
DIANA BINDEA*

ZOOARCHEOLOGICAL ASPECTS REGARDING THE ECONOMIC LIFE OF PRE- AND PROTO-HISTORICAL SITES FROM TRANSYLVANIA

Abstract: Scopul acestui articol este acela de a identifica, analiza și interpreta descoperirile faunistice provenite din situri arheologice transilvănene (din neo-eneolitic și până în epoca fierului). Acest studiu reprezintă o sinteză a activității mai multor specialiști. Materialul faunistic utilizat la elaborarea prezentului studiu constă în mai mult de 33347 fragmente determinabile (în marea lor majoritate provenind de la specii domestice) din 62 de situri arheologice. Evoluția socio-economică a populațiilor din Transilvania, începând cu neoliticul timpuriu până la sfârșitul epocii fierului, prin informațiile obținute din studierea materialului faunistic, a permis, identificarea unor aspecte majore privind exploatarea unor specii domestice și vânărea unor specii sălbatice, pe parcursul pre- și protoistoriei. Din punct de vedere ecologic, prezența în număr mare a unor specii sălbatice (de pădure), în majoritatea siturilor studiate, demonstrează că habitatul acestor specii era mai mare la începutul Holocenului decât astăzi.

Keywords: neo-eneolithic age, bronze age, iron age, Transylvania, archaeozoological analyses.

*Dedicated to the friendship between
Silvia Marinescu-Bîlcu and Alexandra Bolomey*

The aim of this paper is the identification, analysis and interpretation of the materials represented by the fauna remains discovered on the sites, starting from Neolithic to the Roman conquest period in Transylvania.

The working material is represented by the bony fragments, which have appeared as a result of the archeological diggings. The bony remains often represent the remains resulted from food consumption by the old communities members, thus realizing the "domestic remains" or "kitchen remains" of the inhabitants. There are also some fauna groups with ritual character.

The present paper is a synthesis that reunites the personal studies, but also the ones made during time, by the archaeozoological specialists, on fauna materials proceeded from the archeological diggings. The fauna material that makes the object of the present study sums up 33347 determined fragments (in their great majority being domestic remains), which came from 62 archeological sites. Among these materials a number of 10696 remains, discovered in 26 sites, have been personally determined. The sites where the fauna samples have been analyzed and the number of remains determined from each site (in parenthesis) are:

THE NEO-ENEOLITHIC AGE

EARLY NEOLITHIC – Starčevo-Criș Culture: Gura Baciului (522 remains, personal studies; Lazarovici, Maxim 1995: 12-13, 36-40; Rusu 1995: 499-506); Leț

* National Museum of Transylvania, Cluj-Napoca. e-mail: dbindea@mnit.museum.utcluj.ro

(153 remains; unpublished); Zăuan (193 remains; Bindea 2003: 49-57); Ocna Sibiului (305 remains; unpublished); Tăşnad (39 remains; unpublished); Tărtăria (112 remains; unpublished); Livada (110 remains determined by G. El Susi; El Susi 1989-1993: 333-336); Turia (96 remains determined by S. Haimovici; Haimovici 1992: 259-268); Seuşa (422 remains determined by G. El Susi; El Susi 2000a: 49-57); Lesiana Cave (8 remains determined by S. Haimovici; Haimovici 1989: 393-395); Iernut (157 remains determined; Vlassa 1976: 111); Suplacu de Barcău (remains determined by T. Jurcsák, E. Kessler; Ignat 1979: 54).

DEVELOPED NEOLITHIC – Turdaş Culture: Tăulaş – Deva (50 remains determined by M. Bulai-Ştirbu; Bulai-Ştirbu 1984: 45-47); Orăştie (1676 fragments determined by G. El Susi; El Susi 1997a: 78-95); Zau de Câmpie (592 remains determined by S. Haimovici, V. Man; Haimovici, Man 1986: 333-337; 1992: 21-27); Herpály Culture: Peştiş (135 remains determined by T. Jurcsák; Ignat 1973: 482); Cluj – Cheile Turzii – Lumea Nouă – Iclod Culture (CCTLNI): Zau de Câmpie (2002 remains; unpublished); Cluj – Napoca (82 remains; Rusu 1995b: 191-197); Cheile Turzii (278 remains; Bindea, Sângerean 1996: 477-509); Iclod (406 remains, unpublished); Iclod (3872 remains determined by G. El Susi; El Susi 1989-1993b: 187-202); Carei (205 remains determined by G. El Susi; El Susi 1997b: 59-62); Vinča Culture: Tărtăria (148 remains; unpublished).

