Hystrix, (n.s.) 4(2) (1992): 29-34 (1993)

THE BROWN BEAR *(URSUS ARCTOS* L.) IN TRENTINO, ITALY: GEOGRAPHICAL DISTRIBUTION AND POPULATION SIZE DURING 1987-1991

L'ORSO BRUNO *(URSUS ARCTOS* L.) NEL TRENTINO: DISTRIBUZIONE GEOGRAFICA E CONSISTENZA NUMERICA NEGLI ANNI 1987-1991

FABIO OSTI (*)

ABSTRACT

The present research on alpine Brown bears (*Ursus arctos* L.), covers a period **of** five years (1987-1991) of collection of data about the status of this population in Western Trentino (Northeastern Italy). The last wild brown bears survive in the Alps in a range of about M 0 km^2 in the western province of Trento, on the slopes of the Brenta mountains. **At** present. only about 240 km^2 of this area are usually utilized by bear population. Within the last five years the bear population has probably remained stable. About 10 bears are presently believed to live in Trentino, with an annual reproduction until 1989.

Key words: Ursidae. Trentino Brown bear, habitat. population size, geographical distribution.

RIASSUNTO

La presente ricerca sulla distribuzione e consistenza numerica dell'Orso bruno (*Ursus arctos* L.) in Trentino comprende un periodo di cinque anni. Nel Trentino occidentale è ancora presente una piccola popolazione di orsi bruni nelle montagne del gruppo di Brenta su un territorio di circa 800 kmq. Di questi soltanto 240 **kmq** risuitano di importanza primaria per la presenza costante della specie. Negli anni della ricerca **la** popolazione sembra essersi mantenuta numericamente stabile (circa 10 orsi) con una riproduzione annuale fino al 1989.

Parole chiave. Ursidi, Orso bruno trentino, habitat, consistenza, distribuzione.

The last autochthonous Brown bear (*Ursus arctos* L.) population of the Alps survives in **a** small number (about 10 individuals) only in Trentino (Northeastern Italy). Preliminary population study and evaluation have been conducted by Daldoss (1981), Roth and Osti (1979), Roth (1980, 1983), and Osti (1990, 1991a, 1991b). In the present contribution is reported one work conducted from 1987 to 1991 in order to evaluate further the Brown bear population size and geographical distribution in Trentino. The objetive was to identify areas particularly important for bears and for their survival.

(*) Parks and Forests Service, Province of Trento, Torri di Gardolo, I - 38100 Trcnto, Italy

Tab. 1 – **Data** on Brow bear presence collected with systematics and unsystematics methods in Trentino (Italy) in the years 1987-1991.

SIGNS OF PRESENCE	1987	1988	1980	1990	1991	TOTAL	FREQUENCY (%)
SIGHTINGS	4	10	11	13	11	49	11
FAECES	6	32	40	40	24	142	33
FOOTPRINTS	13	24	29	25	42	133	31
TRACKS	3	27	13	20	44	107	25
TOTAL	26	93	93	98	121	431	100

STUDY **AREA**

The Brown bears survive in an area of roughly 800 km^2 in the northwestern region of the Province of Trento. After 1985, most of the bear observations were made along the northeastern slopes of the Brenta Mountains in an area comprising only about 240 km^2 in the Adamello-Brenta Natural Park *(Osti,* 1987, 1990, 1991a). This area is densely settled (70 inhabitants/km^2, according to Roth 1983); on the valley bottoms, whose the elevation range from 200 to 650 m, there are villages with populations from 500 to 2500 inhabitants whose distance is only 1,5 to 4 km. The area that is most frequented by bears lies between 550 and 1600 m above sea level. Up to 900 m the slopes are covered by Pine (*Pinus sylvestris*), followed by mixed hardwood forests, dominated by Beech (*Fagus sylvatica*), Oak (*Quercus pubescens*), and Hophornbeam *(Ostrya carpinifolia*); these forests are clearcut for firewood about every 15 years. The Fir (*Abies alba*) and Spruce (*Picea abies*) forest, partly managed only every 10 years for timber production, with **a** lush undergrowth of *Sorbus* sp. and *Oxalis acetosella*, is found from 1200 to 1600 m above sea level. At upper elevations (1700 to 1900 m), Larch (*Larix decidua*), Mountain pine (*Pinus mugo*) and Rododendron-Blueberry complex *(Rhododendron* sp. and *Vaccinium* sp.), are the dominant vegetation types. At 1900 to 2200 m, this area is characterized by mountain pastures and barrens. Climate is tipically alpine with abundant precipitation from January to April. The bear area is practically undisturbed and vehicle acces is difficult. Since 1939, bears in Italy have been fully protected by law.

