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Comparative Study of the Seasonal Variations of the Social Structures in Three French Wild Ungulates

Richard Bon, Raymond Campan, Maryse Dardaillon, Georges Demeautis, Georges Gonzalez and Pierre Teillaud

Introduction

The works on the social structure in wild ungulates are too numerous to be reported here. Nevertheless, these structures appear to depend on the one hand on ecological conditions such as resources distribution, density, use of home range, human pressures, etc. ... On the other hand on the nature, the intensity and the organisation of interindividual interactions within the social groups, particularly agonistic and affiliative interactions which are developed during ontogeny; the study of the social structures and their determinants is the aim of Socioecology [7].

In this respect the French species are not very well known so far in spite of the work of Schaal [14] on the Fallow-Deer, of Bideau et al. [2, 3] on the Roe-Deer, of Mauget [11], Mauget et al. [12] and Dardaillon [5, 6] on the Wild Boar, for the plain ungulates. In mountain ungulates some studies describe the social structures in the Isard (Pyrenean Chamois) [4, 10, 8, 9, 1]; other works deal with the Corsican Mountain Sheep (Mouflon) introduced in various sites [13, 10, 8, 9]. All these works reveal that the social structures are basically organised around the attachment units constituted by the females and their youngs, the group composition seasonally varying in relation to the main events of the life cycle: rutting and littering.

The present work compares the seasonal variations of the social structures in three wild ungulates living in three sites in the South of France.

Species studied, sites and methods

The species we have studied are: the Wild Boar *Sus scrofa* in the alluvial plain of the Camargue delta; the Isard, *Rupicapra rupicapra pyrenaica*, in the Carlit Massif covered with grasslands and rocky waste with broom, locally under Mediterranean influence, above the forest zone between 1400 and 2900 m of altitude, a hunting reserve; the Corsican Mountain sheep, *Ovis amon musimon* in two different places, the Carlit Massif where it is sympatric with the Isard and the Caroux-Espinouse Massif where it has been

introduced in a rocky area covered with heath, the valley floors sheltering a deciduous forest, which is also a hunting reserve whose altitude ranges from 550 to 1124 m.

The social groups have been described in the course of those observer's regular travels on fixed trails and occasional meetings with the animals; the observations were performed directly, with 8 x 40 binoculars or with a 30 x 90 telescope. We sorted out three types of Wild Boars: the large ones, the yearlings and the piglets. For the Isard and the Mouflon, on the contrary, males and females can be made out even through observation from a distance. We therefore have two classes of adults in addition to the yearlings and the youngs (lambs and kids).

Results

1. The Wild Boar

The group size (Fig. 1 a) varies along the year averaging about 4 animals, the most frequent class of size grouping from 2 to 5 individuals (40% of the observations). The number of animals within a group slightly increases from May to June at farrowing time. The frequency of solitary animals decreases noticeably after September when the frequency of groups including more than 5 animals also rises.

The basic social structure consists of large animals and youngs (Fig. 2 a). The identification of hunted animals shows that these adults are always females. Several females group together with their piglets and some yearlings. Males are mainly solitary during Winter, Spring and most of the whole Summer in spite of the decrease of seasonal variations. Then they group together and get closer to the basic social units at rutting time. During rutting in December, the youngs are temporarily rejected and most of them join the group again later on. In Spring the females become solitary and hide for farrowing. A new familial nucleus is then constituted with the piglets and some yearlings, mainly females. At that time, from March to August, the frequency of the groups of youngs increases.

