

## TROUBLE-MAKING BROWN BEAR *URSUS ARCTOS* LINNAEUS, 1758 (MAMMALIA: CARNIVORA) – BEHAVIORAL PATTERN ANALYSIS OF THE SPECIALIZED INDIVIDUALS

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**Abstract.** In Romania more than 500 damage cases caused by large carnivores are reported by livestock owners and farmers each year. This is the main reason for hunting derogation despite the protected species status. This study is the result of detailed examination of 198 damage cases caused by bears in 2008 and 2009, in the south-eastern Carpathian Mts in Romania. The goal of the study was to examine whether an individual-specific behavioural pattern among problematic bears exists. We looked for bears which showed repeated killing of livestock, a phenomenon claimed by livestock owners to indicate the presence of a problematic individual in the area. In 27% of the observed cases the problematic bears exhibited specific behaviour patterns: clear specialization on a certain type of damage, high degree of tolerance for humans, selectivity for certain prey items, returning back to the damage site in less than 8 days. Fast adaptation and taking advantage of easily obtainable food around human created artificial sources is characteristic for all bear species, due to their high learning capacity and ecological plasticity, but from the conservation and management point of view dealing with individuals which specialize to live mainly around artificial areas becomes a “problem”. Thus defining and identifying individual behaviour patterns oriented towards conflicting behaviour might be useful for wildlife managers in identifying “problem individuals” in order to apply the proper control methods.

**Résumé.** En Roumanie il y a plus de 500 cas par an de dommages provoqués par les grands carnivores, ce qui est la principale cause des dérogations accordées au statut d'espèces protégées, afin de récolter ces exemplaires. Cette étude est le résultat d'observations détaillées concernant 198 cas où les ours ont causé des dommages au cours des années 2008 et 2009 dans la zone de sud-est des Carpates Orientales en Roumanie. Le but de ces études a été d'identifier si il existe un modèle de comportement individuel dans le cas des ours qui provoquent des dommages. Nous avons cherché à identifier les individus qui ont présenté une certaine «personnalité» surtout en tuant d'une façon répétée du bétail, phénomène souvent associé par les fermiers à l'existence d'un individu «problème». En 27% des cas observés, les exemplaires d'ours qui ont causé des dommages ont démontré une claire spécialisation pour divers cas d'attaque, présentant un haut degré de tolérance envers les hommes, une sélectivité pour certains types de proie, revenant à l'endroit où ils ont provoqué le dommage en moins de 8 jours. Ce comportement n'en est pas un anormal dans le cas des espèces d'ours, si l'on tient compte de leur grande capacité d'apprendre ainsi que de leur haute plasticité écologique. Toutefois, du point de vue du management et de la conservation de l'espèce, la présence de tels individus devient un «problème». Ainsi, la définition du «modèle de comportement» qui permet l'identification des «individus problème» orientés vers la production des dommages, peut devenir utile du point de vue de l'administration correcte de cette espèce et pour l'application de mesures correctes pour la contrôler.

**Key words:** damage, brown bear, problem individuals, damage control Carpathians Mts, Romania.

*INTRODUCTION*

There are likely few populations of bears anywhere in the world whose behaviour has not been significantly influenced by man (Stirling & Derocher, 1989). This may confound our understanding of their behaviour and ecology. Remaining populations of bears may not be able to adapt successfully to the combined effects of human predation, disappearing habitat, and climatic change unless profiting on their learning capacity and plasticity to different food sources even if the result is a compromise called by us “habituation” or “specialized individual”.

Bears are omnivorous animals, with the most complex diet, feeding behaviour and ecological plasticity among large carnivores (Swenson et al., 2000). Their predatory or vegetarian feeding behaviour seems to show a big variation among geographical distribution ranges and also a great deal of individual variation in feeding strategies as a result of learning (Stirling & Derocher, 1989). There are evidences especially in North America that sometimes bears are more active predators than previously thought (Cole, 1972; Mysterud, 1973; Franzmann et al., 1980; Stewart et al., 1985; Reynolds & Garner, 1987; Boertje et al., 1988; Stirling & Derocher, 1989; Mattson, 1996). Observations showed that most of kills made by adult bears are done after a short rush from ambush or after stalking to close range and that most kills that require a longer chase will be made by smaller sized females or subadults (Cole, 1972; Reynolds & Garner, 1987). Although in many documented cases and areas bears seem to behave as true predators, there are also studies which concluded that bears use less than 20% animal protein and feed more on vegetal food (Swenson et al., 2000; Berezky, 2004; Shinsuke, 2009; Paralikidis et al., 2009). Especially in European analyzes, the results showed that bears eat a wide range of plant species, insects, and some percent of meat resulted from scavenging or depredation on different mammalian species (Swenson et al., 2000; Berezky, 2004; Shinsuke, 2009; Paralikidis et al., 2009). Hurst et al. (1982) found that the energy required for a plantigrade animal like a bear to move is about double that for most of other mammals. To move at the modest speed of 7 km/h, uses 13 times more energy than lying (Hurst et al., 1982). That is probably why bears pass so fast from predatory feeding to vegetarian and also why some big adult individuals take advantage on their learning skills.

