

PRELIMINARY DATA OF THE WILD BOAR (*Sus scrofa*) SPACE USE IN MOUNTAIN ENVIRONMENT

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Abstract: The work presents the preliminary data of wild boars spatial occupation in mountain environment, based on 9 radio-tagged animals followed during 16 months. The authors suggest that resting places choice and daily movements patterns are related to important seasonal change of the environment and particularly to thermal comfort and safety.

Keywords: Wild boar, *Sus scrofa*, Suidae, Radiolocation, Activity, Resting places, Mountain environment, Europe.

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1. Introduction

Wild boar reproductive success in mountain environments took place during the last twenty years; the damages to alpine prairies and to typical crops of mountain economy (Macchi *et al*, 1992) and the conspicuous number of shootings during hunting season (Durio *et al*, 1992) confirm this trend. Actually no works are published on space use by wild boars in high altitude habitat. Only the studies in the "Great Smoky Mountains National Park" (Singer *et al.*, 1981), and in Caroux Espinouse and Montagne Noire (Cousse, 1994), refer to low mountain environments.

The aim of our work is to present some data we collected using radiolocation techniques, about Wild boar spatial occupation in alpine environment, during a 16 months period. We tried to verify the following points:

- Where the resting places are located in regard to the altitude, the vegetation type and the seasons.

- How wild boars choose their resting places: i) regarding "thermal comfort" as proposed by authors like Mauget (1980), Singer *et al.* (1981), Douaud (1983), Janeau and Spitz (1984), Dardaillon (1986), Cousse (1993); ii) regarding quiet and safety as proposed by Mauget (*op. cit.*), Douaud (*op. cit.*), Janeau and Spitz (*op. cit.*), Dardaillon (*op. cit.*).

- Where the feeding areas are located, in regard to the altitude, the vegetation type, the resting places, and the seasons.

- How wild boars daily movements are organized.

2. Study area

The area is located in the middle of Susa Valley, (northern Cozie Alps), on the right hydrographic side, with northern exposure (Fig.1); 40% of the study area is a protected zone (Orsiera-Rocciavère Natural Park). The meteorological conditions of the area are characterized by low yearly precipitations (minimum about 1,000 mm) (De Biagi *et al.*, 1990). Vegetation is divided into altitude classes identified by:

- chestnut wood (*Castanea sativa*) until 1,000 m;

- beech wood (*Fagus sylvatica*) until 1,400 m;

- conifer wood (*Abies alba*, *Larix decidua*) until 2,100 m;

- bushes (*Alnus viridis*, *Rhododendron* sp.) from 1,400 m to 2,200 m;

- alpine prairie from 2,100 m till the rocks limit, about 2,400 m

Many other species live in this area and particularly, among ungulates, Red deer (*Cervus elaphus*), Roe deer (*Capreolus capreolus*) and Chamois (*Rupicapra rupicapra*).

Cows, sheep and goats are pastured since June until October inside the Orsiera-Rocciavère Natural Park limits, that starts from the level of 1,300 m.

3. Material and methods

Nineteen (19) wild boars were caught using 6 sash-door traps baited with corn grains (*Zea mais*) and located in areas between 500 m and 1,550 m where food was usually distributed. Once trapped boars were immobilized with

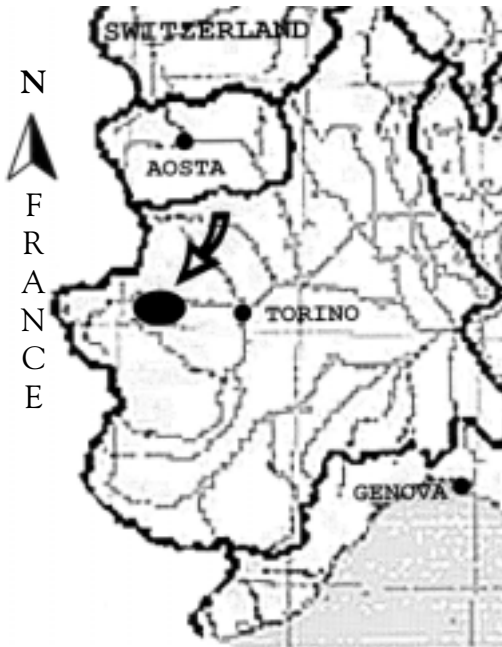


Figure 1 - Study area.

detaining traps or with anaesthetic injection and marked with ear tag (Alflex model). Biometric measurements (weight, metatarsus length, neck circumference) and teeth examination (Iff, 1978) allowed us to age the animals.