DATA COLLECTION

We used systematics and unsystematics methods to collect informations regarding the brown bear distribution and population status in Trentino. We established 490 transects covering 2130 km of trails located in some areas of bear range in Trentino to monitor bear presence. The method of the control of these sample-trails was discussed by Roth (1980). The transects were monitored monthly between April 1987 and November 1991 and signs of bear presence (feces and footprints) were registered. Other data were collected by various peoples by means of unsystematics methods (generalized collection of data) in the same years. These

Tab. 2 – Geographical distribution of the indices of bear presence collected in Trentino (Italy); range of areas and number of individuals estimated in the years 1980-1991 (data of the period 1980-1986 according to Osti, 1991a).

AREAS	N. OF BEARS	N. OF DATA	% OF FREQUENCY	KM^2
1980-1986				
PRIMARY AREA				
Brenta-Tovel-Campa-Spormaggiore	6-7	247	81	250
SECONDARY AREA				
Val Algone-Val di Sole-Vermiglio	3-4	42	14	500
TRANSITIONAL AREA				
Adamello-Presanella	1-2	9	3	690
Giudicarie-Ledro	1	7	2	60
TOTAL	11-14	305	100	1500
1987-1991				
PRIMARY AREA				
Brenta-Tovel-Campa-Spormaggiore	6-7	394	91	240
SECONDARY AREA				
Val Algone-Val di Sole-Vermiglio	1-2	30	7	500
TRANSITIONAL AREA				
Adamello-Presanella	0	0	0	0
Giudicarie-Ledro	1	7	2	60
TOTAL	8-10	431	100	800

data,' always controlled and registered only if considered valid, includes bear-sightings and other signs of bear presence. The data collected in the study area from 1987 to 1991 regarding bear-sightings, faeces, footprints and tracks, are presented altogether in Tab. 1.

RESULTS AND DISCUSSION

We collected altogether 431 sign of bear presence between 1987 and 1991 (Tab. 1. These data provide our best total information of bear distribution. Data regarding the geographycal distribution of bears in Trentino are listed in Tab. 2. The majority of evidence of bear presence along trails was found mainly in Spormaggiore-Sporminore and Valle di Tovel-Campa areas. In Valle di Algone zone the presence of bears is uncostant. At present, the usual bear distribution area is divided into the following categories, according to quantitative order of data collected (Fig. 1).

a) Area of continuative presence of bears (primary area) including a total of 240 km^2. It includes classical feeding areas, winterig areas, reproduction areas (83,4 % of all cubs were found in this area in the last decennium) and areas of location of winter refuges. The denning area covers roughly 100 km^2 and includes the northeastern portion of the Brenta Mountains and the Campa-Tovel Mountains in the Adameilo-Brenta Natural Park. Data from this area represent 91 % of ali bear signs collected from 1987 to 1991 and 81% of indices of bear presence in 1982-1986.

b) Area only periodically used in summer by bears (secondary area) covering **a** range of about 500 km^2. This area includes Valle di Sole (Mezzana-Vermiglio and Mal-Dimaro), Val delle Seghe (Moiveno), Valle d'Ambies (San Lorenzo in Banale) Val Algone and val Manez. The information collected in these localities represents 7% of all data gathered from 1987 to 1991. Only one female with two cubs have been observed in this area in the last decennium.