In general, biologists who have worked with bears have been impressed with how variable the behaviour of individuals appears to be. There are few quantitative studies about the ability of bears to learn, such as Bacon & Burghardt (1976), but generally, in the literature there is an appreciation of their ability to learn or remember things. The success that circuses have had with training bears also suggests that they are good to learn new tasks. We have many observations on the learning abilities of bear cubs performed in an ongoing orphan bear rehabilitation project in the Romanian Carpathians. As long-lived mammals that spend most of their lives within a home range and show strong seasonal fidelity to particular

locations, bears probably learn much about the area, including where and how to find food under a variety of circumstances (Stirling & Derocher, 1989). The variability in the way bears from the same population behave within a particular area may be influenced by both genetic factors and learning (Mazur & Seher, 2007; Breck et al., 2008). It is generally accepted that bears vary their feeding manners according to habitat and the presence of human (Zunino & Herrero, 1972; Swenson et al., 2000). Thus, through learning, some bears may develop individual differences in food preference, vary in the degree to which they prey on live animals, or respond to human disturbance. Individuals will develop behavioural patterns that are modelled by their own experiences (Stirling & Derocher, 1989). Similarly, some behaviour will be learned by cubs while accompanying their mothers during the long period before weaning (Mazur & Seher, 2007).

We presume that all the above mentioned specific behaviour particularities make bears to be able to develop so called “individuality” or “personality”. Predation on livestock animals or feeding in agricultural fields, orchards or beehives might be considered the behavioural response of bears to the existing multi-use landscape conditions characteristic of Europe (Swenson et al., 2000). Our assumption is that within this natural behavioural response, exist several undesired patterns, which could lead at the definition of the “problem” individual. Most researchers who have studied individuals of any mammalian species are likely to have subjectively recognized that different individuals appear to behave slightly differently (Bekoff, 1977). Primatologists have long recognized individuality and have started to use the expression “personality” to describe individuals with different behaviour (Stevenson-Hinde, 1983). Linell et al. (1999) describe several cases when predator individuals show a particular behaviour pattern. In this paper we try to analyze different depredation cases on domestic animals, in which the behaviour of the individuals showed certain characteristics repeatedly. Such behaviour patterns have been associated empirically by people with the “problem individual” reputation. The paper addresses a basic problem related with bear management in Romania: how to recognize/define a trouble-making bear which should be removed from the population due to its high potential of conflict. We observed that there is a difference in shyness, boldness or other characteristics between individuals involved in trouble situations. After analyzing many damages caused by bears, we speculate that at brown bears (*Ursus arctos* Linnaeus, 1758) there is a predisposition of some individuals to take advantage on easy to catch prey situations, thus exhibiting higher opportunism. Our observations led to the assumption that some individuals learn that in certain areas depredating on livestock is the easiest way to obtain good quality food. Inside of this phenomenon we were interested in the behaviour of those individuals which developed a “personal preference” towards searching areas with such opportunistic circumstances.

At the moment, in Romania, the brown bear harvest is restricted due to the European legislation. The existing derogation for bear hunt is explained as

being a prevention method for the control of problem causing individuals. But in the same time there is no clear definition of the “problem” bear and implicitly no clear suggestion for the right control methods in certain trouble situations. Thus any bear can be considered to have problem causing feeding habits, since there are clear observations and documentations in the literature that most individuals of large carnivore species will at least occasionally kill livestock or cause other type of damage where grazing or husbandry techniques create a favourable circumstance for that (Linnell et al., 1999). Since the result of a conflict situation is a consistent loss in people’s welfare, it is obvious that it will have a negative impact on the image of the whole species, lowering the acceptance of local people towards bears and large carnivores in general. Thus the recognizing of specific behaviour patterns and applying the right control methods (either lethal or non lethal) on livestock killing specialized individuals or individuals with problem causing feeding habits will have a better effect than leaving them in the population.

