

## Sociabilidade e hábitat dos rebezos (*Rupicapra pyrenaica parva* Cabrera, 1914) nun sector de Picos de Europa

## Sociability and habitat of the chamois (*Rupicapra pyrenaica parva* Cabrera, 1914) from a sector of Picos de Europa Mountains

**BAS LÓPEZ, SANTIAGO**

R./ Reino Unido, 25.

36162 Pontevedra

E-mail: sbas@edu.xunta.es

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### RESUMO / ABSTRACT

O presente traballo recompila 105 días de observación dos hábitos dos rebezos dun sector de Picos de Europa, distribuídos nas diferentes estacións do ano, entre 1.993e 2.008.

Descríbense os cambios de hábitos, de hábitat, tamaño e composición das greas, nas diferentes estacións do ano; tanto das femias, con ou sen crías, como dos machos, xoves e chibos.

Os desprazamentos estacionais arriba – abaixo na montaña respondían a unha busca intelixente de pasto e non a outros factores ambientais, como a temperatura ou o desxeo.

Nunca se observaron rabaños de machos. No outono (celo) son moi agresivos e poden chegar a matarse, tal como puidemos gravalo en vídeo (BAS, 2.009). No resto do ano manteñen certo grado de agresividade ritualizada e territorialidade. Con frecuencia os solitarios formaban parellas, “dúos de machos”, que resultaban ser estratexias reprodutivas exitosas, para apoderarse das greas de femias.

O único grupo numeroso de machos observado eran sete, que se atopaban xunto á primeira cría vista nesa tempada na Canal de la Sotín. Atraídos pola curiosidade, sen dúbida melloraban a protección á primeira cría do ano. Denominei “bautizo” a ese raro comportamento, do que unicamente coñecemos un equivalente nos ñúes azuis salvaxes en África.

Resáltase que os rebezos da área de estudo evitaban os bosques todo o ano, tal vez motivados pola presenza frecuente de lobos, como pola falta de refuxio e alimento neles.

Expónense tamén os datos de natalidade e o forte descenso numérico de chibos observado, a medida que avanzaba o ano. Chama a atención a forte redución no verán e outono. A falta de datos sobre a agüa real, os datos de depredación, ou carroñeo, na estación estival e no outono por carnívoros coma o lobo e o raposo, xustifican en certa medida dita flutuación estival e outonal. A tasa de renovación da poboación era realmente baixa. No primeiro inverno os chibos non pasan de ser un 4,2 do total da poboación.

The present report compiles 105 days of observation of the chamois's habits of Picos de Europa Mountains, spread over the different seasons of the year, between 1993 and 2008.

It describes the changes in habits, habitat, size and composition of the herds, in the different seasons of the year, regarding both females –with or without offspring– and males.

The season displacements up and down the mountain were not found to respond to an intelligent search for pasture or to other environment factors, such as temperature or thawing.

Male herds were never observed. During autumn (mating season) males become very aggressive, and they can get to the point of killing each other –this aggressive behavior was recorded in video (BAS 2009). During the rest of the year they usually maintain certain degree of ritualized aggressiveness and territoriality. The lonely specimens frequently pair off (these groups are known as “pair of males”), which has proven to be a successful reproductive strategy to grab female herds.

The only large group of males recorded consisted of seven members. They had joined the first newborn chamois we had seen in that season in the Canal del Sotín. Seemingly attracted by their curiosity, they were no doubt improving the protection of the first newborn of the year. We called this unusual behavior “baptism”. No behavior equivalent has been recorded, apart from that of the blue wildebeest of Africa.

We have highlighted the fact that the chamois from the area of study avoided the forests during all year, probably because of the frequent presence of wolves, as well as their lack of shelter and food.

We have included information about the birth rate and also about the sharp decrease of young chamois as the year goes on. We would like to draw attention to the fact that the number of young chamois was heavily reduced during summer and fall. To a certain extent, this fluctuation can be explained by the absence of information about some given factors, such as how little it is actually known about the golden eagle, and also about predation and scavenging habits of carnivorous animals like wolves and foxes during the period of summer and fall. The renewal rate of the population was found to be really low. During the first winter the young chamois did not surpass the 4.2% of the entire population.

## **PALABRAS CLAVE / KEY WORDS**

Adultos, celo, depredadores, crías, hábitat, Picos de Europa, rebecos, sociabilidade.  
Chamois, Picos de Europa, adults, mating, predators, breeding, habitat, sociability.

## INTRODUCCIÓN

Xa na inauguración do Parque Nacional da Montaña de Covadonga en 1.918 o seu principal promotor, o marqués de Villaviciosa, puña especial énfases na defensa e conservación dos rebezos e na loita contra o furtivismo. Decatábase do seu potencial atractivo para turistas montañeiros.

Coa ampliación do Parque Nacional aos macizos central e oriental en 1.995, acábase neles a caza de machos – trofeos e a dinámica de poboación dos rebezos aló responde máis a factores ambientais naturais que á caza. Pero ca chegada dunha epizootia, a sarna sarcóptica, no ano 2.000, a dirección do Parque decide realizar caza selectiva para retirar algúns rebezos, os máis afectados, e así tratar de diminuír os efectos da enfermidade. Entre 1.997 e 2.008 a poboación rebezeira de Picos de Europa redúcese nun 44% , pasando duns 6.200 a uns 3.500 individuos nos censos de verán, con crías (PÉREZ BARBERÍA *et al.*, 2.009).

No presente traballo recóllense datos do uso do hábitat polos rebezos dun sector de Picos de Europa durante un longo período (1.993 a 2.008), no cal tamén estudouse e filmouse a súa conduta (BAS, 2.009).

Prestouse especial atención ao tamaño e composición das greas nas distintas estacións do ano: nº total de rebezos por grea, nº de xoves e de chibos por grea, nº de machos solitarios, grupos de machos e grupos de rebezos novos. Non se prestou atención á sex ratio, xa ben coñecida en Picos de Europa polos censos (PALACIOS, 2009).

## MÉTODO

Entre 1.993 e 2.008 fixéronse un total de 30 visitas a Picos de Europa de 3 a 6 días de duración, completando un total de 105 días de observación dedicados aos rebezos.

O esforzo de observación foi realizado da seguinte maneira:

- .- Primavera: 25 días
- .- Verán: 36 días.
- .- Outono: 28 días.
- .- Inverno: 16 días.

## INTRODUCTION

It was already at the opening of the National Park of the Mountain Covadonga in 1918 that his main promoter, the Marquis of Villaviciosa, put special emphasis on the preservation of the chamois and in its struggle against poaching, highlighting its potential appeal to the mountain tourists. The expansion of the national Park in 1995 put a stop to hunting practices in search of male trophies. Since then, the population dynamics have responded to environmental factors, not the herds' fleeing habits from hunters. But with the arrival of an epizooty, the sarcoptic mange, the park direction decided to perform a selective hunt in order to remove the most affected chamois, and thus try to decrease the effects of the disease.

Between 1997 and 2008 the chamois population in Picos de Europa was reduced to 44%, going from 6200 to 3500 specimens in the summer census (PEREZ BARBERÍA *et al.*, 2009).