ENEOLITHIC – Petreşti Culture: Cheile Turzii (474 remains; Bindea, Sângerean 1996: 477-509); Zau de Câmpie (1277 remains; unpublished); Tărtăria (166 remains; ined); Cucuteni – Ariuşd Culture: Malnaş-Băi (1102 remains determined by S. Haimovici; László, Haimovici 1996: 511); Pastelated handles Culture: Cheile Turzii (546 remains; unpublished).

ENEOLITHIC – EARLY BRONZE – Coţofeni Culture: Şincai (178 remains; unpublished); Tărtăria (103 remains; unpublished); Ghida (57 remains determined by S. Haimovici; Haimovici 1994: 401-404); Poiana Ampoiului (1717 remains determined by C. Becker; Becker 2000: 69-74); Livezile (790 remains determined by C. Becker; Becker 2000: 74-77); Cicău (63 remains determined by P. Georocanu, C. Lisovschi; Georocanu, Lisovschi-Chelăşanu, Georocanu 1978: 273-274); Ţebea (29 remains determined by P. Georocanu; Andriţoiu 1992: 132); Boiu (31 remains determined by P. Georocanu; Andriţoiu 1992: 132).

BRONZE AGE

EARLY BRONZE –Livezile cultural group: Livezile (1773 remains determined by G. El Susi; El Susi 1997c: 45-64); Iernut cultural group: Zoltan (101 remains determined by D. Moise; Moise 1997: 230-241); Şoimuş cultural group: Ţebea (210 remains determined by P. Georocanu; Andriţoiu 1992: 132); Şoimuş (36 remains determined by P. Georocanu; Andriţoiu 1992: 132).

MIDDLE BRONZE –Wietenberg Culture: Derşida (1695 remains; unpublished); Mintiu Gherlei (47 remains; unpublished); Cluj – Napoca – in the interior of a hole (G7) it have been discovered 15 pieces, represented by incisors and canines from *Sus scrofa* (domestic and wild, sometimes undetermined) and *Bos taurus*, analyzed or to be analyzed, some of them having perforations probably being the pieces from a necklace; Boiu (28 remains determined by P. Georocanu; Andriţoiu 1992: 132); Tureni – it has been discovered the skeleton of a bull, ritually disposed, in anatomic position (Rusu, Tarcea, Maxim 1989-1993: 229-238); Oarţa de Sus (analyses S. Haimovici; Haimovici 2003a: 57-64) – hole with cultural remains

(including man) and domestic remains; Otomani Culture: Otomani (2283 remains determined by S. Haimovici; Haimovici 1987: 37-54;); Sălacea (5417 remains determined by T. Jurcsák; Bader 1978: 131-132); Săcueni (1911 remains determined by T. Jurcsák; Bader 1978: 131-132); Medieșu Aurit – Potău (1389 remains determined by T. Jurcsák; Bader 1978: 131-132).

LATE BRONZE –Noua Culture: Iclod (55 remains; unpublished); Zoltan (5489 remains determined by G. El Susi; El Susi 2002: 153-172).

IRON AGE

HALLSTATT: Mediaș – „Cetate” (160 remains, Bindea – Haimovici, in press); Zau de Câmpie (133 remains, unpublished); Bernadea (286 remains determined by G. El Susi; El Susi 2001a: 223-246); Teleac (769 remains determined by C. Lisovschi-Cheleşanu; Vasiliev, Aldea, Ciucudean 1991: 162); Mediaș – „Gura Câmpului” (215 remains determined by P. Georocanu; Blăjan, Stoicovici, Georocanu 1979: 36-37; 1980: 203-204, 211, 214).

LA TÈNE: Merești (728 remains; Bindea 1999: 83-103; 2000: 159-180); Covasna (879 remains, in press); Porolissum-Moigrad (195 remains determined in “holes with incinerated material” by S. Haimovici; Haimovici 1993: 12-17; 269 remains from dwellings determined by G. El Susi; El Susi 1999: 387-396); Sighișoara (874 remains determined by G. El Susi; El Susi 1996: 511-524); Șimleu Silvaniei (1429 remains determined by G. El Susi; El Susi 2000b: 299-315); Biharea (35 remains determined by S. Haimovici; Haimovici 1988: 121-130); Târnăvioara-Copșa Mică (62 remains determined by P. Georocanu; Georocanu, Blăjan, Georocanu, Lisovschi 1980: 69-78); Seușa - 2 skeletons have been discovered, one of *Equus caballus*, one of *Canis familiaris* (analysis by G. El Susi; El Susi 2004: 273-285).