#### STUDY AREA

The study area is overlapping the Central and South Eastern surface of the Eastern Carpathians, remarkable by the presence of favourable habitats for large carnivores. The area comprehends the core of maximal brown bear population concentration in Romania (Fig. 1).

The whole surface of Harghita, Covasna and Vrancea counties is 15196 km<sup>2</sup>. Approximately 5500 km<sup>2</sup> are covered by forests and represent bear habitats. Estimations made by the local wildlife management units on the whole region of the project indicate the size of the bear population at approximately 2300 individuals (according with data from the Ministry of Environment’s web site). According with the up mentioned numbers, the medium density of bears on the project’s area is 4.3 bears/1000 ha (10 km<sup>2</sup>). This density is variable in different seasons and on different areas. The landscape in the study area is dominated by forests with the following main vegetation levels: until 800 m the main vegetation is dominated by oak and oak mixtures (*Quercus* ssp.); between 800-1200 m it is the deciduous level, the main specie being represented by beech (*Fagus sylvaticus*) or beech mixed with other broad leaved species and Scots pine *Pinus sylvestris*) or silver fir (*Abies alba*). On this level the forested areas are intersected with bush lands, covered mainly with shrubs and small tree species as hazel (*Corylus avellana*), wild rose (*Rosa canina*), gelan (*Prunus avium*) and others; between 1200-1800 m, on the boreal level, the coniferous forests are dominating, mainly spruce (*Picea abies*) or mixed with other coniferous species; over 1800 m there is the sub-alpine level, with different specific bush and alpine vegetation covers, whereas the landscape is mainly mountainous with altitudes up to 2000 m. Topography is characterized by alternating big massifs and valleys and more or less steep slopes with elevation ranges from 500 m to 2000 m. In the regions of lower altitude (300-800 m) there is an abundance of agricultural

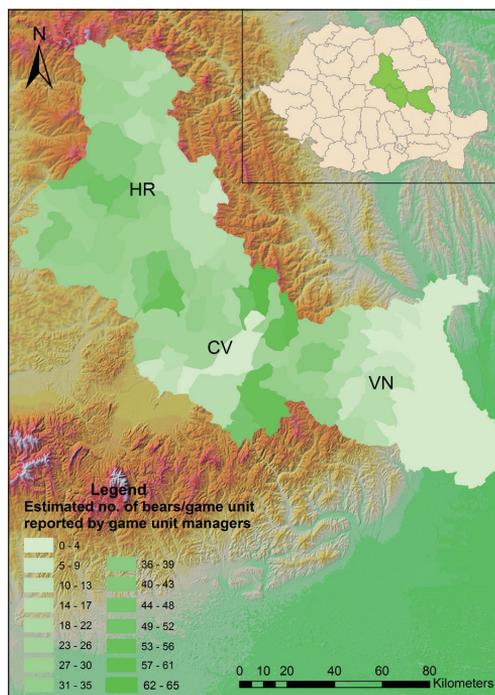


Fig. 1 - Map of the study area and evaluated brown bear population density in different management units (HR - Harghita county; CV - Covasna county; VN - Vrancea county).

fields in bear habitats or very near the bear habitats. The study area is sparsely populated by humans at elevations over 1000 m, but densely inhabited below this elevation. Isolated houses and mid-traffic roads are also dense at altitudes below 1000 m. On the study area there are 173 human settlements, occupying a total area of 3293 km<sup>2</sup>, 90% of them being situated below 1000 m altitude elevation.

#### METHODS

The observations have been performed in the frame work of an ongoing large carnivore conservation project. During the field data collection, we directly surveyed the farmers which suffered different damages caused by bears, and also other livestock owners from the area. During the field data collection, we directly surveyed the implicated farmers and livestock owners. The location of every damage case has been registered and overlaid on the map of the area. Analyzing each case, the following aspects were observed:

- The period when the damage occurred, in the monitoring interval (June 2008 until October 2009).
- Distance of the damage site from human settlements or any urban area.

- Favourable habitat factors which can enhance the approaching of the bears to the damage site.
- Used protective methods (e.g. solid or electric fences, guarding dogs, no. of shepherds, etc.) – obstacles over the bear had to pass in order to enter into the farm or other damage site.
- When the damage occurred repeatedly within one week, a field crew tried to identify the damage causing bear with direct observations, in order to assess whether the same bear was always coming. Information was gathered also from eye witnesses. Descriptions matching for the same bear (i.e. size of the bear, specific colour variation like black or very light, white spotted, etc.) were considered evidence for the presence of the same individual.
- More incidents were reported in the same day/night in the area?
- Number of hours/days passed between the occurrences of next attacks in the same place.
- Damaged item: domestic animals species, beehives, agriculture field, etc.