The present report compiles information about the chamois's use of their habitat in a sector of Picos de Europa during a long period (from 1993 to 2008); during that time their behavior was also studied and filmed (BAS, 2009).

We put special attention on the size and composition of the herds in the different seasons of the year: total number per chamois herd, number of the young and baby chamois per herd, number of lone males, male groups and young chamois groups. Due to the fact that the sex ratio is already well known –Picos de Europa's census (PALACIOS, 2009)–, it has not been taken into account in this study.

## METHOD

Between 1993 and 2008 a total of 30 visits of 3 to 6 days of duration were made. This led to a total of 105 days of observation dedicated to the chamois.

The distribution of these visits is specified below:

- Spring: 25 days.
- Summer: 36 days.
- Autumn: 28 days.

Sería desexable una prospección máis intensa no inverno; pero as nevaradas, que ás veces pechaban os accesos en automóbil, e algún imprevisto ás veces impedírono.

En cada visita tomábase nota do tamaño e composición das greas, observadas con óptica lixeira (prismáticos 10 -12x), así como da súa localización precisa, que se levaba a mapas de escala 1: 25.000, tomando nota dos seguintes datos:

- Altitude s.n.m. no primeiro intre da observación.
- Tipo de hábitat: A) Abertos: penas, pedreguizas, pasteiros, matogueira baixa. B) Pechados: bosques. C) Ecotonos: lindes de de bosques e matogueiras baixas con árbores ciscadas.
- Meteoroloxía: ambiente meteorolóxico nas observacións e durante a estación.

A área de estudio centrouse nas “canais” próximas a Cordiñanes de Valdeón (provincia de León): Canal de la Sotín – Vega de Liordes – Collado Jermoso y en menos ocasións: Canal de Capozo – Pedriza Carbanal. Unicamente nunha ocasión , e a xeito de comprobación, realizouse unha visita en decembro do 2008 a unha zona lonxana: Vega Redonda – Rondiella no entorno dos Lagos de Covadonga (Asturias).

A área de estudio caracterízase polo seu relevo moi accidentado e quebrado, cun importante gradiente altitudinal, dende 700 a 2.647 m. (Torre do Llambrión), Tal como se pode ver nos cortes verticais feitos sobre mapa a escala 1: 25.000. Tamén pola variedade de hábitats: pequenos e grandes pasteiros subalpinos (coma Vega de Liordes e Pedriza Carbanal), penas, pedreguizas, lagoas glaciares, bosque de faias, , bosques abertos con mestura de carballos, tilos e outras especies, etc.

En principio todos estes hábitats podían ser utilizados

- Winter: 16 days.

A better surveyal during the winter would have been desirable, but snowfall sometimes impeded the access by car.

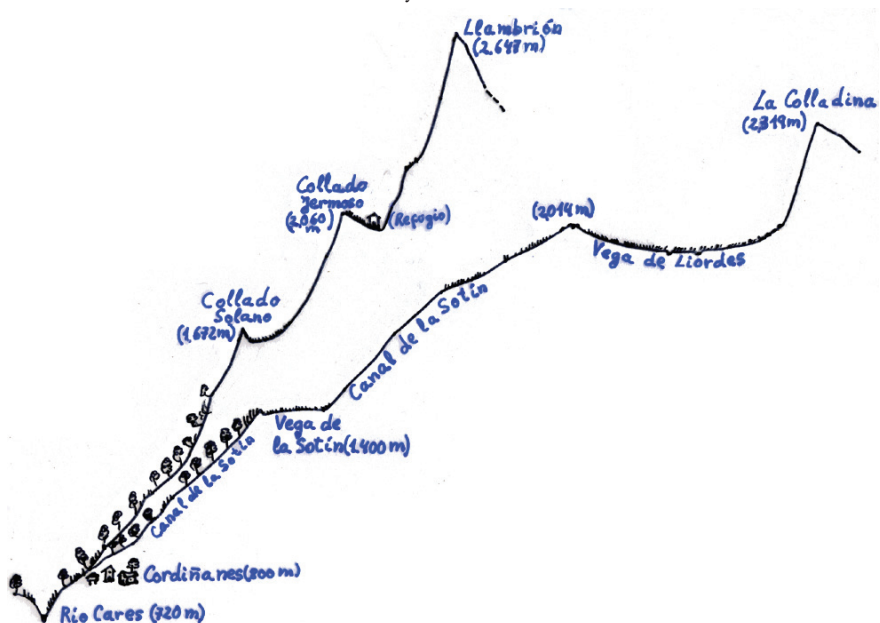
During each viewing we took notes of the size and the composition of the herds, which were observed by binoculars (10-12x). We also annotated their exact location, which was later recorded in maps (scale 1:25.000). We included the following information:

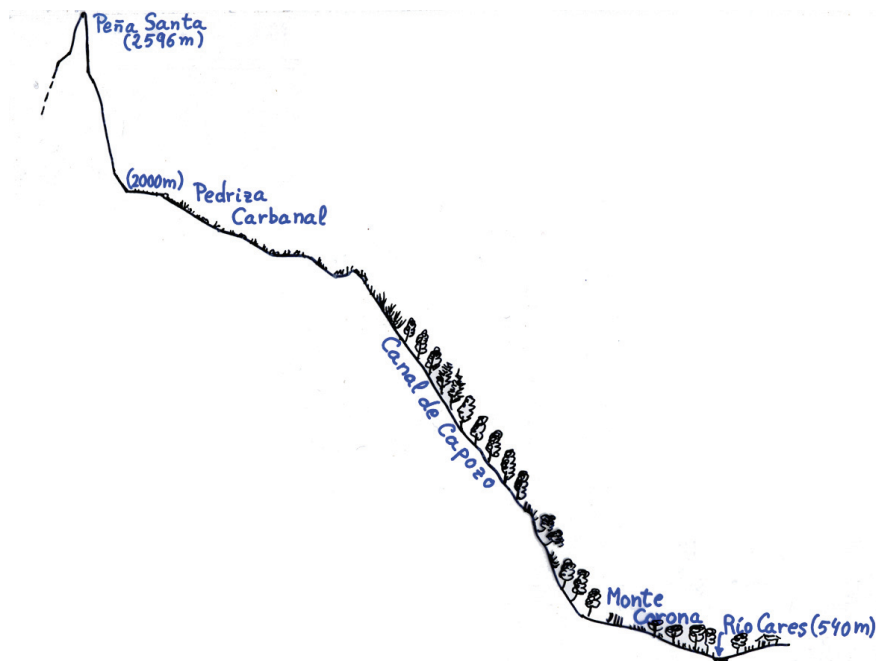
- Altitude.
- Type of habitat: A/ open habitats: boulders, pasture lands, rocky grounds, low scrublands. B/ closed habitats: forests. C/ semi-open habitats: edge of forests and low scrub lands with some scattered trees.
- Meteorology.

The area of study was focused on the “canals” next to the Cordiñanes de Valdeón (province of León): Canal del Sotín - Vega de Liordes - Collado Jermoso, and in fewer occasions: Canal de Capazo – Pedriza de Carbanal. Only once we made a visit to a further location: Vega Redonda – Rondiella, in the surroundings of the lakes of Covadonga (Asturias).

