

FIRST EXPERIENCES WITH THE RELEASE OF 2 FEMALE BROWN BEARS IN THE ALPS OF EASTERN AUSTRIA

GEORG RAUER, Forschungsinstitut WWF Österreich, Ottakringerstraße 114-116, A-1160 Wien, Austria

Abstract: In June 1989 and June 1992, 2 female brown bears (*Ursus arctos*), 3.5 (bear 1) and 6.5 (bear 2) years old, respectively, were released in the Limestone Alps of Styria and Lower Austria. The release area was within the home range of an old male that had migrated from Slovenia in 1972. Ranges used in the first 3–4 months after release were 115 km² and 3,817 km² and daily movements were 2.5 km and 8.0 km for bear 1 and bear 2 respectively. In 1991 bear 1 had 3 cubs, but 2 of the cubs probably did not survive until autumn.

Int. Conf. Bear Res. and Manage. 9(2):91–95

Key words: Alps, augmentation, Austria, brown bear, *Ursus arctos*.

During the 19th century, the brown bear was nearly exterminated within the borders of present day Austria. In Styria, Lower Austria, Carinthia, and Northern Tyrol, the last bears were killed in 1840, 1853, 1884, and 1913 respectively (Bachofen von Echt and Hoffer 1930, Amon 1931, Oberrauch 1952, Anderlüh 1987). While individual bears occurred infrequently predominantly in areas close to the Slovenian border, they never stayed long and all disappeared. After World War II as the Slovenian bear population recovered through management for hunting purposes, the frequency of bear visits to Austria also increased. During the 1950s and 1960s, several bears were shot in Carinthia and Eastern Tyrol. The public showed little tolerance for these killings and in 1971 the hunting of bears was prohibited by the local government. Since that time a small population of 3–6 individuals has developed in the southwestern part of Carinthia (Knaus 1972, Krže 1988, Gutleb 1992). Since 1990, at least 1 bear has been reported from the northwestern part of Styria (J. Frei, Forstverwaltung Mitterndorf, Bad Mitterndorf, Austria, 1992, pers. commun.) (Fig.1).

In 1972 a young male brown bear migrated into the area of Ötscher, Dürrenstein and Kräuterin in the Limestone Alps of Lower Austria and Styria. The bear remained in the area possibly because of raspberries (*Rubus* sp.) growing on the extensive areas of windfall from 1966, or because the numerous roe deer (*Capreolus capreolus*) feeding stations of Herzog Albrecht von Bayern offered plenty of high quality food. This animal thus became the first resident bear in Austria in the last 100 years. It is interesting to note that the bear chose the area where the last bears of Eastern Austria were shot in the middle of the last century.

As soon as it was apparent that the “Ötscherbär” remained in the area, the idea was born to look for a mate for the lonely pioneer. It took more than 15 years before this idea was realized. Between 1982 and 1986 a group of interested people and the hunting organization of Lower

Austria investigated the feasibility of a bear release project. M. Janik from the Mala Fatra National Park Service in Slovakia stated that the 500 km² area compared well with bear habitat of Slovakia, and concluded that about 40 bears could live there. However, the release plan was defeated by opposing cattle-breeders and beekeepers who were concerned with compensation for damages caused by the released animals (Hager 1985, Kraus 1985, Splechtina 1987). In 1988 World Wildlife Fund (WWF) of Austria took the initiative, signed a contract with an insurance company to assure that damages would be paid, and released a test bear in June 1989. A second bear was released in 1992. The reaction of the public to this WWF activity has in general been very positive. The aim of the project is to accelerate the natural immigration process in Carinthia by releasing additional animals at the other end of the possible bear habitat in the Alps of Austria.

