Microcavia* is the most primitive, *Galea* intermediate, and *Cavia* the most advanced. The behavior patterns, particularly those involved in threat and sexual behavior, follow this trend being most complex in *Cavia*. In addition, a pattern found in all forms studied has taken on a separate function in *Galea* and *Cavia*. Furthermore, some patterns widespread in *Galea*, are confined to one sex or age group in *Cavia*. Several common *Microcavia* patterns are found in *Cavia* only in young animals or are confined to sexual behavior.

LITERATURE CITED

- GOY, R. W., HOAR, R. M. and YOUNG, W. C. 1957. Length of gestation in the guinea pig with data on the frequency and time of abortion of stillbirth. — Anat. Rec. 128: 747-757.