The area of study’s main feature is its hilly and cracked relief, and a considerable range of altitude, from 700 to 2,647 m. (Torre de Llambrion) as can be seen on the vertical cuts made on the map (scale 1:25.000). Another feature that characterized the terrain is its variety of habitats: small and big pasture

Área de estudio / The area of study





lands (like Vega de Liordes and Pedriza Carbanal), rocky grounds, glacier lakes, beech forests, open forests with oaks, lime trees and some other species.

All of these areas had been supposed to be used by the chamois and our initial purpose was to discover their preferences between open spaces and forests. We also wanted to know at which altitude the chamois were on each season of the year, and which environmental factor their location depended

on.

We also paid attention to the birth rate of the offspring, as well as the number of offspring observed at the beginning of the summer (number of births) and the next seasons (number of deaths).

On each visit we recorded the number of females, of newborn chamois and of young chamois found in each herd, as well as the size of the groups of males not belonging to any herd.

The altitudinal distribution of the chamois clearly responded to a seasonal pattern; however, it was not directly related to their social behavior. Therefore, in the second part of this study (graph 2 and subsequent ones), when we deal with sociability, we will divide the year in three distinct parts:

- Autumn (mating period): October, November and December. Prospection: 28 days
- Winter: January, February, March and April. Prospection: 21 days
- Summer (breeding period): May, June, July, August and September. Prospection: 56 days

April was included under the “winter” subheading because we could not observe any noteworthy behavioral changes. The first behavioral changes showed up with the appearance of the first newborn chamois in May.

polos rebezos e a intención nosa era desvelar as súas preferencias entre espazos abertos e bosques. Tamén se pretendeu saber a que altitudes se atopaban en cada estación do ano, e en función de qué factores ambientais.

Prestouse tamén atención ás datas de nacementos das primeiras crías da tempada, así como ao número de crías observadas ao comezo do verán (natalidade) e nas seguintes estacións (mortalidade das crías).

Número de femias, crías e xoves en cada grea, así como o tamaño dos grupos de machos sen grea, foron datos recollidos en cada visita.

A distribución altitudinal dos rebezos axustábase a un patrón claramente estacional, pero non así a súa conduta social, por iso na segunda parte deste artigo (gráfica 2 e sucesivas), cando se trata o tema da sociabilidade, consideraremos o ano dividido en tres:

- Outono (celo): Outubro, novembro e decembro completos. Prospección : 28 días.
- Inverno: xaneiro, febreiro, marzal e abril completos. Prospección: 21 días.
- Verán (cría): maio, xuño, xullo, agosto e setembro. Prospección: 56 días.

Foi incluído abril no “inverno” por non observar cambios conductuais de importancia. Os cambios chegan co nacemento das primeiras crías en maio.



## RESULTADOS

### 1.- Distribución altitudinal:

A gráfica 1 recolle os datos obtidos sobre a distribución altitudinal dos rebezos na zona de estudo de 100 en 100 metros de altitude nas catro diferentes estacións do ano.

No outono: período caracterizado polo celo das femias. O núcleo da poboación de rebezos instalábase entre os 1.400 e os 1.800 m de altitude. Os escasos rebezos observados en zonas máis baixas solían ser machos solitarios, que vivían en sitios inadecuados (crestas sen pasto, barrancos e fondos de barrancos), e presumiblemente expulsados das greas polos machos dominantes, que eran os que acaparaban os mellores pastos xunto cas greas de femias.

Por outra banda, había tamén moitos rebezos que no outono permanecían en altitudes de 1.800 a 2.100 m., soportando ben o frío e as primeiras nevaradas. En visitas realizadas en outonos con temperaturas suaves (coma no 2.005) isto fíxose notar moito e poucos rebezos baixaron ás cotas habituais do outono.

Normalmente no outono os rebezos abandoaban as veigas outas de La Sotín (Vega de Liordes), pero non as do outo Capozo (Pedriza Carbanal). Estando ambas á unha altitude duns 1.900 m resultaba paradójico. A explicación máis convincente que atopamos pode ser, que nesas datas a Vega de Liordes secábase polas xeadas e, pola contra, o outo Capozo (Pedriza Carbanal) aínda estaba verde.

O inverno: o inverno é un período duro para os rebezos. A falta de pasto, que se ve cuberto pola neve, obrígalles a manterse por baixo dos 1.700 m, desprazándose con frecuencia entre os 700 e os 1.600 m de altitude, baixando cos temporais de neve e subindo entre temporais; buscando mellores pastos. Algúns,

## RESULTS

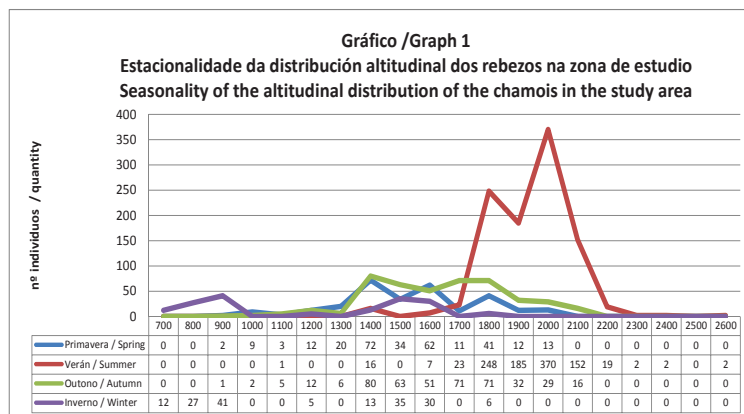
### 1. - Altitudinal distribution

Graph 1 compiles the obtained data related to the altitudinal distribution of the chamois in the study area, every one hundred meters, during the different seasons of the year.

During autumn: female's heat period. The main chamois population remains between the 1,400 meters and the 1,800 meters of altitude. A few of them were observed in lower areas. They were mostly lone chamois who lived in unsuitable places like ravines and rocky grounds without pasture. They were presumably expelled from the herds by the dominant males, who were occupying the best pasture lands with the female herds.

On the other hand, there were several chamois who remained on a higher altitude (between 1,800 and 2,100 meters), enduring the cold and the first snowfalls. During some visits, when the temperatures were warmer, the chamois tended to remain in high areas and just a few of them descended to the regular autumn places. Usually during autumn the chamois left the higher meadows of La Sotín (Vega de Liordes). However, they did not forsake the meadows from Capozo (Pedriza Carbanal). This fact appears to be contradictory because both of these areas share the same height (1,900 meters.) The most convincing explanation we found was that, at the time, whereas the meadows from Vega de Liordes were drying up the ones from Capozo (Pedriza Carbanal) were still green.

During winter: Winter is a hard period for the chamois. The lack of pasture, covered by the snow, makes the chamois to keep under the 1,700 meters, sometimes between the 700 and the 1,600 meters, descending with the rough weather in search of better



escasos, rebezos permanecían a máis de 1.800 m de altitude, aproveitando o pouco pasto que asomaba nalgúns cotarelos, grazas ó vento que varría a neve e soportando temperaturas baixísimas.

Na primavera: os rebezos remontan a montaña; pero retrasan a remontada para subir ás veigas outas, cara onde irán a finais de xuño, a pesares de que estas solían estar libres de neve xa en maio e, ás veces, mesmo en abril, como sucedeu na quente primavera de 1.995.