The Institute for Wildlife Biology and Game Management at the Agricultural University of Vienna was in charge of the accompanying research project in 1989 and 1990. In 1991, the Research Institute WWF Austria took over these responsibilities, although the co-

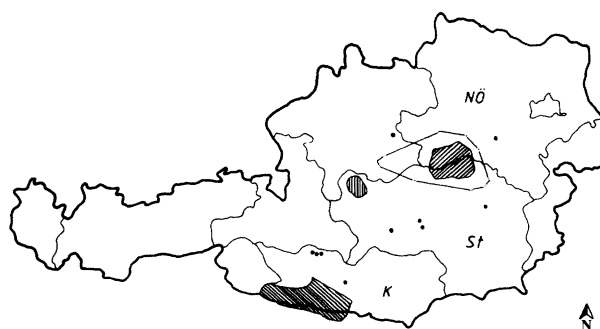


Fig. 1. Brown bear distribution in Austria. Hatched: areas of regular bear presence. Dots: additional observations 1989–92. Open polygon: range of the female released in June 1992. NÖ: Lower Austria, St: Styria, K: Carinthia.

operation has continued. I thank J. Dieberger for his technical advice and C. Aste and C. Leditznik for their help in the field. K. Splechtna, Forstverwaltung Langau, has supported this project to release bears and supervised the release of animals. Special thanks are due to D. Huber, Veterinary Faculty, Zagreb, Croatia, for his efforts to capture the bears. The ÖBF (Österreichische Bundesforste) allowed the release of 1 bear in their domain and were very cooperative with our research intentions. A part of this work was funded by the Jubiläumsfonds der Österreichischen Nationalbank.

STUDY AREA

The bear release area was situated at the border of Lower Austria and Styria and constituted a part of the Northern Limestone Alps (Fig. 1). The topography is characterized by large massifs with extended plateaus and steep slopes. Elevations vary from 500 m to 1,900 m. The climate is typical for the Alpine border: a long winter with deep snow cover, abundant rain in the late spring and summer, and a rather dry autumn. The mean annual precipitation is 1,900 mm, and the mean annual temperature is 3.4°C. Forests below 1,300 m are naturally dominated by beech (*Fagus sylvatica*), spruce (*Picea abies*), and fir (*Abies alba*). However, in large parts of the area forestry practices have influenced the species composition in favor of the spruce. Most of the native spruce-dominated forests above 1,300 m were cleared centuries ago to gain Alpine pastures for cattle grazing. At the highest elevations dwarf-pine (*Pinus mugo*) forms vast and impenetrable thickets (Splechtna 1987). Intensive forestry activities have led to a dense network of forest roads. In contrast to many other bear regions, all forest roads are strictly closed to public traffic. Human density in the area of the 14 central communities, which encompass 1,452 km², averages 12.6 inhabitants/km² (Österreichischer Amtskalender 1991/1992). Tourism levels are moderate compared to other parts of Austria such as Northern Tyrol and Carinthia.

METHODS

Bears were captured with Aldrich spring activated foot snares (Aldrich Snare Co., Clallam Bay, Wash.) set near bear baiting sites used for hunting purposes or at feeding places for wild boar (*Sus scrofa*). The capture program occurred in the forest enterprise of Delnice in Northern Croatia in 1989 and 1990 and in the hunting preserve Medved in Kocevje, Slovenia, in 1992. Captured bears were immobilized with ketamine hydrochloride and xylazine hydrochloride and fitted with radiocollars

(Telonics, Inc., Mesa, Ariz.). Routine measurements and samples were taken, and we extracted a first premolar for age determination. Bears of acceptable age and sex were put in a cage mounted in a small van and transferred to Austria immediately. We tried to keep the first two bears immobilized as long as possible during the journey, but after the second bear died, we decided to minimize the amount of drugs used and to transport the bears awake. The distance from the Slovenian and Croatian capture sites to the release spots was 420 km and 460 km, respectively; transport took from 8 to 11 hours. The bears were released as soon as we arrived at the site.

Bears were tracked by triangulation every day for at least the first 2 months after release. Areas of bear use were delineated by the minimum convex polygon method (Hayne 1949). Movements were analyzed using straight line distances between consecutive day locations. Further information on the released bears and the bear already living in the area (Altbär) was gathered from contacting local foresters and game wardens, looking for tracks, scat, hair, and other sign at promising sites, and checking every rumor of bear observations or other evidence of bear presence.