Nine (9) wild boars were fitted with double stage T.W.-2 Biotrack transmitters (148-149 MHz) supplied with a lithium 3.6 V.C.C. cell and a 1/4 wave length whip antenna. Transmitters were potted in epoxy resin and fixed on a leather collar. Total weight of the radio-collar was about 350 g (< 5% of wild boars' weight). On field we used 4 elements hand held Yagi antennas, receivers (CE 12 Custom Electronics of Urbana Inc.), headphones, high precision compass and topographic maps (1:25,000). Each animal location was estimated by 2 directional bearings from 2 receiving stations in known places. We identified by a preliminary study the adequate receiving places for the whole study area: 22 receiving positions (and 22 associated and partially overlapping sectors) were so determined, allowing us to take fixes of radio-collared animals wherever they were in the study area. Reflected signals were sometimes received leading us to repeat the fix from a better receiving

position. When it was possible, we used fixed radio-beacons as reference points, but these beacons were often unavailable because of the hard territory geomorphology. We tried the Null-peak triangulation system where geomorphological condition allowed its use (uneasy to transport, unusable in sites with excessive reflections). Bearings accuracy was immediately controlled by a triangulation program on personal computer and fixes were repeated when accuracy was too low.

Radio-locations were made each 15 minutes (Spitz, 1988) since animals' departure from initial resting place to the next resting place. Animals' locations were reported using UTM I.G.M.I. cartography (1:25,000, 1:10,000). This work was conducted 2 days a-week since August 1992 till November 1993. The data obtained are not fully analyzed. The results we present in this paper are based on 114 resting places and 24 daily movements. Ninety nine (99) resting places and the 24 daily movements refer to 2 females, initially caught as subadults, that gave birth to 1 and 3 piglets respectively in the next farrowing season (1993). The remaining 15 resting places concern 5 males (1 adult, 4 subadults) that moved away from the study area after few months, and 2 subadults (1 male, 1 female) whose collars stopped working approximately after 20 days since the tagging. We shall use the terms "winter" or "bad season" to refer to a period that goes from half September to April, characterized by particularly hard weather conditions, and the terms "summer" or "good season" to refer to the better weather part of the year.

The animals we studied were spread all over the study area, so we tried to divide it into altitude classes.

- The first class goes from the bottom of the valley (about 500 m) to 1,350 m.
- The next class goes from 1,350 to 1,800 m.
- The last class goes from 1,800 m to the edge of the mountain chain (about 2,500 m).

4. Results

4.1. Resting places

The radio-tagged animals resting places are shown in figure 2. We can see in figure 3 that location altitude changes according to season. We studied the ground conformation of these places and we found out a preference for:

- high altitude and south-eastern exposure, near rocky faces or big stones, where vegetation varies from low bushes to thin larches, during bad season. The medium altitude of