De novo a conduta dos rebezos parecía contradicir á lóxica. Inda que as veigas outas xa estaban libres de neve nun 70% en maio, ou antes, os rebezos parecen saber de antemán, que nelas o pasto inda estaba seco. Non subían á Vega de Liordes nin á Pedriza Carbanal ata finais de xuño, cando estas reverdecen e florecen. Amosando unha conduta intelixente, previsor a longo prazo.

No verán: instalábanse maioritariamente nas veigas outas e cercanías; tamén nos pequenos pasteiros do piso subalpino, entre 1.800 e 2.100 m. de altitude.

O tamaño das greas, que ocupaban cada pequeno pasteiro, parecía estar en función do tamaño deste e do seu gromo. En ambientes pedregosos sempre había poucos rebezos.

En cada pequeno pasteiro cadansúa grea e cada grea en cadanseu pasteiro. Certos individuos, que coñecíamos individualmente, aparecían ano tras ano nos mesmos pasteiros. En ocasións puider observar, que as femias sedentarias defendían de intrusas o seu pasteiro, a súa despensa.

Pasteiros moi grandes, coma Vega de Liordes con máis de 1 km de diámetro, albergaban simultaneamente a varias greas e alí os enfrontamentos entre femias dominantes eran frecuentes.

Algúns rebezos solitarios, tanto machos coma femias, deixaban os pasteiros para vagabundear ou escalar picos. Así atopámoslos nalgúns cumios en altitudes superiores ós 2.200 m; incluso no mesmo cumio do Llambrión (2.647 m) (!)

Os poucos rebezos que se aventuraban en tales escaladas nunca foron femias con crías. Outros autores sinalaban a gran capacidade de desprazamento

pasture lands. A few of them staid over the 1.800 meters, taking the last pasture that remained in some hills and supporting extremely low temperatures.

During spring: The chamois start the ascent of the mountain; nevertheless, they do not reach the higher meadows until the end of July, in spite of these being free of snow since May, and sometimes even before that (an example of this occurrence can be found in the spring of 1995).

A seemingly contradictory behavior is observed once again. Despite the fact that the pastures were already free of snow, at least up to a 70 %, the chamois seem to know that the pastures are still dry and, therefore, would not climb, neither to Vega de Liordes nor Pedriza Carbanal, until the end of July, when both pastures blossom. We can conclude the chamois show an intelligent and far-sighted behavior.

During summer: Most of them settled in high meadows and their surroundings, and also in small pasture lands of the subalpine flat, between 1,800 and 2,100 meters of altitude.

The size of the herds seemed to be related to the size of the pasture lands they were occupying. In fact, there would be just a few of them in the rocky landscapes.

Certain specimens showed up in the same pasture lands year after year. On some occasions we could observe that the sedentary females defended their pasture lands from intruders.

Big pasture lands, like Vega de Liordes, with more than 1 km in diameter, could host at the same time several herds. In these areas the confrontations between dominant females were common.

Occasionally some lone chamois, both male and female, left the pasture lands to roam and to climb peaks. Some of them were found over the 2,200 meter of altitude, even on the summit of Llambrión (2,647 meters).

Those chamois who ventured far from the pasture lands were never females with offspring. Other authors have previously indicated the great capacity of lone chamois to travel long distances. For instance,

dos rebezos “vagabundos”, que camiñaron ata 300 Km desde o seu punto de orixe, ou ben outros, que se achegaron ó cumio do Mont Blanc, chegando a 4.750 m de altitude (COUTURIER, 1964; WÉBER, 2004).

## 2.- A vexetación e o hábitat

A case totalidade dos rebezos, observados en calquera estación do ano, atopábanse en espazos abertos: pasteiros, matogueira baixa, pedreguizas crestas e picos.

Con certa frecuencia observábanse rebezos perante o outono e inverno na beira dos bosques; pero case sempre por fóra do bosque.

Apenas tres individuos observados dentro dos bosques (menos do 1% das observacións) avalan o devandito. Nesta parte de Picos de Europa os rebezos evitaban sistematicamente os bosques.

Pode haber varios motivos:

- Os bosques, maioritariamente de faias, non ofrecen alimento nin refuxio.
- Nos bosques había lobos. Evitación de depredadores.
- Nos bosques había moitos corzos. Competencia.

Posiblemente sexa a combinación dos dous primeiros motivos o que xustifica este comportamento na área de estudio.

**3.- Tamaño das greas** (en adiante consideraremos o ano dividido en tres: verán, outono e inverno, tal como se indicou no apartado: método).

a) As femias:

Eran raras as greas, que xuntaban a máis de dez rebezas adultas. No verán poden coincidir varias greas nun sitio; xuntándose de 15 a 50 individuos en grandes pasteiros (Vega de Liordes e Pedriza Carbanal), aló podíanse observar enfrontamentos entre femias dominantes, como xa se apuntou. No outro extremo, hai que falar de femias solitarias, con ou sen cría non eran raras no verán, que non se acoplaban a ningunha grea e solían estar en pedreguizas, fóra dos mellores pasteiros, dominados polas greas. Os patróns de conduta social non son xeneralizables a tódalas femias.

No outono as greas grandes son máis raras,

some of them have walked up to 300 kilometers from their origin point, and others have got closer to the summit of Mont Blanc, reaching 4,750 meters of altitude (COUTURIER, 1964; WÉBER, 2004).

## 2. - Vegetation and habitat

Almost all the observed chamois, no matter the season, were found in open spaces: pasture lands, scrublands, rocky grounds and peaks. We often observed chamois on the edge of forests, but we have rarely seen them venturing within.

Just three specimens were observed within the forest (less than 1% of the observations). We concluded that in this area of Picos de Europa the chamois systematically avoided the forests.

This might occur due to an array of several reasons:

- The forests cannot offer food and shelter.
- There were wolves in the forests. In this case, the chamois were obviously avoiding predators.
- There were a lot of roebucks in the forests. In this case, they would be avoiding competition.

The most likely reason for this kind of behavior is a combination of the two former reasons.

**3- Herd size** (as was indicated above, from now on we will divide the year in three distinct parts –summer, autumn and winter).

a) The females:

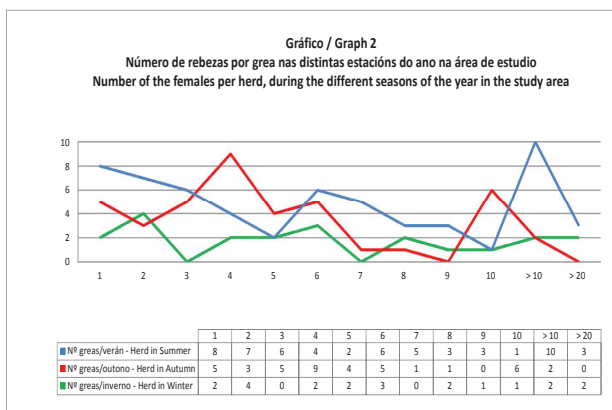
It was rare to find herds with more than ten adult female chamois. During the summer several herds could happen to be in the same place. These groupings, which ranged from 15 to 50 specimens in the same pasture land (Vega de Liordes and Pedriza Carbanal, mostly), could result in violent confrontations between dominant females. On the other hand, there were also lone females –with or without offspring– that could be easily spotted during the summer. They would be in the rocky grounds, out of the best pasture lands. Therefore, the social behavioral patterns cannot be extrapolated to all females.

