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Hose's Civet Diplogale hosei – *Photo: Yasuma Shigeki*

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Territorial behaviour between male Common Genets

Iñigo ZUBEROGOITIA[1] & Jabi ZABALA[2]

The Common Genet *Genetta genetta* represents an isolated African element in the European fauna (Schauenberg, 1966). This author suggested that genets arrived on the continent through the Gibraltar land bridge, before its flooding. However, other authors (Calzada, 1998) suggested that this species might have been introduced by Arabians to Spain.

Nowadays, its European distribution spreads only over Spain and France, although the range seems to be increasing and some individuals have been found in Belgium, Switzerland and Germany (Blanco, 1998). This small distribution has limited the studies on the species and has left it as one of the lesser known European carnivores. Studies have been carried on in few localities, notably Doñana, in southern Spain, one of the most regular sites of scientific studies about genets (see Palomares, 1993; Palomares & Delibes, 1988; 1991; 1994). The rest of the literature is scarce and spread, and only few works have investigated home range, habitat selection and other behaviours using radio-tracking techniques (Palomares & Delibes, 1988, 1994; Camacho *et al.*, 1992; Zuberogoitia *et al.*, 2002). Common Genets in Doñana show a clear territorial system in a pattern typical of small carnivores (see Palomares & Delibes, 1988, 1994), but little is known about it in other areas.

However, during a study at the Urdaibai Biosphere Reserve (UBR: see Zuberogoitia *et al.*, 2002 for further details), we gathered some data that contradict this statement. During the study we monitored two male genets at the same time in the same area for 13 months (Table 1). MG1 and MG2 shared the same areas with a high overlapping level: 17.52 % and 83.96 % of their respective home ranges.

The pattern of seasonal home range was quite different in each male. MG1 increased its home range in summer and autumn, while MG2 increased its home range in winter (Table 2). We never found both genets in the same point at the same time, so we could not determine dominances. However, MG1 had a lot of scars on its face, ears and legs, while MG2 had none. Both genets showed a strong preference for oak forests, during both activity and resting periods (Zuberogoitia *et al.*, 2002). The availability of this vegetation type was 13.1% of the home range for MG1 and 56.6% of the home range for MG2. However, the two genets showed different habitat selection for the other vegetation types (*see* Zuberogoitia *et al.*, 2002).

Palomares & Delibes (1994) found that in Doñana adult genets of the same sex seemed to be territorial, because little home-range overlap was observed. Territoriality patterns are usually explained after two different hypotheses: as a way of ensuring reproductive access to females or as a way to monopolize areas with plenty of resources (Gittleman *et al.* 2001; Lodé *et al.*, 2003; Zabala & Zuberogoitia, 2003). In our case, MG1 had a bigger home range so he could include more females in his territory, although there is also the possibility of the home range being large due to a low habitat quality. This would lead him frequently to use alternative habitats. However, although the proportion of home range covered by oak forest was lesser than for MG2, this male, MG1, had a much larger absolute area of oak forest within its home range. On the other side, MG2 had a smaller home range, so the number of females could be lower too, but his home range was almost totally covered by oak forest, a high quality habitat. Besides, during the second winter, MG1 used frequently MG2's core area and the latter expanded his home range, settling far away. This behaviour could be explained in two different ways: MG1 came into MG2's core area when the latter had gone to other sites looking for females, or MG1 expelled MG2 out of his territory. A problem for the second hypothesis is that MG2 came back regularly and both shared the same sites. However, if we consider it as territorial behaviour determined by access to females we would have more problems. In fact, in the study area, females have two reproductive periods, in winter and in summer, as it occurs in other regions (Zuberogoitia *et al.*, 2001). Therefore, if one of the studied male genets were dominant, his territory should be maintained during the mating and non-mating seasons, and this is not the case.

	MG1	MG2
Trapping date	17th February 1999	19th February 1999
Last monitoring day	7th March 2000	28th March 2000
Days radio-tracked	110	114
Number of locations	574	444

Table 1. Trapping and monitoring data of the two male genets (adapted from Zuberogoitia et al., 2002)

For carnivores in general, changes in territoriality patterns have been documented in different density conditions. High densities produced changes in territoriality of Stoats *Mustela erminea* (Robitaille & Raymond, 1995) and Red Foxes *Vulpes vulpes* (Blanco, 1988). Other authors proved that some species, like European Polecat *Mustela putorius*, Least Weasel *Mustela nivalis* or Stoat *Mustela erminea*, may increase their home range and

Table 2. Home-range area (km^2) during winter, spring, summer and autumn of 1999 and winter of 2000 for two adult male genets in Urdaibai Biosphere Reserve.

	Winter 99	Spring 99	Summer99	Autumn 99	Winter 00	Total
MG1	0.38	2.56	5.80	8.31	0.88	10.16
MG2	1.81	0.95	1.01	1.81	2.75	2.12

	Winter 1999	Spring	Summer	Autumn	Winter 2000	Total
MG1	0.00%	11.33%	0.17%	10.83%	89.77%	17.52%
MG2	0.00%	30.53%	0.99%	49.72%	28.73%	83.96%
Overlapping area km^2	0.00	0.29	0.01	0.90	0.79	1.78

Table 3. Overlapping between two male genets during seasons and total in Urdaibai Biosphere Reserve.

decrease the territorial aggressiveness, and even show a non-territorial behaviour, during low availability of resources (Weber, 1989; Jedrzejewski *et al.*, 1995; Robitaille & Raymond, 1995). However, this last seems not to be the case at the UBR, where genets increased and decreased their home ranges throughout the year but in different patterns, which is not consistent with a consequence on changes in resource availability. In our case a lack of strong territorial behaviour or a decrease of territorial behaviour due to the high genet density (see Zabala *et al.*, 2001) would be the more plausible explanation. Although our observations are based only on two males and should be regarded with caution, our results agree with Blanco (1988) and Robitaille & Raymond (1995), pointing out the high density condition as a determinant factor of territorial behaviour scaling in small carnivores. Only in this way it is possible to explain the differences between Doñana's gennets and Urdaibai gennets.

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[1]Estudios Medioambientales
Icarus s.l. Apdo 106 48940 Leioa,
Bizkaia, Basque Country, Spain.
inigo.zuberogoitia@wanadoo.es

[2]Sebero Otxoa 45 5 B,
E-48480 Arrigorriaga, Bizkaia, Basque Country,
Spain. jzabalaalbizua@yahoo.com

Malaysia Carnivore Project

A field project has been set up within Krau Wildlife Reserve on Peninsular Malaysia to investigate the ecology of small carnivore species and to study the genetic diversity, biogeography and systematic status of Malaysian viverrids. A variety of methods is being employed including live-trapping and radio-tracking. DNA samples are being collected for analysis at the Paris Natural History Museum. The initial phase of this project began in July 2004 and will end in October 2004. Fieldwork will continue next year if further funding can be obtained.

Further details of this project can be found at www.carnivoreproject.org.

For additional information email Andy Jennings (smallcarnivores@yahoo.com) and Géraldine Veron (veron@mnhm.fr).

Andy Jennings and Géraldine Veron

MALAYSIA CARNIVORE PROJECT