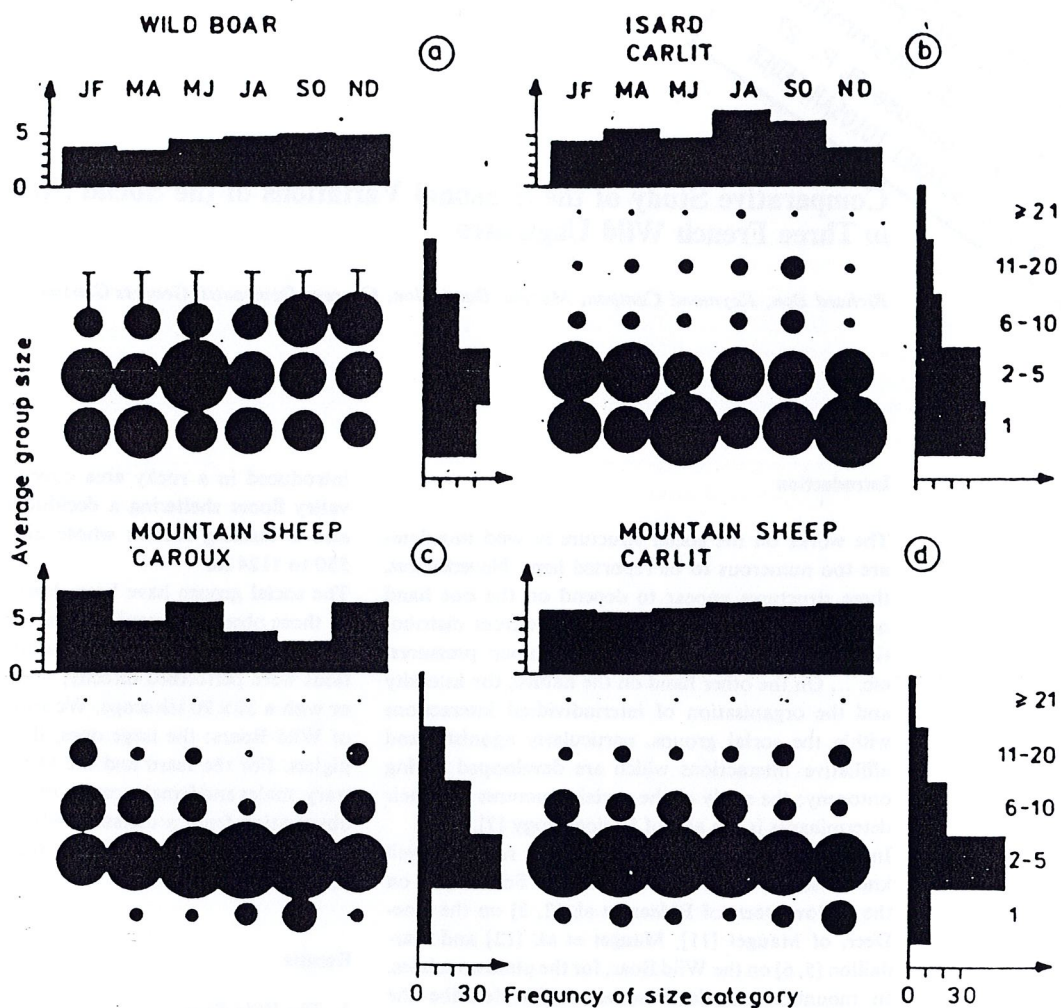


Fig. 1. Comparison of the seasonal variations in the group size: a, the Wild Boar; b, the Isard; c, the Mouflon in the Caroux and d, the Mouflon in the Carlit. In each of the four graphs, the horizontal histogram represents the variation by two month period of the average size of the observed groups. The vertical histogram represents the relative frequency of each class of size. The circles at the centre show the relative frequency of each class of size for each two month period

2. The Isard

One meets mostly solitary animals (39% of the observations) and mainly from May-June to November-December (Fig. 1 b) or groups from 2 to 5 individuals (35% of the observations) particularly between January and April. The frequency of the groups with more than 5 animals increases during the Summer (between July and October). The average number of animals within a group varies between 4 (in November-December) and 7 (in July-August).

The basic social unit in the late Spring includes the female and its kid (Fig. 2 b), sometimes with its yearlings. Two to three such units usually group together.

During the Summer, the young males tend either to join these groups or to group themselves in large herds. In the late Summer and the beginning of Autumn the oldest males either join the females groups or become territorial. The group structure scatters during rutting. Eventually the males become solitary again and the familial groups are reconstructed around the females and the youngs. The youngs are then rejected during the parturition period when the females hide themselves. Eventually some yearling females join the new units, the yearling males usually grouping together.

3. The Mouflon

The most frequent group size throughout the year corresponds to the class 2 to 5 animals per group in the Caroux-Espinouse (45% of the observations, mainly between July and October) as well as in the Carlit (more than 50% of the observations) (Fig. 1c and d). If the seasonal variations are reduced in the Pyrénées, with an average of 6 animals per group, in the Caroux on the contrary, that number ranges from 3 in October to 7.5 in January, with a slight increase of the group size in May-June. In the latter place we also observe larger groups (over 11 animals) between November and February and the highest

number of solitary animals (the less frequent class 7% of the observations) in September-October.