During autumn it was unusual to see large herds. The rare big herds could be explained due to



ó abandonar estas as veigas outas. Os raros rabaños grandes observados explícanse pola coincidencia de varias greas nun dormitorio común (Alto Capozo). A intensa actividade dos machos intentando apropiarse das greas, agredíndose, etc. conlevaba tamén a rotura, ciscado e reparto das greas.

Son máis raras tamén no outono as femias solitarias, pois seguramente o celo estímulaas a xuntarse cas greas. Nos galanteos observados, as femias afastábanse algo das greas temporalmente, seguidas polo macho e poden dar a falsa impresión de solitarias na gráfica, e os machos de falsos monógamos. Non había femias solitarias no outono, senón en parella ou en galanteo cun macho (gráfico e táboa 2).



A monogamia era rarísima e só observamos e filmamos un caso, protagonizado por un macho coxo (BAS, 2.009).

No inverno a neve reducía moito a extensión dos pastos, e obrigaba ás greas a xuntarse en greas grandes, con ou sen crías, entablándose entón formas de competencia intraespecífica entre eles polo alimento (BAS, 2.009). Diversos autores sinalaban xa, que a cobertura de neve, e non o frío, é o que fai duros os invernos para as greas (CRAMPE, 1.986; CRAMPE, 1.996; WÉBER, 2.004).

Femias sen cría:

Expoñemos os resultados das observacións na gráfica e táboa 3, os comentarios serían parecidos ós de femias con crías.

b) Os machos solitarios:

the gathering of several herds in the same place (Alto Capozo), but the intense fights among the males to dominate the herds may also provoke the fracture and dispersal of the herds.

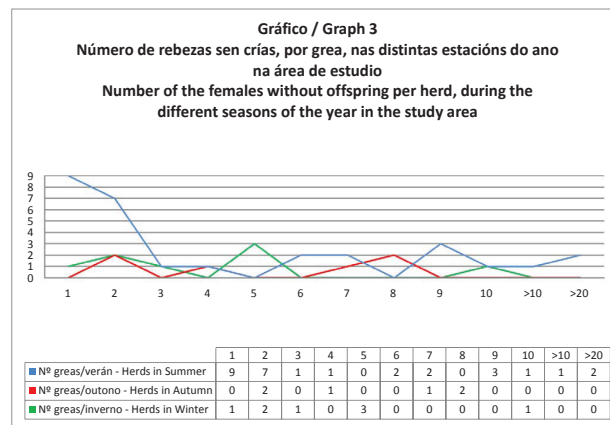
It was unusual to find lone female chamois during autumn. It is highly probable that being in heat stimulates their gathering together. Some females left the herd, followed by a male, during courtship. This could lead, while reading the graph, to wrongly categorize them as lone females and the males as fake monogamous. Nevertheless, there were not lone females during autumn at all, just couples away from the herd during courtship (graph and table 2)

Monogamy was very rare indeed. We just observed it and filmed it once. In this particular case the couple included a lame male chamois (BAS, 2009).

During winter snow reduces the surface of pasture lands a lot; therefore the small herds tend to gather into large herds. This causes new rivalries among them due to food shortage (BAS, 2009). Several authors have pointed out that the main reason why winter is such a hard time for the herds is the fact that snow covers most of the pasture lands; it is not directly related to the cold temperatures (CRAMPE, 1986; CRAMPE, 1996; WÉBER, 2004).

Females without offspring:

The result of the observations can be seen in graph and table 3. The obtained data would be similar to the females with offspring.



Durante todo o ano atopabamos machos acompañando e defendendo as greas e tamén machos solitarios. A agresividade dos machos dominantes fronte aos solitarios intrusos era moi intensa, máxima, no outono, podendo chegar a matar ao adversario; tornábase mínima no verán e final da primavera, limitándose entón os machos a condutas ritualizadas (BAS, 2.009).

Durante todo o ano os machos solitarios desprazábanse moito, indo dunha grea a outra, buscándoas visualmente ou olfactivamente, seguíndolles o rastro.

Resultaba frecuente, normal, ver os machos solitarios en parellas, buscando, localizando e apoderándose das greas.

En tres ocasións no outono puidemos ver, que o macho dominante da grea evitaba enfrontarse ao dúo de intrusos, non así a intrusos solitarios, contra os que indefectiblemente cargaban moi agresivamente. Por tal motivo considero a estes “dúos” de machos coma unha estratexia reprodutiva exitosa.

Os “dúos de machos” eran máis frecuentes no verán, tal vez porque nesa estación machos e femias levan unha vida máis independente, pois o período de celo inda estaba lonxe. O número de machos en dúos respecto ó total de machos sen grea pódese ver na táboa 4.

b) Lone males:

We found males going with the herds and defending them from intruders all year round. The aggressiveness between dominant males and lone males was very intense, even reaching the point of killing their opponent. These confrontations were observed to decrease at the end of spring and during summer, when we just observed some ritualized fights between males (BAS, 2009).

Lone males can travel quite frequently, going from one herd to another, searching for them all year round. It was usual to see couples of lone males tracing and trying to grab the herds.

In three occasions we could observe that the dominant male of the herd tried to avoid the confrontation against a pair of intruders, who attacked him very aggressively. For that reason we came to the conclusion that these “pair of males” proved to be a successful reproductive strategy.

The “pairs of males” were more frequently spotted during the summer. One reason for this could be that during this season males and females lead more independent lives because the mating period is still far away. The number of pairs of males in relation to the total number of lone males without a herd is reflected on table 4.

We never observed a male herd. The exception

	Verán / Summer	Outono / Autumn	Inverno / Winter
Proporción (%) / Proportion (%)	51,06	30,15	19,04
Nº machos en dúos - total / Nº of pairs of males - total	24/47	19/63	4/21

Táboa 4. Machos sen grea. Número e proporción de machos en dúos nas distintas estacións do ano na área de estudio.

Table 4. Males without herd. Number and proportion of the pairs of males during the different seasons of the year in the study area.

Nunca se observou ningunha grea de machos. O único grupo numeroso, a excepción, con sete machos, observouse na mesma cornixa herbosa ca primeira cría da tempada o 20 de maio do 1.996, nacida poucos días antes na Torre de Cantodota, na Canal de La Sotín. Sen dúbida achegáronse a curiosar, ofrecendo tamén máis protección á primeira cría da tempada.