RESULTS

Two bears were translocated: Mira, a 3.5-year-old female and Cilka, an adult female, presumably 6.5 years old. Mira was released 9 June 1989 in the Rothwald, a small patch of primeval forest on the south-eastern slope of the Dürrenstein in Lower Austria. Cilka was released 29 June 1992 in Styria, 3 km south of the first release spot, at the northern slope of the Kräuterin.

An additional 3 bears were caught for the project but not released. A yearling female was considered too young. A 5-year-old male died during transport. Three possible causes for this accident were identified: (1) the leg in the snare was badly injured, (2) the application of an additional drug, Combelen, to tranquilize the animal for a longer period put an additional stress on its circulation, and (3) as revealed by the autopsy, the bear suffered from heart disease and chronic pleuritis. The third animal was another male that mauled itself while it was captured in the only snare without an alarm transmitter. It chewed off several digits although it was in the snare less than 24 hours. Upon discovery, this bear was killed instantly by order of the Director of the hunting preserve. Two fatal accidents with 5 captures is a rather unpleasant statistic, especially for a wildlife conservation organization such as the WWF. In continuing the capture program, every possible precaution has been taken to minimize the risk

of an injury; another accident of this kind would certainly have meant the end of the release project.

Following the release, both bears were located daily by ground tracking. With Cilka this daily routine has continued until the present. With Mira, the female released in 1989, the daily locating effort was stopped after 50 days. In the following months this bear was located 2 or 3 times a week. By the end of October 1989 the radiotracking of Mira ended, as an intensive search on the ground and 3 search flights covering an area >1000 km² revealed no signal, although tracks of corresponding size indicated her continued presence. We concluded that the transmitter failed. An additional aerial check the following spring gave the same result. On 16 September 1992, we by chance located Mira again. Unfortunately we had not checked for a signal during the 2 years between the release of Mira and Cilka. It could be argued that the transmitter had not failed, and we simply did not find Mira. This seems improbable based on our tracking experiences with Cilka. Although it was sometimes difficult to find her while tracking on the ground, once we were in the air it never took more than an hour to find a signal.

After release, Mira moved 3 km to the north. For the following 13 days she stayed in a rather elevated area using a range of approximately 7 km² (mean consecutive day distance = 1.4 km, $n = 12$). Thereafter, she made larger movements, covering distances up to 8 km (mean = 2.3 km, $n = 32$). After a short trip north she returned for a day to the vicinity of the release site then turned southwest and covered in a few days the range she would use over the next months. This area is still the center of her present day home range. By the end of July, daily travel distances decreased again and seldom exceeded 4 km (mean = 2.3 km, $n = 32$). Her range encompassed 115 km² if all locations were included. Without the June locations, the range decreased to 40 km².

After our experience with Mira we believed we understood the behavior of a bear released in an unknown area: a phase of rest and restoration to recover from the stress of the transport followed by an exploration phase with large movements to inspect the new environment and a consolidation phase after establishing a new home range. But Cilka, the second bear, did not behave this way. For 2 days she stayed close to the release site; then she began to travel, covering up to 23 km in 1 night. In the 3 months since her release (29 Jun–6 Oct 1992), she has roamed an area of 3,817 km² (Fig. 2). Despite her mobility she did not appear to try to return home. She made long excursions to the southwest, northeast, southeast, west and north, but she always returned to the release area. Sev-

eral times she traveled less for a few days, but only once did she stay in a place for some time (8 days in an area of 20 km²). More than 70% of the consecutive day distances were >5 km and nearly 30% were >10 km; the mean was 8.0 km ($n = 82$). Twice she ventured into regions at the fringe of what C. Aste (An ecological classification of bear habitats in Austria, Poster Session, 9th Int. Conf. Bear Res. and Manage., Grenoble, France, 1992) classified as possible bear habitat with a forest cover close to 50%, many scattered farms, and a rather high density of roads. No damage has been reported so far with the exception of a visit to a remote maize field. Although Cilka was constantly on the move, she seemed in good condition when observed from a blind at close distance.