The basic social unit includes females with their lambs and some yearlings, but the seasonal variations of the groups structures are obvious (Fig. 2c and d). The lowest frequency of this type of group is recorded at the beginning of Autumn and the highest one in the late Spring with a lag between the two areas while the minimum is in September-October in the Caroux and November to February in the Carlit when the maximum takes place in May-June for the former place and in July-August for the latter one. The decrease of the frequency of the basic units

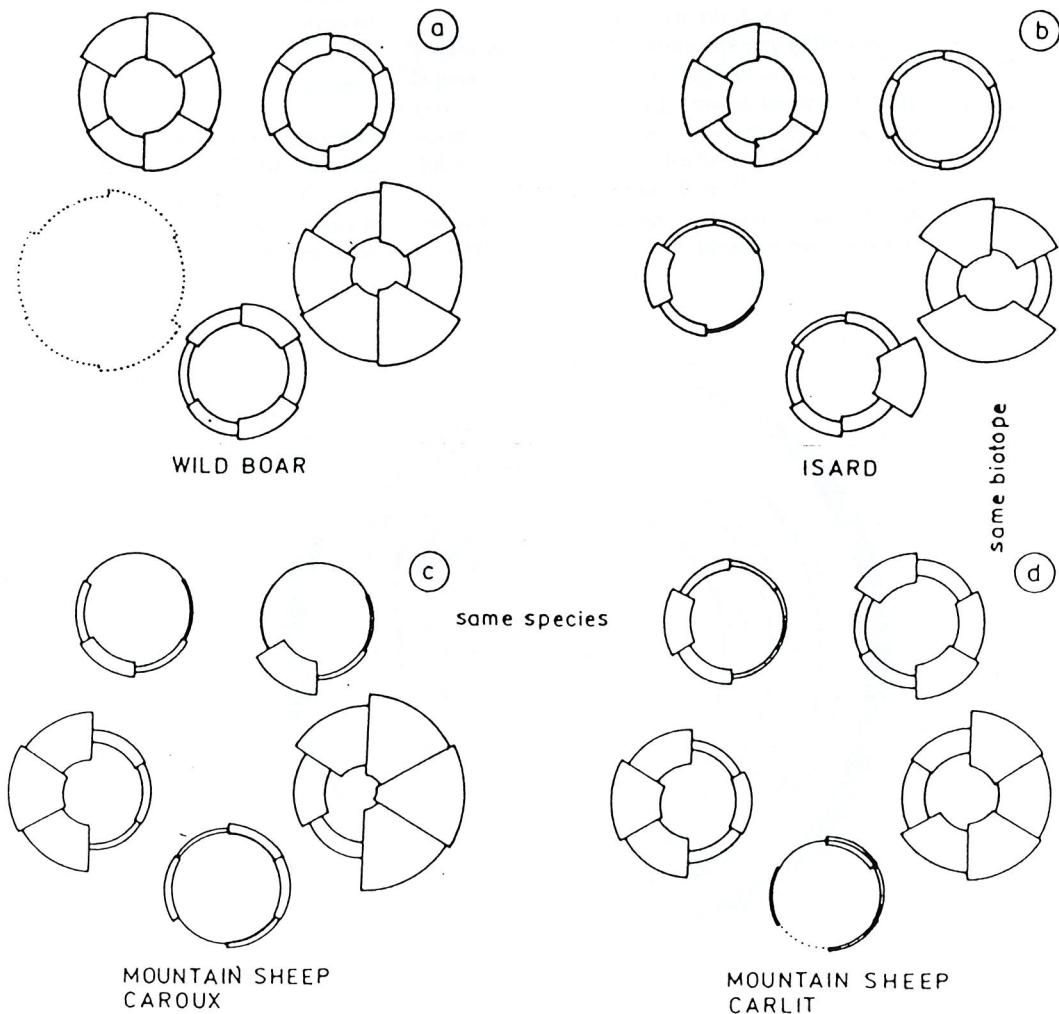


Fig. 2. Comparison of the seasonal variations of the types of groups: a, the Wild Boar; b, the Isard; c, the Mouflon in the Caroux and d, the Mouflon in the Carlit. In each of the four graphs each ring represents one type of group and the thickness of that ring is proportional to its observed frequency by two month period

corresponds to the increase of the frequency of mixed groups in Autumn. Eventually, the solitary males are rare but their number tends to increase during rutting in both areas. In the Caroux most of the males leave the observation area outside the rutting period.