Entre aqueles sete machos, curiosamente, non se desencadeou ningunha conduta agresiva nin

was a large group of seven males we spotted near the area where the first newborn chamois had been birthed that season –recorded on 20th May 1996. This calf had been born a few days before in Torre Cantodota in the Canal de La Sotín. The male herd undoubtedly approached the area out of curiosity and also to offer their protection to the newborn. Curiously, there was no aggressive behavior or even the ritualized type among them. One of the males went as far as to

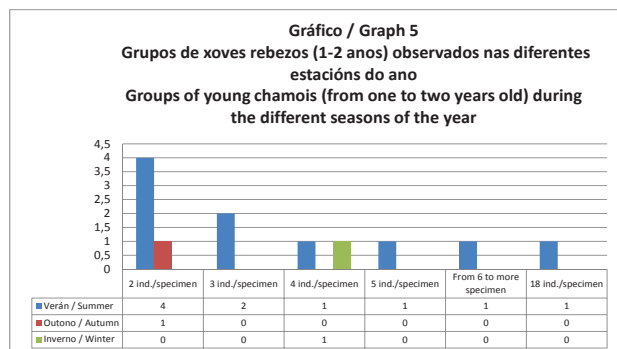
ritualizada, e mesmo un deles apadriñou durante dez minutos á cría do ano anterior, cando quedou separada da súa nai (BAS, 2009). Esta forma de conduta denomínea “bautizo” e desde entón non volvemos observar nada parecido.

Crías recién nacidas, de 1 – 4 días, observáronse o 29 de maio do 2.006 en Cueto bellán (1.657 m) e na Torre del Collado Solano (1.672 m) en picos case inaccesibles, acompañadas das súas nais. Nunha ocasión vimos ao macho dominante compartindo ca nai a vixilancia da cría recién nacida.

c) Os xoves:

Durante todo o ano permanecen os xoves dun ou dous anos nas greas, acompañando ás súas nais. Observouse e filmouse un grupo de nais pastoreando aos seus xoves fillos, dun e dous anos, cara a única sombra que había na Vega de Liordes en plena canícula, amosando así os fortes vencellos materno – filiais, que lles unen (BAS, 2.009).

Tamén era frecuente observar greas de xoves sós en período perinatal (maio, xuño e primeiros de xullo). Parece tratarse de xoves expulsados polas nais, para que non interfirán na crianza dos recém nacidos. Observáronse doce destas greas de “orfos”, con dous a dezaioito xoves por grea. Os datos resúmense na gráfica e táboa 5.



Aparentemente quedaban abandonados, pero púidose observar en moitos casos, como se incorporaba a estes grupos algunha rebeca adulta ca cría neonata e pasaba cos xoves algunhas horas ou todo o día.

Estes xoves ían reincorporándose ás greas ao longo do verán. No outono só se observou un

temporarily adopt a one-year-old chamois, when he was briefly separated from his mother (BAS, 2009). We coined this unusual behavior “baptism”, and it has not been recorded again since.

We observed a few newborn chamois (from 1 to 4 days old) the 29th of May of 2006 in Cueto Bellán (1,657 meters) and in Torre del Collado Solano (1,672 meters) and in some almost inaccessible peaks, accompanied by their mothers. We also observed the dominant male sharing the task of watching over the newborn with the mother once.

c) Young chamois (from one to two years old):

Young chamois remained a part of the herds accompanied by their mothers all year round. We could film a group of female chamois leading their offspring to the only shaded area in Vega de Liordes during a heatwave, showing their strong maternal bonds (BAS, 2009).

In addition, herds of lone young chamois in their perinatal period (May, June and the beginning of July) were easily spotted. It seemed they were expelled by their mothers, so that they would not interfere in the breeding of the newborns. We observed twelve of these orphan herds, from two to eighteen members per herd. The information is summarized in graph 5.

These specimens were apparently abandoned, but occasionally we could observe how a female chamois with her newborn would spend several hours or even the whole day with the young chamois.

These young chamois would rejoin their herd throughout the summer.

During autumn we only observed a small group of two young chamois. The only time we spotted a small group of this kind in winter was at the end of April. At that time four ten-month-old young chamois were expelled from their herd by two newcomer males. The newcomers did not chasing them away, but their aggressive expression was enough to make them leave (BAS, 2009).

d) Baby chamois (until one year old):

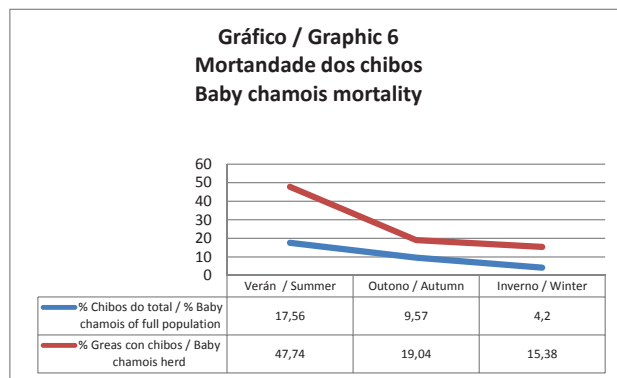
pequeno “grupo” de dous xoves. A única observación de inverno corresponde a finais de abril. Entón catro xoves de dez meses foron expulsados por dous machos recién chegados á grea. Non os perseguían, pero a súa expresión agresiva abundou, provocando que liscasen (BAS, 2.009).

d) Os chibos:

Tal como se comentou antes, os primeiros aparecían a finais de maio. Durante o mes de xuño nacían moitos e o seu número aumentaba con rapidez.

O número de chibos observados por grea oscilaba de un a quince no verán, de dous a seis no outono e de un a cinco no inverno.

A relación entre número de chibos e o total da poboación (chibos incluídos) representámolo na gráfica e táboa seis.



Necesitáranse máis observacións de inverno, para extraer conclusións rigorosas. Pero pódese resaltar, que ao forte descenso poboacional no inverno, hai que engadirlle o de verán e do outono, onde os depredadores poden xogar un papel importante (Táboa 8).

A tasa de fecundidade era alta, e a poboación mantíñase estable debido á elevada mortaldade dos

Mortandade de crías / Mortality of baby chamois	Nº de femias con cría/nº total de femias / Nº females with offspring / total nº of females	%
Verán / Summer	490/702	69,80%
Outono / Autumn	121/241	50,41%
Inverno / Winter	32/150	21,33%

Táboa 8. Fecundidade das femias na área de estudo, promediando todo o período de estudo, e fluctuación numérica dos chibos a medida que avanzaban as estacións do ano. Table 8. Fertility of the females in the study area, during the whole period of study, and the fluctuation of the baby chamois as the different seasons of the year went on.

As mentioned before, the first newborn chamois showed up at the end of May. Many more were born throughout the month of July, and their number increased rapidly.

The number of baby chamois per herd ranged from one to fifteen in summer, from one to six in autumn and from one to five in winter. The relationship between the number of baby chamois and the total population (baby chamois included) is represented in graph and table 6.

We would need to have more winter observations to draw more rigorous conclusions. But, despite the strong population decrease during winter, the severe decrease during summer and autumn, where predator animals play an important role, should not be ignored (Table 8).

Even though fecundity was high, the population stayed stable due to the high mortality of the baby chamois. The number of female chamois observed with their offspring, during the period of visits between the end of June and the middle of August is reflected in graph and table 7.

4.- Chamois predators:

During the period of observation we were able to pick up several carnivorous excrements to

Fecundidade / Fertility	Agosto/August	Xuño/June	Xullo/July	Xullo/July
	1993	1995	2005	2007
Nº crías/Nº femias -Nº baby chamois/Nº females	28/49	14/17	43/60	50/93
Porcentaxe / Percentage	57,14%	82,35%	71,60%	53,70%

Táboa 7: Fecundidade das femias na área de estudo. Proporción de femias con cría observadas nas visitas estivais de 1.993, 1.995, 2.005 y 2.007.