We considered that any incident repeated within 8 days in the same spot, showing similarity in operation method and killed item, indicates the existence of a “specialized” individual with increased “preference” towards livestock killing. In such cases the application of a lethal or non lethal control method or, depending on the circumstance, looking for the right damage prevention method is recommended.

### *RESULTS*

In the study period, we recorded totally 198 livestock depredation cases. Fig. 2 shows the density of bear damages in the three counties and fig. 3 the locations of the observed cases. In every case when attacks were signalled in a range of maximum 15 km, with a repetition not passing 8 days, performed by the same individual, we considered that the bear shows significant specialized behaviour and preference for livestock killing.

Among the observed attacks we founded 11 cases (Tab. 1), when specialized behaviour could be claimed as follows:

- Case of Barcani: the median of day no. passed between the attacks was 5. As we can observe from the table, between 26 June and 19 September the bear returned nearly every day to the damage site, making totally 12 victims. He showed a clear preference for swine. He developed a special strategy to enter into the stables and used that strategy repeatedly.
- Case of Bodoc: the median of attack repetition was 6 days. The bear preferred only beehives, coming into the beekeeper’s yards during 2 months.
- Oituz case: the median of attack repetition was 3 days. The bear showed preference for only small domestic animals like rabbits and domestic birds.

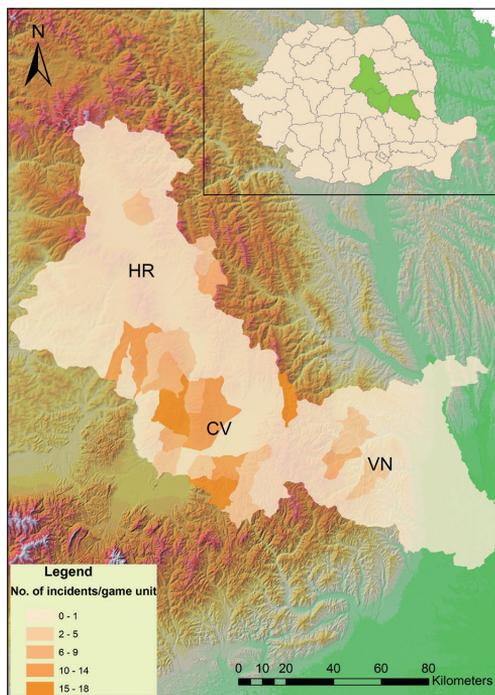


Fig. 2 - Densities of bear damages in Vrancea, Covasna and Harghita counties (HR - Harghita county; CV - Covasna county; VN - Vrancea county).

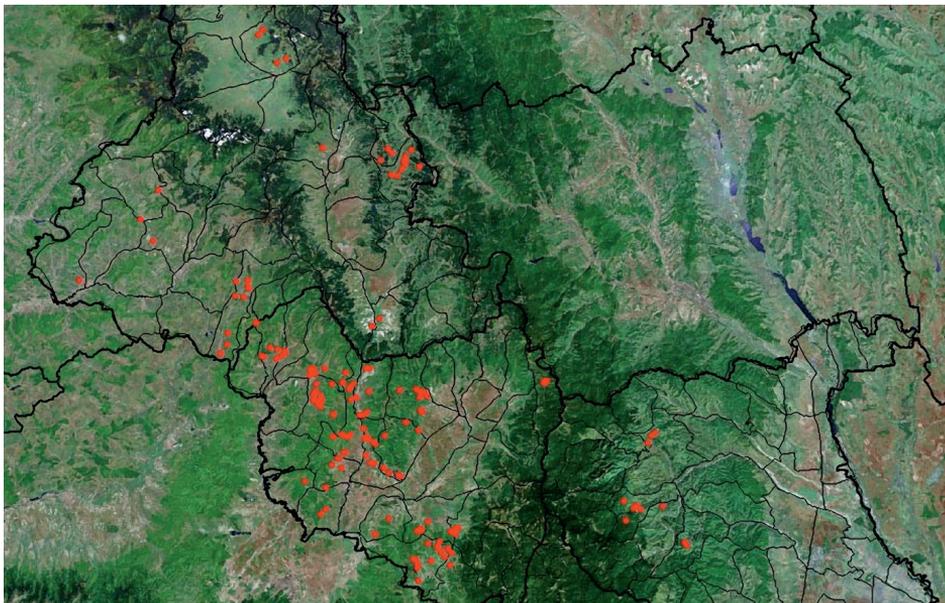


Fig. 3 - Locations of observed damage cases in Vrancea, Covasna and Harghita counties.