The different behavior of the 2 females suggests that young animals on the point of establishing a home range are better suited for a release project than adult animals taken from an already established home range. Aside from homing capabilities mostly of problem bears, there is very little information on the behavior of transplanted bears. In their study of a design for a program to augment grizzly bear populations Mace and Haroldson (1984, cited in Servheen et al. 1987) concluded that the animals most suited for a release are subadult females because this age and sex class has the smallest home range and are least likely to leave the target area and return to their former home ranges. M. Janik (Mala Fatra National Park Service, Gbelany, Slovakia, 1991, pers. commun.) recommended the opposite, releasing only adult animals. He argued that young animals are less experienced and less shy and hence more likely to come into contact with human-related food sources and acquire nuisance behaviors. The different behavior of Mira and Cilka to some extent corroborated the idea of Mace and Haroldson (Servheen et al. 1987): the young female remained close to the release site and the adult female did not. But instead of returning to Slovenia, Cilka regularly returned to the area where she was released. The behavior of Cilka could also be seen in a positive light: she was not lost to the target population, rather she enlarged the target area.

In the years since the failure of her transmitter, Mira has enlarged her home range. The size of her 3-year range (Jun 1989–Oct. 1992) determined through data on tracks and observations using the convex polygon method was 407 km². The home range of the old male calculated in the same way was about twice as large as Mira's, or 915 km² (Fig. 3). These estimates of size are minimums because unverified observations and unidentified tracks found far from the central bear area were not included. The concentration of data points in the central part of the common range reflects both the intensive use of this area

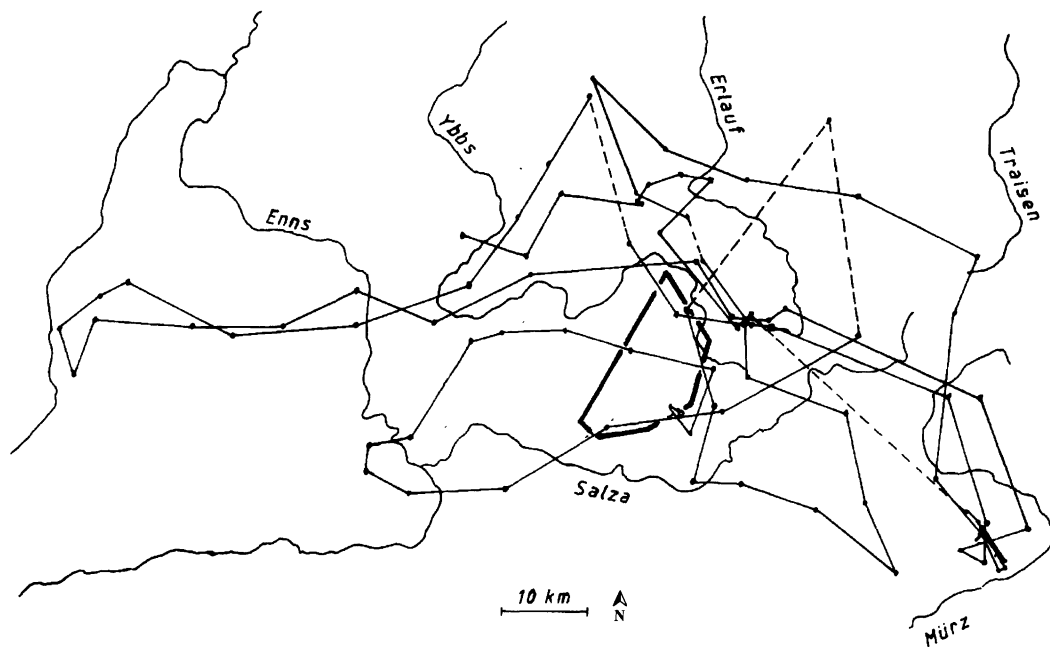


Fig. 2. Movements of the 6.5-year-old female brown bear released in the Alps of Eastern Austria on 29 June 1992, from the day of the release (open circle) to 6 Oct. 1992. Consecutive day locations are connected with solid lines; locations >1 day apart, with dashed lines. The polygon in the middle of the map denotes the corresponding range (June–Oct.) of the 3.5-year-old female released in 1989.