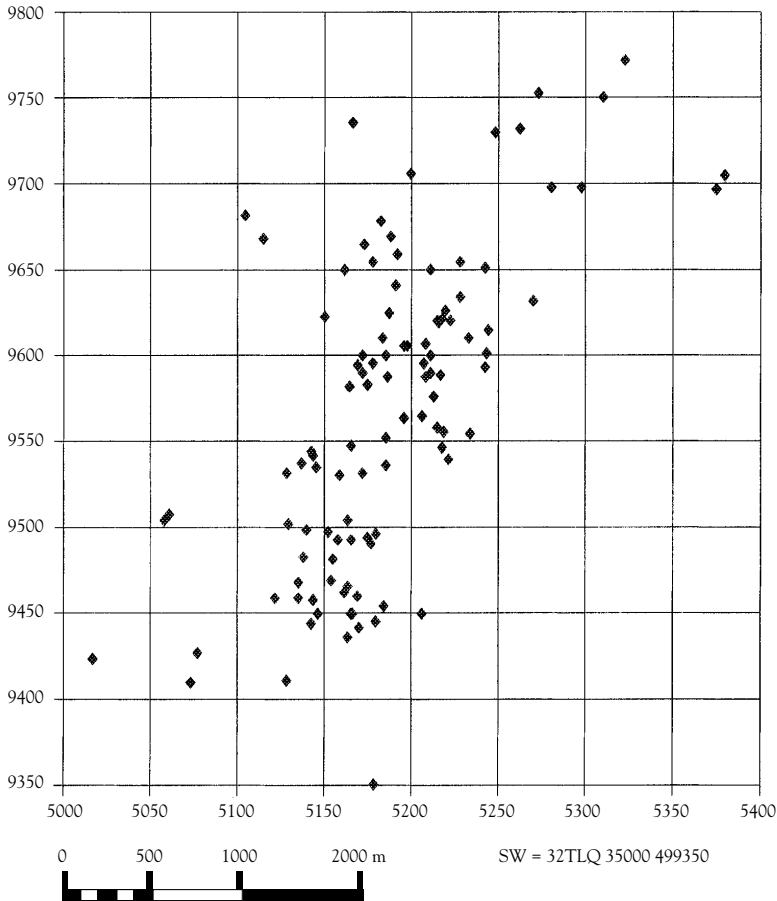


Figure 2 - Resting places UTM grid.

winter resting places is 1,595 m (min. 1,380 m, max. 1,810 m). Higher resting places were given up for lower ones only when snow cover was high (> 80 cm).

- medium-low altitude, fresh climate, water and vegetation abundance, north eastern exposure, during good season. The medium altitude of summer resting places is 1,235 m (min 990 m, max. 1,480 m).

The slope of resting places varies from 0 to 5 degrees in summer while it reaches even 20° in winter. This is probably linked to better insolation, better water drain of the ground, shorter snow persistence time.

The absence of diurnal resting places in the vicinity of some particular areas with farms, houses and touristic places is patent. Moreover, displacements were noticed in relation to

human disturbance, particularly poachers' shooting, and some of these displacements suggest an use of the protected areas (Natural Park) as "safe" zones.

4.2. Female movements

Radio-tagged females showed 2 movement types according to season (Fig. 4):

- In winter they quickly descend from their high altitude resting areas to reach feeding places at lower altitude (800 - 1,300 m). They often visit beech and chestnut woods (Durio *et al.*, 1995). Whereas their speed is high while they are going down, when they reach lower altitudes, bearings confidence ellipses overlap, identifying slow moving areas (speed < 1 km/h). Three-four hours later wild boars return to resting areas and usually they rest in a nest

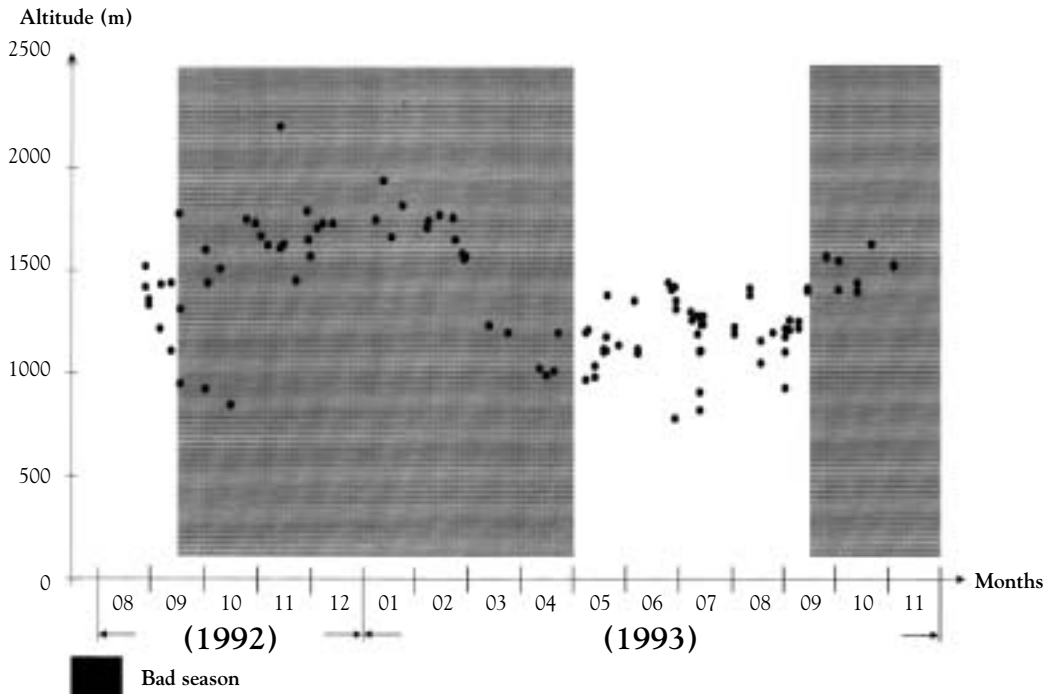


Figure 3 - Variation of resting places altitude through months.

that is different from the starting one as in "loop pattern" by Spitz and Janeau (1990).