Conclusion - Discussion

In the three species, the females isolate themselves for littering; at that time a strong attachment is established with their young(s) inducing affiliative relationships which strengthen the social basic structure. This includes then primarily the mother and the young(s). Such units tend to group together in the three species, including also some yearlings mainly females with which the attachment lasts.

As the rutting time approaches, the adult males usually solitary or grouped together get closer to the familial units and either become part of such herd or stay solitary and some even become territorial. Then the youngs are often rejected. After rutting, the adult males move away from the familial groups.

At littering, when the females isolate themselves, they reject the yearlings which tend to band together;

nevertheless some of them are incorporated into the new familial units after littering.

For the three species living in temperate areas the seasonal variations of the group structure are strongly rhythmized by the environment conditions. The life cycles (Fig. 3) are organised to allow littering at the best time of the year, after the Winter season, weaning taking place when the plant resources but also the animal food (for the Wild Boar) become abundant.

The differences between the cycles, as for example the precocious beginning of rutting in the Isard with a longer pregnancy duration and all the consequences on the social structure, are answers to particular local constraints. Consequently the social structures appear as a part of the whole adaptation of a population to its environment.

Summary

In the three species studied, the Wild Boar, the Isard and the Mouflon, the females isolate themselves to litter. The basic social structure is the female with its young(s). Such units tend to gather with some yearlings mainly females. As rutting time approaches,

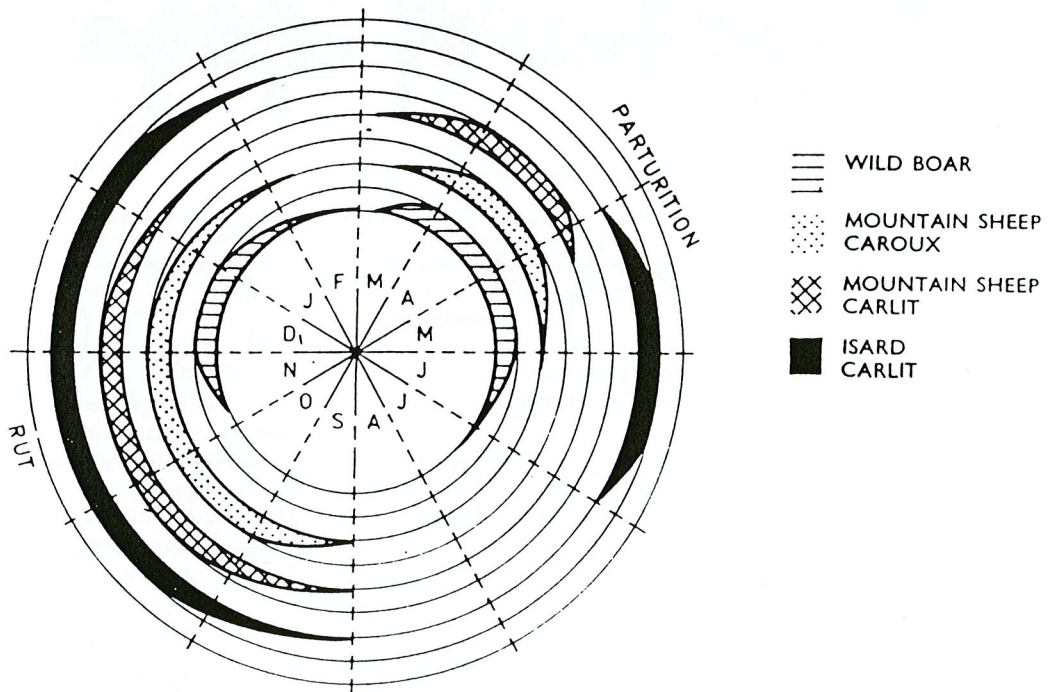


Fig. 3. Comparison of the annual life cycles. From the center to the periphery: Wild Boar, Mouflon in the Caroux, Mouflon in the Carlit and Isard

adult males either solitary or in group get closer to the familial units and become part of mixed groups or remain solitary, even sometimes territorial. Next the young are rejected but after rutting the males move away and the familial groups are reconstructed. At littering, the females also reject the yearlings which tend to group together but some of them come back into the new familial units after littering. The seasonal variations of the group structure are strongly rhythmized by the general and local environmental condi-

tions; then the social structures appear as a part of the overall adaptation of a population to its environment.

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