Table 1

## Specialized bear cases.

Specialized bear identification area	Date of first attack (month/day)	Period between attacks (days)												Date of last attack	No. of incidents (*)	Preyed species	Place of occurrence (*)	The median of days between attacks
Year 2008																		
Barcani	6/2	1	2	1	5	7	2	9	2	16	18	22	9/19	12	Swine	stable	5	
Bodoc	6/29	0	5	1	9	16	1	7					8/6	7	beehives	yard	5	
Oituz	9/9	7	5	11	11	1	8	7	18	11	1	11/29	11	Rabits and birds	yard	8		
Year 2009																		
Turia	6/30	3	11	1	2	1	8						8/25	7	swine	stable	3	
Podul Șchiopului	6/10	30	4	11	20								8/14	5	cattle	During grazing	16	
Aita Seacă	7/20	12	5	9	1	4							9/20	6	cattle	Night corral	5	
Zălan	8/7	6	4	18	23								9/28	5	cattle	During grazing	12	
Moacșa	9/14	3	1										9/18	3	Rabbits and birds	yard	2	
Valea Mare	10/23	4	2										10/29	3	Birds and sheep	yard	3	
Lunca de Sus	Six attacks at cattle night shelters														Cattle	Night corral		
Barcani - Zagon	6/21	5	1	3	2	11	1	4	2	7	1	9/27	11	Swine	Stable	3		

(\*) The conflicts registered in the discontinuous urban areas are marked with gray.

- Turia case: the median of attack repetition was 3 days. The bear preferred only swine.
- Podul Șchiopului, Zălan, Lunca de Sus and Aita Seacă cases: the bears attacked repeatedly the cattle during grazing. Attack repetition median: 4 days.
- Barcani-Zagon case: similar swine preference and attack repetition like in Barcani.
- Moacșa case: the bear preferred domestic birds and sheep. Attack repetition median: 3 days.

As we can observe the period of the attacks of these bears was between June-September. Field investigations revealed the following facts:

- Sometimes the bear came back several times in the same night.
- 77% of the attacks occurred in discontinuous urban areas according with Corine Land Cover map of Romania (Fig. 4).
- When incidents occurred in urban areas, the preferred prey items were small sized domestic animals (sheep, goats, birds, etc.).
- In every case, the bears had to pass over different obstacles: fences, stables and others, or had to avoid guarding dogs and people.

- In the majority of cases the farms or yards where the damages occurred were very close to forest areas or the environment facilitated the approach of the bear (e.g. shrub lands or bush vegetation around).
- Bears with approximated body weight over 100 kg showed preference for bigger prey items, whereas smaller individuals preferred smaller prey species like sheep, birds, beehives.
- The circumstance in all of these cases offered other predation opportunities as well like other domestic animals, or food sources around the farms/households, but the bears showed clear preference for a certain type of prey. In one of the cases (Barcani) the bear was killing only sows, even if on its way encountered male pigs and piglets.

Field observations made us to believe that the bear implicated in the Barcani (2008) and Zagon (2009) cases was the same individual. Preferred prey items, operation “style” and description of the bear by eye witnesses was similar. After the damage occurrence in 2009 that particular area, hunters from the area shared that they shot a bear near this damage spot and they assumed to be the trouble maker. Fact is that the bear damages decreased considerably after that in the surrounding areas.

Among the 198 observed incidents, 70 matched the described behaviour patterns and have been considered to be done by bears specialized to obtain food in human created artificial areas. These incidents represent 27% of the studied cases. Their typology showed a big number of similarities and offered sufficient information for identifying behaviour patterns describing a “specialized individuals”. 54 of these 70 cases (77%) occurred in discontinuous urban areas. In all other incidents, when the bears didn’t show a clear predation pattern (128 cases), we can’t affirm that each case can be attributed to a different individual. There is an unquantifiable probability that some damages from different areas have been done by the same

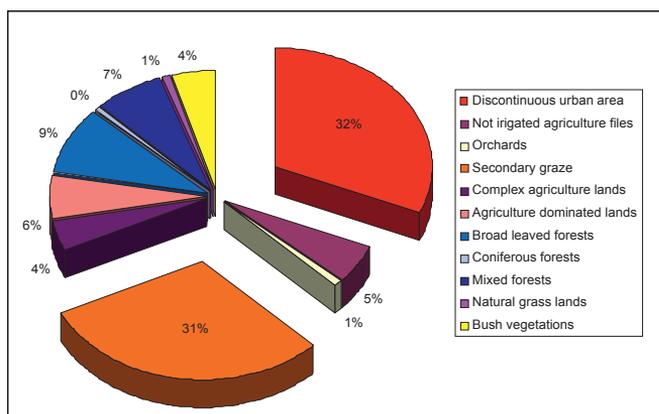


Fig. 4 - Habitat type around the damage occurrence area.