- In summertime altitude range is shorter and resting areas overlap feeding places (800 - 1,200 m). Activity movements are more diversified than in winter in regard to patterns suggested by Spitz and Janeau (*op.cit.*). All these patterns were observed: "small zone", "loop", "zig-zag" and "ranging".

The mean movement parameters differences between winter and summer are described in the figure 5.

5. Conclusion

We have observed variations of the resting place location (altitude, vegetation type) in regard to the season. These variations confirm the hypotheses about thermal comfort, safety and quietness preferences.

Females daily movements differences occur also in regard to the season and can be related to the change in overlapping of feeding and resting areas. Consequently, we observe variations of the mean movement parameters.

This work, in progress, must be analyzed with the male data and new field records, to precise and understand the spatial behaviour of Wild boar in the high elevation environment.

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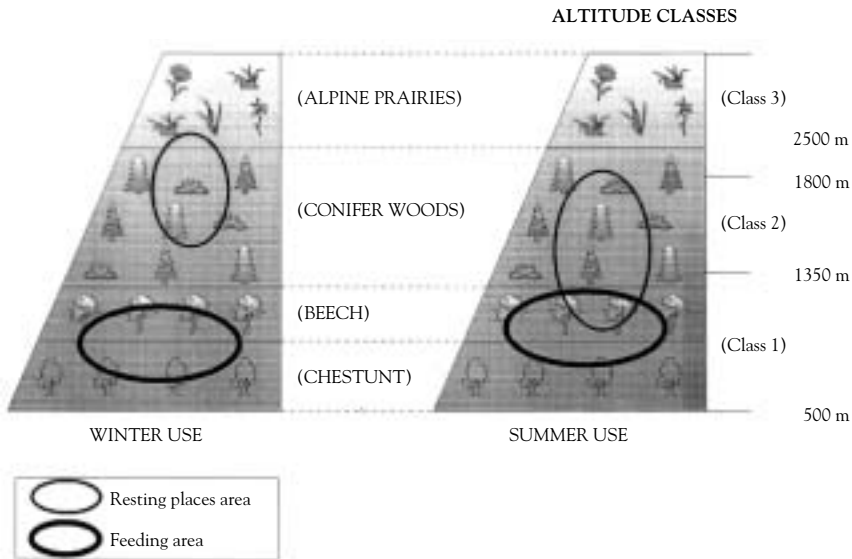
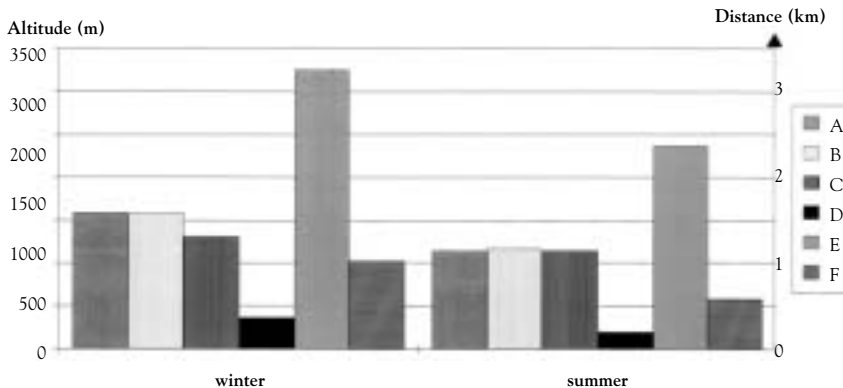


Figure 4 - Environment use.



A) Starting resting place altitude (m); — B) Ending resting place altitude (m); — C) Altitude of the farthest location reached during night activity (m); — D) Altitude difference (m); — E) Horizontal covered distance (total displacement) (km); — F) Distance of the farthest location from starting resting place (km).

Figure 5 - Mean movement parameters: differences between winter and summer.