Table 7. Fertility of the females in the study area. Proportion of the females with offspring observed during the summer visits in 1.993, 1.995, 2.005 y 2.007.

analyze in the laboratory. Due to the fact that they were collected around the boundaries of the forests, the results may be somewhat biased. It is possible that chamois come up as prey in more occasions than they are actually prey. In the case of wolf excrements, this

is undoubtedly the case.

a) The fox (*Vulpes vulpes*)

chibos. O número de femias observadas ca súa cría nas visitas realizadas entre finais de xuño e mediados de agosto foi a reseñada na táboa 7.

#### 4.- Os depredadores de rebezos:

Durante o período de estudio recolléronse excrementos de diversos carnívoros para analizar no laboratorio. Polo feito de seren recollidos por riba dos límites dos bosques na maioría dos casos, os resultados poden estar algo sesgados. Posiblemente aparecen os rebezos como presas máis frecuentemente do que eran realmente. Tal é, sen dúbida, o caso dos lobos.

##### a) O raposo (*Vulpes vulpes*):

Reseñamos un excremento no que se atopou papel de aluminio, porque tiña tamén un pezuño e pelos dunha cría de rebezo, amosando así o carácter oportunista deste depredador, que non despreza os restos que deixan os montañeiros (Táboa 9).

A proporción en que aparecían restos de rebezos parecíanos bastante grande como para que os raposos se limitasen a comer preas. Por tal motivo facemos aquí unha comparación dos resultados dos excrementos recollidos en época de cría (maio a setembro incluídos) e o resto do ano. Para estimar o esforzo de prospección en ambos períodos do ano, consideramos os días de prospección (táboa 10).

Resulta sorprendente a elevada proporción de restos de rebezos, que aparecían na tempada de cría nos excrementos de raposos, 0,27 por día de prospección; moi superior á de outono – inverno (0,16 por día) cando, sen dúbida, atopan moitas preas.

Interpretamos que os raposos non se limitan a comer preas de rebezos e parecen ser depredadores de crías no verán e outono. Non esquezamos, que a mortalidade de crías no verán era bastante elevada.

##### b) O lobo (*Canis lupus*):

É un importante depredador de corzos e rebezos, crías e adultos. Incluso vimos unha femia de

In one of the excrements we found a baby chamois hoof along with some fur as well as some fragments of aluminum foil. It can be concluded that these predators do not despise tourists' leftovers (table 9).

The proportion in which the chamois remains

Raposo ( <i>Vulpes vulpes</i> ), (nº de excrementos analizados: 177)		
Fox ( <i>Vulpes vulpes</i> ), (nº of analyzed excrements: 177)		
Presas / Preys	Frecuency	%
Rebezo / Chamois ( <i>Rupicapra pyrenaica</i> )	23	12,9
Corzo / Roe deer ( <i>Capreolus capreolus</i> )	3	1,7
Cabra doméstica / Domestic goat	1	0,56
Ovella / Sheep	2	1,12
Micromamíferos / Micromammals	99	55,9
Froitos / Fruits	32	18
Insectos / Insects	12	6,8
Indeterminado / Indeterminates	16	9
Envoltorio de aluminio / Aluminium foil	1	0,56

Táboa 9. Frecuencia de aparición de diferentes presas nos excrementos de raposo e porcentaxes.

Table 9. Frequency of appearance of the different preys in the fox excrements.

were present in the excrements is high enough to stand to reason that foxes were not just eating carrion. With this theory in mind, we compared the results of the excrementos taken during the breeding period (from May to September included) to the rest of the year. To estimate the effort of prospection in both periods of the year, we will consider the days of prospection (Table 10).

Raposo / Fox ( <i>Vulpes vulpes</i> )			
	Nº excrementos con rebezo	Nº días de prospección	Nº/día (%)
	Nº excrements with chamois	Nº days of prospection	Nº/day (%)
Maio-Setembro May – September	16	58	0,27%
Outubro-Abril October – April	7	44	0,16%

Táboa 10. Frecuencia de aparición de restos de rebezos en excrementos de raposos en diferentes períodos do ano, intensidade de móstreo e índice (% entre ambos).

Table 10. Frequency of the appearance of the chamois remains in the fox excrementos during the different seasons of the year.

The high proportion of chamois remains which appeared in the fox's excrementos during the breeding period (0.27 per day) is surprising. This figure is far superior to the fall-winter period (0.16 per day) when they were finding much more carrion.

Therefore, we can conclude that foxes are not limited to eating chamois carrion. It seems they are baby chamois's main predator during summer and autumn. We should not forget that baby chamois mortality was very high during summer.



tres anos e medio e dous chibos matados polos lobos no alto da Canal de Capozo en novembro do 2.007. Os resultados expoñémolos na táboa 11. Inda que a mostra é algo escasa, resulta bastante aclaratoria.

Lobo ( <i>Canis lupus</i> ), (nº de excrementos analizados:12)	
Wolf ( <i>Canis lupus</i> ), (nº of analyzed excrements: 12)	
Presas / Preys	Frequency
Rebezo / Chamois ( <i>Rupicapra pyrenaica</i> )	4
Corzo / Roe deer ( <i>Capreolus capreolus</i> )	3
Porco bravo / Wild boar ( <i>Sus scrofa</i> )	1
Cabra doméstica / Domestic goat	2
Ovella / Sheep	1
Indeterminado / Indeterminates	1

Táboa 11. Frecuencias de aparición de restos de diferentes presas nos excrementos de lobos. Todos entre abril e novembro inclusive. Table 11: Frequency of the appearance of the different remains in the wolf excrements. All of them between April and November.

En ningún caso se atoparon restos de rebezos en excrementos doutros carnívoros. Analizáronse a tal efecto: 105 excrementos de *Martes sp* (máis probablemente *Martes martes*), 10 de teixugo (*Meles meles*), 10 de gato bravo (*Felis sylvestris*) e 2 de *Mustela sp*. (*M. nivalis*/ *M. erminea*).

## DISCUSIÓN

Os resultados deste traballo refírense a unha zona de Picos de Europa e non deben extrapolarse a todo o Parque Nacional nin, moito menos, á Cordilleira Cantábrica.

En contra do que sucede noutras montañas, os rebezos de aquí non ocupaban os bosques en ningunha estación do ano. WÉBER (2.004) citaba poboacións forestais de rebezos en inverno e mesmo todo o ano noutras montañas. A escaseza de refuxio e de alimento nos bosques da nosa área de estudio, así como a presenza de lobos, parecen xustificar este particular comportamento.

A remontada primaveral cara ás veigas altas non se relacionaba co desxeo nin cas altas temperaturas dalgunhas primaveras. Nas nosas observacións, os rebezos nunca se adiantaron ao reverdecemento e floración de ditas veigas. Parecía que sabían de antemán onde e cando ir, para atopar os mellores pastos en cada estación. Formas de comportamentos intelixentes

### b) The wolf (*Canis lupus*)

It is a significant predator of roebucks and chamois, both adults and young ones. We could actually record one three-year-old female chamois and two baby chamois being killed by wolves on top of Canal de Capozo in November 2007. The results are displayed in table 11. Although the sample is limited, it seems quite explanatory.