individual, considering the seasonal and daily movement patterns of the bears in the area. Though in the majority of cases the troubles done by “specialized” individuals occurred on areas between 1-10 km<sup>2</sup> (Oituz, Bodoc, Valea Mare), in Barcani-Zagon case, the area surface is over 100 km<sup>2</sup>. We hypothesize that livestock herding techniques and the surrounding environment are main factors leading to the possible formation of “specialized” individuals. In many analyzed cases the cattle herd was kept free during the night without any guarding. The graze lands are near forest areas and the vegetation offers good cover to an approaching predator. In many cases when the bear entered into a settlement, in people’s yards, we founded garbage thrown around, with food remnants and sometimes even animal carcasses. It is unlikely that in such circumstances a brown bear will avoid to come closer to a potential abundant food source. The existing easy catchable prey in the area is a chance which probably would be interesting to any bear. In systems where domestic animals are constantly herded, kept in opened fields, or confined at night inside a corral, predation on livestock requires learning and development of specialized behaviour by the predator (Linnell et al., 1999). To successfully kill livestock, the predator has to either pass by the shepherd and his dogs, enter open habitat, or cross physical barriers. Individuals must learn how to access this food source.

We founded also a relation between the approximate size of the bear and the size of the prey species specialized on. As table 2 shows, individuals with body weight approximated below 100 kg showed a preference towards small sized domestic animals such as birds, sheep, beehives, etc. whereas bigger bears preferred bigger prey like pigs and cattle. Body weight has been approximated with observations performed by experienced persons (hunters, foresters or members of our field crew). It is obvious that the body size of the predator influences not only his predation capability, but also its ability to carry away the prey. In an environment where guarding dogs, people, and other disturbing factors are present, a captured prey brings much bigger benefit to the predator if it is able to carry it away and consume it in a quiet place. Sometimes the big body size gives the power to defend himself during the consumption of the prey in the same place. We speculate that this logical aspect could enhance somehow the specialization of some individuals to certain prey species.

Body size/weight is documented to influence the way how different individuals develop their attacking and hunting strategy (Rosenvig, 1966; Gittleman, 1985; Vezina, 1985; Stirling & Derocher, 1989). In our case, the observations showed that bigger individuals took advantage on their power in order to obtain bigger quantity of food even if it was necessary to destroy a wood beam constructed stable, or to attack a herd which was guarded by many dogs. Observations showed that bigger individuals attack fast after sunset, showing less prudence whereas smaller ones were waiting after middle of the night, when the disturbing factors (people’s activity) decreased. Big bears consumed part of the prey directly at the killing site, coming back next day to the carcass, whereas smaller individuals tried to transport

Table 2

Approximate body weight of the specialized bears and preferred prey species.

Specialized bear	Approximated weight of the bear (kg)	Preferred domestic prey species
Barcani	150-200	Swine
Bodoc	50-100	Beehives
Oituz	50-100	Rabbits and domestic birds
Turia	100-150	Swine
Podul Șchiopului	Over 250	Cattle
Aita Seacă	150-200	Cattle
Zălan	200-250	Cattle
Moacșa	Below 50	Rabbits and domestic birds
Valea Mare	50-100	Sheep and domestic birds
Lunca de Sus	Over 250	Cattle
Zagon	150-200	Swine

their capture away in bush or forest covered areas. We presume that the energetic efficiency strategy plays an essential role in the development of specialized behaviour in some individuals, which will profit on their learning skills and power in order to get better quality and quantity of food. This theory is somehow sustained also by the fact that most of attacks occurred in late summer or fall, in the period when bears need big amounts of food/energy.