c) Area only occasionally used by bears for trophic causes or for human induced diplacements specially during summer months (transitional area). At present this area includes Val di Rumo, Val di Bresimo and some localities of Valle di Ledro e Giudicarie. The Adamello-Presanella mountains (Val Genova, Val Breguzzo, Val di Fumo) have appeared abbandoned by bears since 1985. This area included about 690 km^2 in the years 1982-1986; at present includes only about 60 km^2.

According to the present research, Trentino bears at present inhabit a core area of about 800 km^2 nearly ali in the Adamello-Brenta Natural Park. According to Barigozzi (1963), Daldoss (1981) and Roth (1983), bear range has included 1600 km^2 (1500 km^2 at 1985, according to Osti, 1990). The population of brown bears in Trentino is estimated, in the last 10 years, around to 10 individuals (see Tab. 2).

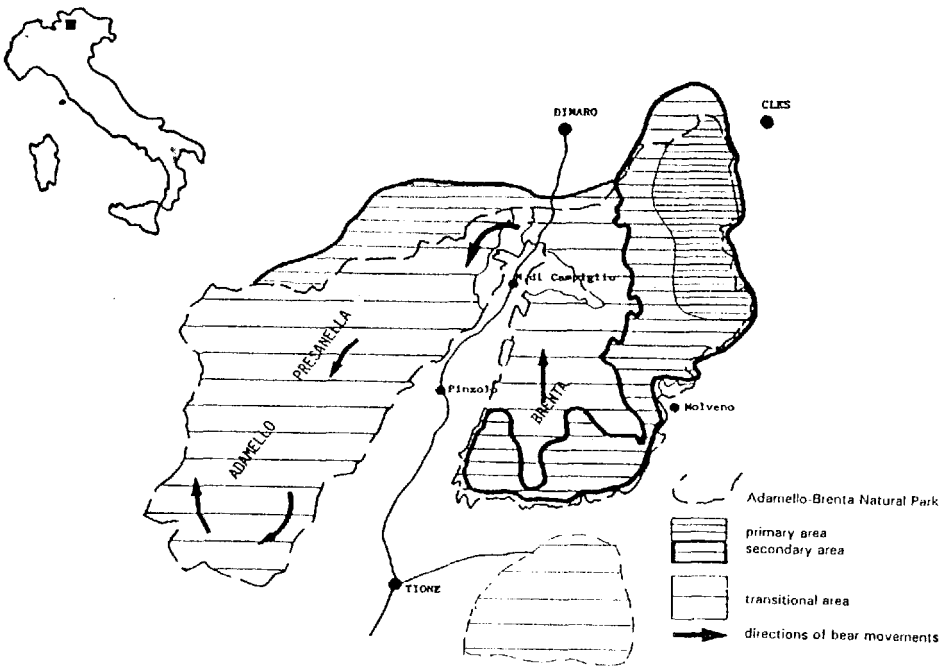

Fig. **1** – Bear distribution in Trentino (Italy).

Tab. 3 – Number of verified births in the Brown bear population in Trentino (Italy) in the years 1987-1991 compared with those collected in the period 1982-1986 (Osti, 1991a).

1982-1986	N. OF CUBS	1987-1991	N. OF CUBS
1982	2	1987	1
1983	1	1988	1
1984	2	1989	1
1985	1	1990	0
1986	3	1991	0
TOTAL	9	TOTAL	3

Tab. 4 – Seasonal and elevational distribution of data on the Brown bear presence in Trentino (Italy) in the years 1987-1991.