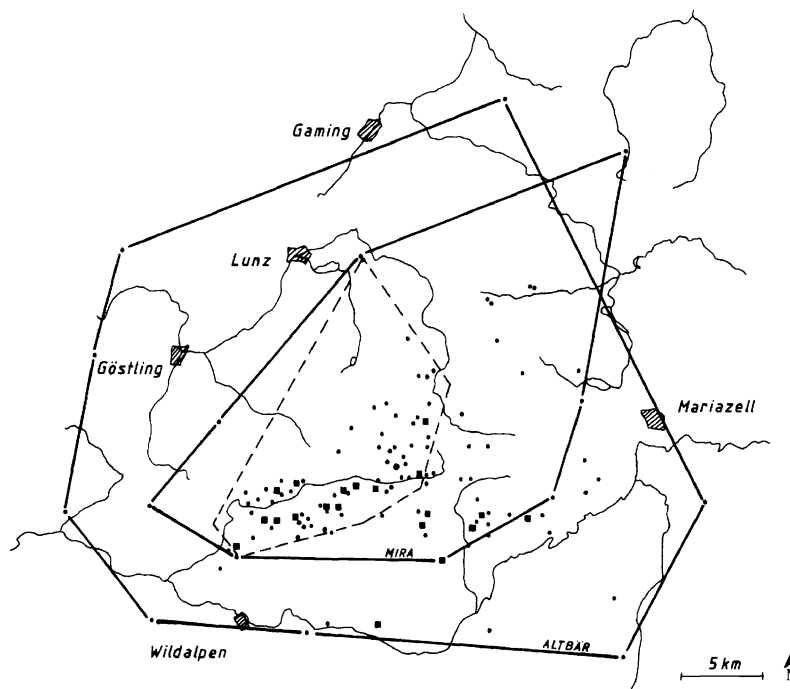


Fig. 3. Home ranges (June 1989–Oct. 1992) of the old resident male bear (Altbär) in the Alps of Eastern Austria and the young female released on 9 June 1989 (Mira), based on identified tracks and observations (dots). Filled squares represent roe deer feeding stations regularly visited by both bears. Dashed line: Mira's range from 9 June to 16 Oct. 1989 as determined by radiotracking.

by 2 bears, and our greater search effort in that area. Mira established her home range within the boundaries of the home range of the old male, and even their centers of activity overlap to a large extent. We often found fresh tracks of both individuals at attractive sites like roe deer feeding stations.

The home ranges of Mira and Altbär were 4 times larger than the home ranges reported from other Central European populations, possibly because the calculations of the latter ranges are all based on shorter observation periods. In Plitvice National Park, the largest male and female ranges were 224 km² and 96 km², respectively (Roth 1983, Huber and Roth 1989). The larger size of the ranges of the bears in Eastern Austria was probably a consequence of the very low number of bears having an extensive area of suitable habitat at their disposal. The adult male followed several years by Clevenger et al. (1990) in the Cantabrian Mountains had an overall home range comparable to that of the Altbär. After leaving the den and during the fall–winter period, this bear used rather small ranges but in 1 breeding season it traveled extensively in order to locate a female. The range delineated for the Altbär, however, has not been enlarged by extensive movements during the breeding season as most of the observations at the border of the range were made in early spring or autumn.