#### DISCUSSIONS

Surveying the people which suffered damages, we observed that the problem was considered much bigger when occurred repeatedly. The problem was fast forgotten when occurred accidentally (more than 500 damage cases caused by large carnivores are reported each year), but people highly condemned the carnivores when the predation occurred within several days, and when livestock depredation or damage occurred within a range of 15 km. It seems that the biggest problem consists not in that bear accidentally take the opportunity to feed on livestock items, but when certain habituation signs show up. Presuming that each predation case was done by different individuals, we can assume that on the study area a number of 198 potentially “specialized” bears exists, which would represent 8% of the existing 2300 individuals reported by the wildlife management units. Practically, these are bears which took advantage of opportunistic moments to feed on easily obtainable food sources around livestock, circumstances which existed within their home-ranges. The fact that 35% of these damages have been done by only 11 bears, it is obvious that our presumption is false. According to the observations, only these individuals manifested a “special” behaviour pattern, risking repeatedly their lives approaching systematically to food sources around humans. Since any predator takes advantage of favourable factors as habitat, lack of protection measures, human negligence, etc., in order to obtain better quality food, it is unlikely that all the other cases were habituated “specialized” individuals. Thus, having a brown bear

population estimated at 2300 individuals in the study area, the proportion of the “specialized” individuals is 0.4%. Specialization in these individuals is oriented towards predation on livestock. In the 11 described cases, the bears demonstrated a high adapting capacity to an environment with high human activity. They identified and used narrow moving corridors between people’s yards. They showed a high learning capacity, in many cases finding the best entrance into the stables or protecting fences.

### *Conclusions*

According to our study, there is a reason to believe that individuals within a bear population can show different behavioural trails. When in a certain area within a range of 15 km damages are reported with a smaller frequency than 8 days, there is enough reason to assume the presence of a “specialized” individual. We assume that exhibiting such individual specialized behaviour is in most of the cases associated with higher degree of intelligence. These identified behaviour typologies could be used in the future for signalling in utile time the existence of a specialized bear, in order to apply the right prevention methods or removing the individual out of the population. We hypothesize that most individuals within a bear population will at least occasionally kill accessible livestock they encounter in their home-range. If true, this implies that problem individual control will need to remove preferably those individuals which show a high degree of human acceptance, and the following observable indices like:

- Predation in a place where passing through human created obstacles is required.
- It was necessary to develop a special strategy for passing over protective items.
- Selective preference for prey items.
- The frequency of new predations: repetition within 8 days.

We consider that damage control and prevention problematic must be oriented especially towards limiting occasional incidents, enhanced by the lack of proper protection methods, and not towards the bear population of which only a very small percent represents an imminent danger for farmers and livestock owners. Because changing the behaviour of bears is not a directly controllable process, the management objectives should regard first of all the elimination of those factors which enhance the occurrence of damage cases. Husbandry techniques and environmental factors which enhance the development of problem individuals should be seriously regarded by wildlife managers. Improving of livestock pasturing methods and equipments are highly required especially when farmers move with their livestock close to carnivore’s habitats.

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PAGUBE PROVOCATE DE URSUL BRUN *URSUS ARCTOS* LINNAEUS, 1758  
(MAMMALIA: CARNIVORA) – ANALIZA UNOR TIPARE COMPORTAMENTALE  
ALE INDIVIZILOR SPECIALIZAȚI

REZUMAT

În România, sunt peste 500 de cazuri de pagube provocate de carnivore mari semnalate anual, aceasta fiind principala cauză pentru care se acordă derogări de la statutul de specii protejate, în vederea recoltării unor exemplare. Acest studiu este rezultatul unor observații detaliate a 198 de cazuri în care urșii au produs pagube în anii 2008 și 2009 în zona sud-estică a Carpaților Orientali în România. Scopul studiilor a fost de a identifica dacă există un model comportamental individual în cazul urșilor care produc pagube. Am căutat identificarea indivizilor care au prezentat o oarecare „personalitate” în special prin omorârea repetată a animalelor domestice, fenomen deseori asociat de către fermieri cu existența unui individ „problemă”. În 27% din cazurile observate, exemplarele de urs care au produs pagube au arătat o specializare clară la diferite tipuri de atacuri, prezentând un grad ridicat de toleranță față de oameni, selectivitate pentru anumite tipuri de pradă, întorcându-se la locația pagubei în mai puțin de 8 zile. Acest comportament nu este unul anormal în cazul speciilor de urs, datorită capacității lor înalte de învățare și plasticității ecologice ridicate, dar din punct de vedere al managementului și conservării speciei prezența unor asemenea indivizi devine o „problemă”. Astfel definiția „modelului de comportament” care duce la identificarea „indivizilor problemă” orientați către producerea pagubelor, poate fi util din punct de vedere a gospodăririi corecte a acestei specii și în vederea aplicării unor măsuri corecte de control.