* * *

The fauna materials belong to several groups: mammals, birds, reptiles, amphibians, fishes and mollusk. From the 91 species determined in the pre- and proto-historic settlements from Transylvania, 47 can be found in the materials personally analyzed.

MAMMALS

Domestic mammals

Bos taurus (cattle): they represent the domestic species with the greater frequency in most of the placements from Transylvania, 16608 fragments. The majority of the material represents “the kitchen remains” of the communities, but there are also remains proceeded from ritual depositions: Zau de Câmpie, Carei (El Susi 1997b: 59), Tureni, Porolissum (Haimovici 1993: 12). The domestic bovine occupies the first place on most archeological sites. The cattle percent varies between 3.96% on the eneolithic site from Malnaș-Băi (László, Haimovici 1996: 511), where the big horned mammals are placed on the 5th place, and 88.7 % on the Dacian site from Târnăvioara (Georocanu, Blăjan, Georocanu, Lisovschi 1980: 72), the criteria being the number of the remains (Fig. 1; * - sites from where we took the fauna samples from the specialty literature, NR = number of remains, MNI = minimum number of individuals). The cornular processes differ under morphologic and dimensional ratio, being situated to the two types: “primigenius” and “brachyceros” (the majority).

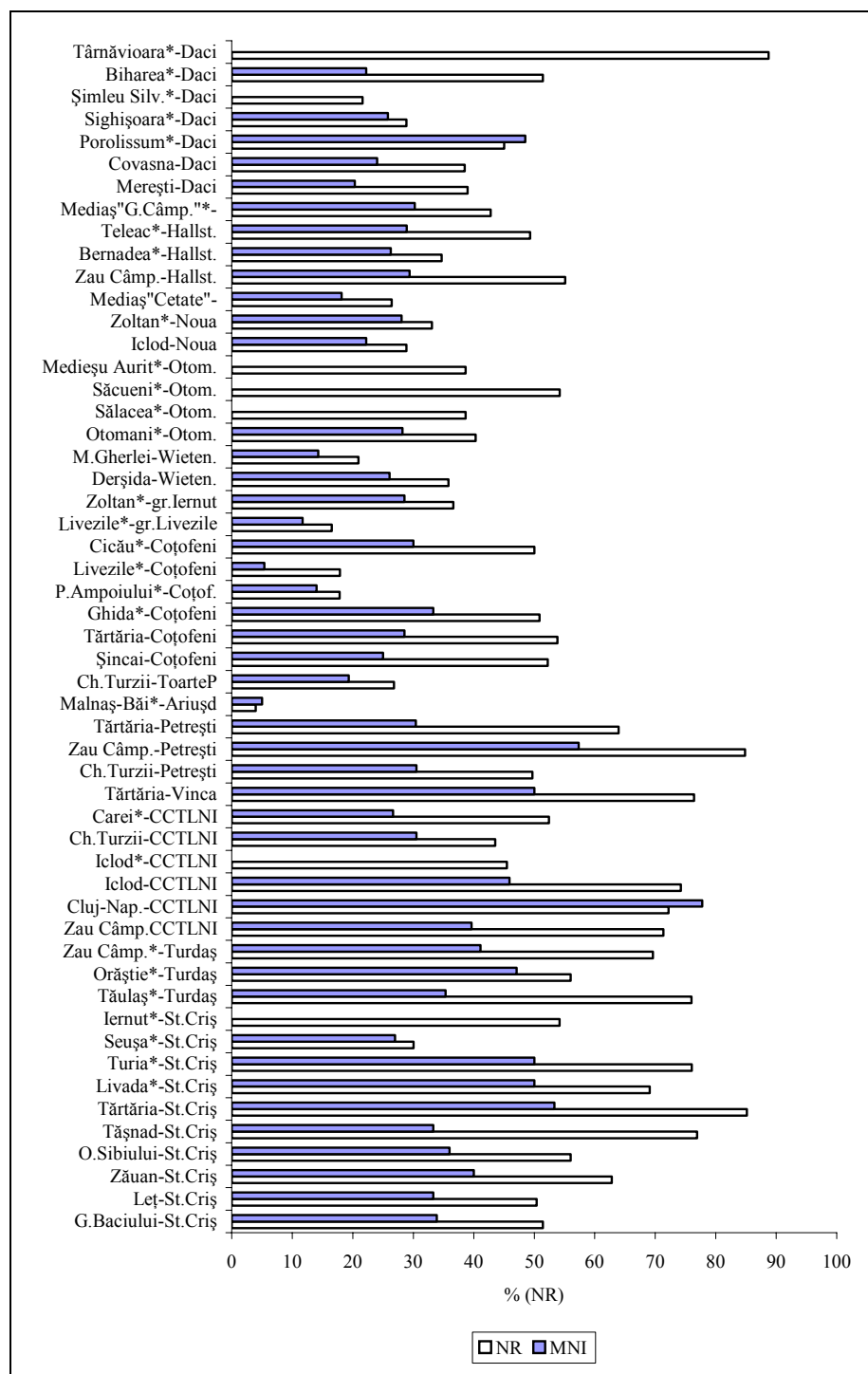


Fig.1 The frequency of *Bos taurus* in sites from Transylvania.

Based on a great number of metric data drew at the appendix skeleton level, it have been performed several works. At Zau de Câmpie (CCTLNI Culture) after realizing the dispersion diagram for the proximal epiphyses of the radius it has been proved a possible grouping on sexes of the individuals of *Bos taurus*, being obvious the values that characterized the wild species.