### c) Other predators

Chamois remains were not found in any other carnivorous excrements. We analyzed 105 excrements of *Martes sp*. (probably *Martes martes*), 10 of badger (*Meles meles*), 10 of wildcat (*Felis sylvestris*) and 2 of *Mustela sp* (*M. nivalis* / *M. erminea*).

## DISCUSSION

The results of this report are focused in one area of Picos de Europa and they must not be extrapolated to the rest of the National Park or the Cantabrian mountain chain.

In spite of what happens in other mountains, the chamois from this area do not populate the forests during any season of the year. WÉBER (2004) mentions forest populations of chamois in winter and even all year round in other mountains. The lack of food and shelter in the forests of our area of study, as well as the presence of wolves, seem to justify this particular behavior.

The spring ascent towards the high meadows was related neither to the thaw nor to the early rising temperatures of some springs. During our observations, the chamois never arrived to the meadows before they had blossomed. In fact, they seem to know in advance where and when to go to find the best pasture lands in each season of the year. Similar ways of intelligent behavior have been described in the Cantabrian grizzly bears (CLEVENGER and PURROY, 1991)

We agree with WÉBER and with CRAMPE (opus cit.) when they mention that the winters with a lot of snow, but not with specifically low temperatures, are the most harmful for the chamois, because of the

parecidas foron descritas en osos pardos cantábricos (CLEVENGER e PURROY, 1.991).

Coincido con WÉBER e con CRAMPE (opus cit.) en que son os invernos de moita neve e non os fríos, os que máis prexudican aos rebezos, pola escaseza de pasto. Pero ponse o acento aquí na competencia intraespecífica, polo espazo e alimento, que se desencadea neses invernos de moita neve dentro das greas, mesmo entre os chibos (BAS, 2.009).

No noso caso a maioría das greas tiñan 10 ou menos exemplares, sen contar os chibos. Greas grandes fórmanse á forza no inverno ou ben nos grandes pasteiros subalpinos (Vega de Liordes e Pedriza carbanal) no verán; pero inda así, as femias dominantes de distintas greas solen enfrontarse manténdose independentes (BAS, 2.009).

Os machos adultos nunca formaban greas, coma as citados no verán no macizo de Carlit, en Pirineos (WÉBER, 2.004). Podían permanecer cas greas de femias en calquera estación do ano, ou ben deambular solitarios dunha grea a outra seguíndolles o rastro e desprazándose moito, tenteando ás femias. Moitos deles aparecían en dúos, que resultaban ser unha estratexia reprodutiva exitosa, para apoderarse das greas, evitando así o ataque do macho dominante. Estes “dúos de machos” eran máis frecuentes no verán, cando machos e femias levan unha vida máis independente (BAS, 2.009).

O único grupo numeroso de machos, observado no presente traballo en maio de 1.996, atopábase xunto á primeira cría observada nesa tempada na Canal de la Sotín. Sen dúbida chegaron aí atraídos pola curiosidade. Reforzaban a protección á primeira cría da tempada e, de feito, un deles apadriñou durante dez minutos á cría do ano anterior, cando esta quedou separada da súa nai. Sorprendentemente, estes machos non amosaron ningunha agresividade entre eles. Por todo isto denominei a esta rara conduta “o bautizo” (BAS, 2.009). Tal conduta foi filmada e descrita tamén, en África, nos ñúes azuis (*Connochaetes taurinus*).

A tasa de natalidade observada coincide bastante ca mencionada por PALACIOS (2.009) para

lack of pasture they bring forth. Due to that fact, inside herd competitions for space and food increased, even among the smaller herds (BAS, 2009).

In our case, most of the herds had less than 10 members, not counting the baby chamois.

Large herds were formed by force during winter and also because several herds met in the same subalpine pasture lands during summer (Vega de Liordes and Pedriza Carbanal). However, dominant females from different herds tended to confront one another in order to maintain their independence (BAS, 2009).

Adult males never formed herds, as it was mentioned regarding the mountain massif of Carlit in the Pyrenees during summer (WÉBER, 2004). They would remain with the female herds in any season of the year, as well as wandering from one herd to another, following their trail and seeking prospective female partners. Most of lone males showed up in couples, which seemed to be a successful reproductive strategy to grab the herds and thus to avoid being attacked by the dominant male. These couples of males were more common during summer, when males and females lead more independent lives (BAS, 2009).

The only large group of males observed in our report was found near the first newborn seen in that season in May 1996 in Canal de la Sotín. There is no doubt they went there out of curiosity and as a way to improve the newborn’s safety. As a matter of fact, one of them briefly adopted a one-year-old chamois, when he was separated from his mother. Surprisingly, these males did not show any aggressiveness among them. We coined this curious behavior “baptism” (BAS, 2009). Such conduct has been filmed and described in the blue wildebeest of Africa (*Connochaetes taurinus*).

The observed birth rate correlates well with the one mentioned by PALACIOS (2009) for the whole National Park. We have also highlighted the high mortality rate of the baby chamois all year round. The renewal rate was very low, since the baby chamois consisted of just the 4.2% of the total population in their first winter. Few baby chamois survive their

todo o Parque Nacional. Resaltamos tamén a elevada mortalidade dos chibos en tódalas estacións do ano. Accidentes fortuítos e depredadores, como lobos e raposos, están case sen dúbida entre as principais causas de mortalidade de crías e adultos. A taxa de renovación era baixa, pois no primeiro inverno as crías só constituían un 4,2 % da poboación. Poucos chibos sobreviven ao primeiro inverno.

Os xoves de un ou dous anos viven xunto ás súas nais, que seguen a coidar deles; pero a maioría son botados fóra das greas no período perinatal e forman grupos de “orfos” aparte, algo indefensos. Esta conduta tamén era citada por WÉBER (2.004). Observamos tamén que as nais, individualmente, visitaban ocasionalmente a ditos grupos “de orfos”; así moi raras veces quedaban realmente solos.

Non puidemos observar a expulsión destes xoves das greas polas súas nais, pero si, en dúas ocasións, por parte de machos adultos na súa chegada ás greas, a finais de abril e en maio.

## AGRADECEMENTOS

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Tamén a todos aqueles amigos, que nalgunhas ocasións acompañáronme nas excursións montañeiras polos Picos de Europa: Fernando, Margarita, Diego, Amalio, Villa e Blanca. Inda que algunhas veces me distraían, outras axudábanme a ver os rebezos; pero sobre todo, acompañábanme cunha santa paciencia, que agradezo moito.

A todos eles o meu recoñecemento.

first winter. The baby chamois (from one to two years old) live along their mothers, who take care of them; but most of them are expelled from the herd during their perinatal period, and they go on to form separate “orphan” groups. This behavior has also been mentioned by WEBER (2004). Nevertheless, we observed that the mothers would occasionally visit these orphan herds, so in rare occasions were they truly alone.

We never managed to observe the expulsion of these baby chamois by their mother. Instead, we were able to observe, twice, how newcomer adult males banished these babies at the end of April and May.

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