LITERATURE CITED

- BACON, E. S., G. M. BURGARDT, 1976 - Ingestive behaviours of the American black bear. International Conference on Bear Research and Management, Binghamton, U.S.A., 3: 13-25; 27-36.
- BEKOFF, M., 1977 - Mammalian dispersal and the ontogeny of individual behavioral phenotypes. American Naturalist, 111: 715-732.
- BERECZKY, L., 2004 - The behavioral particularities and ecology of the brown bear in the Carpathians. Unpublished Bsc diploma thesis. West Hungarian University - Institute of wildlife management and vertebrate zoology. 187 pp.
- BOERTJE, R. D., V. C. GASAWAY, D. V. GRANGAART, D. G. KELLEYHOUSE, 1988 - Predation on moose and caribou by radio-collared grizzly bears in east-central Alaska. Canadian Journal of Zoology, 66: 2492-2499.
- BRECK, S. W., C. L. WILLIAMS, J. P. BECKMANN, S. M. MATTHEWS, C. W. LACKEY, J. J. BEECHAM, 2008 - Using genetic relatedness to investigate the development of conflict behavior in black bears. Journal of Mammalogy, 89 (2): 428-434.
- COLE, G. F., 1972 - Grizzly bear-elk relationship in Yellowstone National Park. Journal of Wildlife Management, 36: 556-561.
- FRANZMANN, A. W., C. C. SCHWARTZ, R. O. PETERSON, 1980 - Moose calf mortality in summer on the Kenai Peninsula, Alaska. Journal of Wildlife Management, 44: 765-768.
- GITTLEMAN, J. L., 1985 - Carnivore body size: ecological and taxonomic correlates. Oecologia, 67: 540-554.
- HURST, R. J., M. L. LEONARD, P. D. WATTS, P. BECKERTON, N. A. ORITSLAND, 1982 - Polar bear locomotion: body temperature and energetic cost. Canadian Journal of Zoology, 60: 40-44.
- LINNELL, J. D. C., J. ODDEN, M. E. SMITH, R. AANES, J. E. SWENSON, 1999 - Large carnivores that kill livestock: do “problem individuals” really exist? Wildlife Society Bulletin, 27: 698-705.

- MATTSON, D. J., 1996 - Use of ungulates by Yellowstone grizzly bears. *Biological Conservation*, 81: 161-177.
- MAZUR, R., V. SEHER, 2007 - Socially learned foraging behavior in wild black bears, *Ursus americanus*. *Animal Behaviour*, 75: 1503-1508.
- MYSTERUD, I., 1973 - Behaviour of the brown bear at moose kills. *Norway Journal of Zoology*, 21: 267-272.
- PARALIKIDIS, N. P., K. N. PAPAGEORGIOU, V. J. KONTSIOTIS, 2009 - The dietary habits of the brown bear in western Greece. *Mammalian Biology*, 75: 29-35.
- REYNOLDS, H. V., G. W. GARNER, 1987 - Patterns of grizzly bear predation on caribou in northern Alaska. *International Conference on Bear Research and Management*, 7: 59-67.
- ROSENWIG, M. L., 1966 - The strategy of body size in mammalian carnivores. *American Naturalist*, 80: 299-315.
- SHINSUKE, K., 2009 - Long term trends in food habits of Asiatic black bears in the Misaka Mountains of the Pacific coast of central Japan. *Mammalian Biology*, 75: 17-28.
- STEVENSON-HINDE, J., 1983 - Individual characteristics: a statement of the problem, consistency over time, predictability across situations. Pp. 28-35. *In*: R. A. Hinde (ed.), *Primate social relationships*. Blackwell Scientific, Oxford, England.
- STEWART, R. R., E. H. KOWAL, R. BEAULIEU, T. W. ROCK, 1985 - The impact of black bear removal on moose calf survival in East-Central Saskatchewan. *Alces*, 21: 403-418.
- STIRLING, I., A. I. DEROCHER, 1989 - Factors affecting the evolution and behavioural ecology of modern bears. *Proceedings of the 8th International Conference of Bear Research and Management*: 198-204.
- SWENSON, J. E., N. GERSTL, B. DAHLE, A. ZEDROSSER, 2000 - Action plan for the conservation of the brown bear in Europe. *Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)*, Nature and Environment, N. 114. Council of Europe Publishing, Strasbourg, France.
- VEZINA, A. F., 1985 - Empirical relationships between predator and prey size among terrestrial vertebrate predators. *Oecologia*, 67: 555-565.
- ZUNINO, F., S. HERRERO, 1972 - The status of the brown bear in Abruzzo National Park, Italy, 1971. *Biological Conservation*, 4: 263-272.

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