The size calculus (synthesizing with the data from literature) proved the fact that the bovine were bigger in the Neo-eneolithic Age, when it took place a gracilization phenomenon during times. The great values from Iclod and Cluj-Napoca belong to the same castrated individuals, being proved the fact that this process of castration was practiced in Transylvania even from the developed Neolithic. Castrated have been outlined also in Zau de Câmpie (CCTLNI Culture), Merești, Covasna.

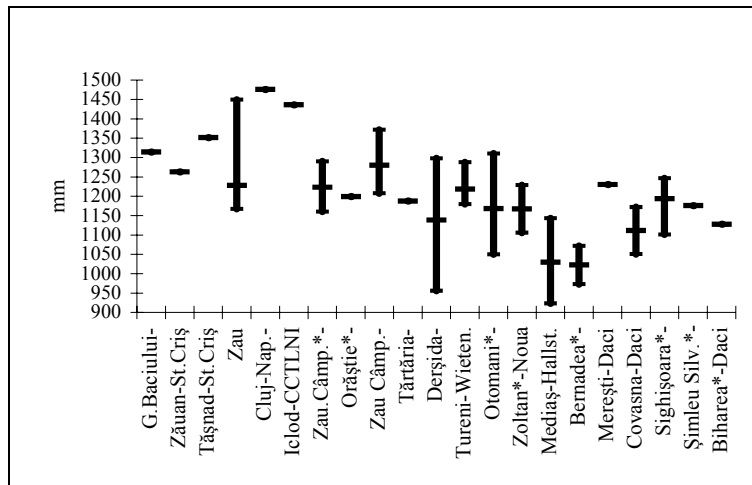


Fig.2 The size (min./max./average values) of *Bos taurus* in sites from Transylvania.

Ovis aries* / *Capra hircus (caprovines): represent the group that occupies the second place among the domestic animals after the bovine. This group reunites two species: *Ovis aries* (the sheep) and *Capra hircus* (the goat). From caprovines come 7259 bony fragments.

The smallest percentages of caprovines, between 1-2% from the number of fragment, can be found in Săcueni (Bader 1988: 132), Otomani culture and in Orăștie (El Susi 1997a: 79), Turdaș culture (Fig. 3). The greatest frequencies of 74.39% from the number of remains are registered in Coțofeni, from Livezile (Becker 2000: 75). In most of the placements the caprovines take the second place after the cattle, and sometimes the third place after the cattle and pigs. In most of the Coțofeni sites, the caprovines are placed first: Poiana Ampoiului, Livezile (Becker 2000: 70, 75), Țebea, Boiu (Andrițoiu 1992: 132), but in some placements of the Bronze Age such as: Livezile (El Susi 1997c: 19), Mintiu Gherlei or in the hallstattian site from Mediaș – "Cetate". At Tășnad and Turia (Haimovici 1992: 260) the caprovines are missing, their absence from the species list can be caused by the reduced number of the lot. The size estimation of the sheep reveal the smallest sizes, generally in neo-eneolithic sites (except the site from Zau de Câmpie, CCTLNI and Petrești culture), compared to the ones belonging to the