ELEVATION	WINTER	SPRING	SUMMER	FALL
< 500 m	0	0	0	6
500-1000 m	0	51	40	60
1000-1500 m	72	23	29	21
1500-2000 m	28	26	31	12
> 2000 m	0	0	0	1

Data collected indicate the decrease of the bear population. The number of births in the last decennium is presented in Tab. 3. The Alpine bear population has a low reproductive capacity and in the last two years of this research the indices of cub presence are inexistent. Information regarding the seasonal and elevational distribution of bear signs collected are presented in Tab. 4. These data indicate that the active period for bears extends from mid-April to early November. Areas below 500 m are rarely used by bears, and most of spring and fall activity occurres between 500-1000 m. Areas between 1000 and 1500 m are used in summer and during denning activity; at upper elevations the bear presence is occasionai.

CURRENT MANAGEMENT PRACTICE AND CONSERVATION NEEDS

The last confirmed case of a killing of a Trentino bear occurred in 1971 (Daldoss, 1972), and, at present, bears are tolerated by local hunters and peasants. Actually, the principal threats to the trentine Brown bear popylation can be summarized as follows:

a) the fragmentation and deterioration of the habitat due to the explotation of the forest by industries of wood products, by the increased construction of forestry roads in the core area and by motor vehicle access to roads in criticai bear habitat;

b) reduced size of popolation and genetic isolation.

The conservation of the Brown bear population of the Trentino Mountains will require the following measures:

- a forestry management program, which was based on the type and intensity of the bear activity observed in various parts of the area proposed by the Adamello-Brenta Natural Park administration with a financial compensation for loss of income due to restraints imposed on forestry.
- the investigation on the ecological requirements of the Brown bear and its needs for survival.
- the application of the technique of restocking (releasement of 5-10 individuals presumably of Slovene and Croat origin) to increase the genetic variability and *to* set a viable bear population demographically stable. Analysis of the available historical information would suggest the hypothesis that about 200 years of isolation (equal to about 20 generations) is not enough to bring about a significant genetic divergence. This hypothesis could be scientifically tested in a short time since three laboratories (in Germany, France and Italy) are currently carryng out programmes of genetic analysis on various popuiations of european bears (including those in the Adamello-Brenta Natural Park and in the Abruzzo National Park). This work of restocking must be combined with **a** programm of education to conservation aimed at people living in or near bear range.

REFERENCES

BARIGOZZI, C. 1963. Tentativo di stima numerica degli orsi bruni nel Trentino. Rend. Ist. Lomb. Acc. Sci. Lett.. Milano, V, 97: **19-32.**

DALDOSS, G. 1972. Rilievi sulla presenza deli'orso bruno nel quinquennio 1967-1971, W.W.F. C.A.I., Trento.

DALDOSS, G. 1981. Sulle orme dell'orso. Temi, Trento, 251 pp.

OSTI, F. 1987. Status of a remnant brown bear population in Trentino, Italy: 1981-1985. Int. Conf. Bears Res. and Manag., 7: 17-18.

OSTI, F. 1990. The brown bear in Trentino, Italy. Aquilo, Oulu (zool.), 27: 89-91.

OSTI, E 1991a. L'orso Bruno nei Trentino. Arca, Trento. 210 pp.

OSTI, F. 1991b. Attuale consistenza e distribuzione dell'orso bruno delle Alpi (*Ursus arctos* L.). Atti II Seminario Italiano sui Censimenti Faunistici. Brescia. Suppl. 1st. Biol. Selvagg., Bologna. 16: 599-603.

ROTH, H. U. 1980. Il metodo dei percorsi campione e la sua applicazione per lo studio deli'orso in trentino, Natura Alpina, Trento, 24: 19-25.

ROTH. H. U. 1983. Diel activity of a remnant population of europewan brown bears. Int. conf. Bears Res. and Manag., 5: 223-229.

ROTH, H. U. & E OSTI. 1979. Prime esperienze di radiolocalizzazione di due ***orsi*** bruni nel Trentino. Natura Alpina, Trento, 17: 44-46.