During spring 1991 Mira was followed by 3 cubs. Unfortunately 2 of the cubs probably did not survive until autumn. In June and July she was with 3 cubs, in August and September with 1 or 2 cubs and in October with 1 cub. Tracks in late autumn and early spring of the next year could not prove the presence of >1 cub. At the end of May a yearling was seen several times at a roe deer feeding station. It was not accompanied by its mother, but a larger bear that could not be identified was tracked and observed at the same time in the area. The last observation of a bear of this description was reported about a month ago when a game warden saw a somewhat smaller bear being chased away by Mira. Thus the chances are high that at least 1 cub survived until today. WWF will continue the program with the release of a male that should be <5 years old.

LITERATURE CITED

- AMON, R. 1931. Die Tierwelt Niederösterreichs. Verlag Optische Werke C. Reichert, Wien, Austria. (In German.)
- ANDERLUH, G. 1987. Der Braunbär in Kärnten. Pages 35–39 in Atti del Convegno "L'orso bruno nelle zone di confine del Friuli-Venezia Giulia," Tarvisio, 21 Nov. 1987. Fondo Mondiale per la Natura, Delegazione Friuli-Venezia Giulia. (In German.)
- BACHOFEN VON ECHT, BARON R. AND W. HOFFER. 1930. Jagdgeschichte Steiermarks, III. Bd., Jagdstatistik und Geschichte des steirischen Wildes. Leykam-Verlag, Graz. 328pp. (In German.)
- CLEVENGER, A.P., F.J. PURROY AND M.R. PELTON. 1990. Movement and activity patterns of a European brown bear in the Cantabrian Mountains, Spain. Int. Conf. Bear Res. and Manage. 8:205–211.
- GUTLEB, B. 1992. Verbreitung, situation und entwicklungs-chance des braunbären (*Ursus arctos*) in Kärnten. Endbericht des Vorprojekts zum Bärenprojekt Kärnten des WWF Österreich und der Kärntner Jägerschaft, Vienna, Austria. 18pp. (In German.)
- HAGER, E. 1985. Bärwild: ja oder nein. Österreichs Weidwerk 85(6):4–6. (In German.)
- HAYNE, D.W. 1949. Calculation of size of home range. J. Mammal. 30:1–18.
- HUBER, D., AND H.U. ROTH. 1989. Kretanje mrkih medvjeda na području Nacionalnog parka Plitvicka jezera. Plitvicki Bilten 2:77–86. (In Croatian.)
- KNAUS, W. 1972. Der Kärntner bär. Der Anblick 27:237–239, 283–285. (In German.)
- KRAUS, E. 1985. Meister Petz oder die Bienen? Nationalpark 49:18–20. (In German.)
- KRŽE, B. 1988. Rjavi medved. Pages 23–62 in B. Kry tuf ek, A. Brancelj, B. Krže, and J. Čop, eds. Zveri II. Izdala Lovska zveza Slovenije, Ljubljana, Slovenia. (In Slovenian.)
- OBERRAUCH, H. 1952. Tirols Wald und Waidwerk. Schlern Schriften 88. Universitätsverlag Wagner, Innsbruck, Austria. 328pp. (In German.)
- ÖSTERREICHISCHER AMTSKALENDER. 1991/1992. Lexikon der Behörden und Institutionen. Druck und Verlag, Österreichische Staatsdruckerei, Wien, Austria. 999pp. (In German.)
- ROTH, H.U. 1983. Home ranges and movement patterns of European brown bears as revealed by radio-tracking. Acta Zool. Fennica 174:143–144.
- SERVHEEN, C., W. KASWORM, AND A. CHRISTENSEN. 1987. Approaches to augmenting grizzly bear populations in the Cabinet Mountains of Montana. Int. Conf. Bear Res. and Manage. 7:363–367.
- SPLICHTNA, K. 1987. Ein bär in einer Landschaft: Grüne Gedanken um einen braunen niederösterreichischen Ehrenbürger. Pages 176–185 in Tagungsbericht zum Symposium "Wildtier und Umwelt" d. Forschungsinstituts f. Wildtierkunde d. Vet. medical Univ., Wien, Austria. (In German.)