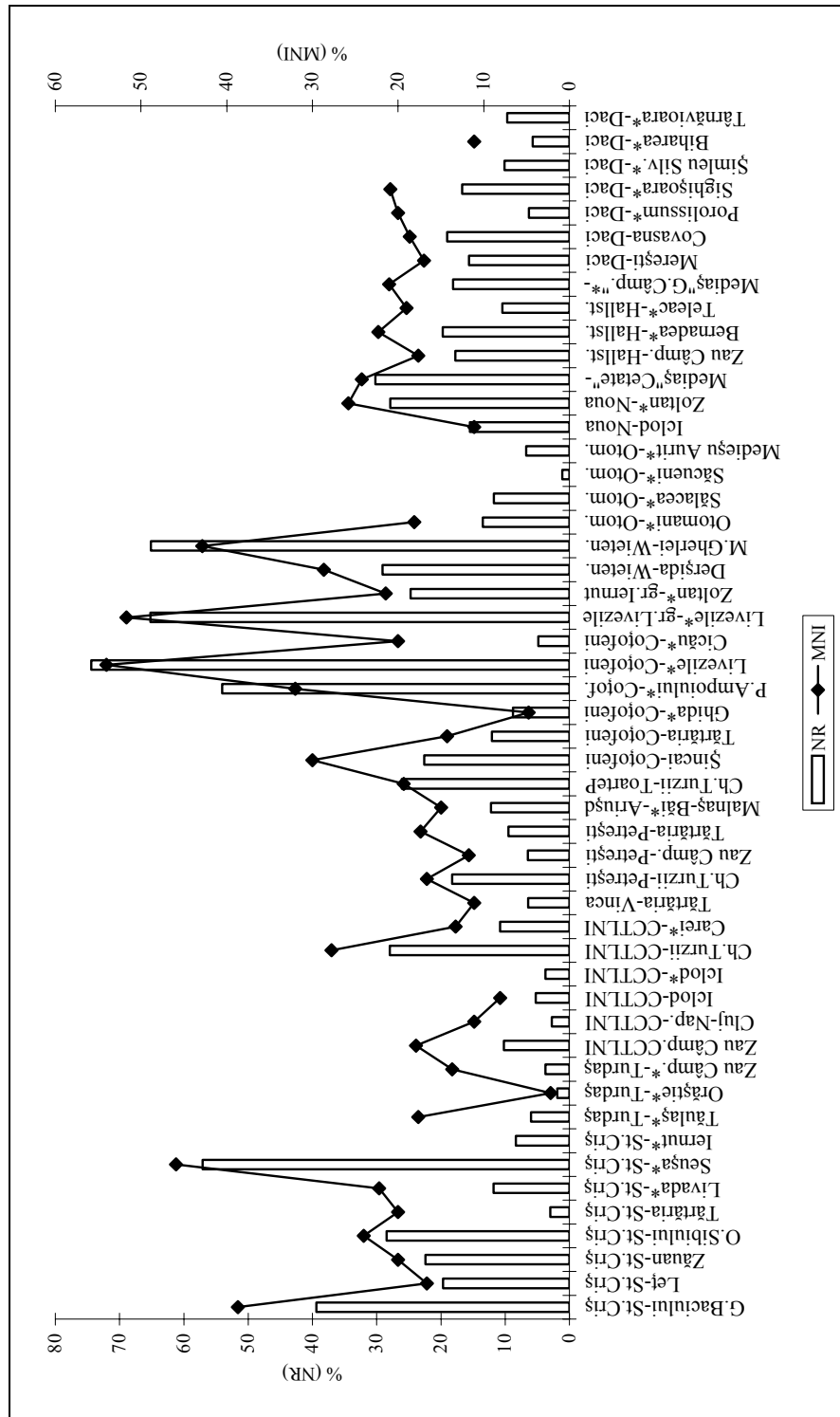


Fig. 3 The frequency of *Ovis aries* / *Capra hircus* in sites from Transylvania.

Bronze Age. In the Iron Age, the withers size (the medium values, but also the maximum ones) of the sheep is smaller than the ones in the previous periods.

Sus scrofa domesticus (domestic pig): gathers 6414 fragments. The pigs occupy, in most of the sites the third place, after the cattle and caprovines, but in some settlements are placed second, being preceded by the cattle. At Merești (Dacian site), the pig occupies the primordial place, having as a criteria the minimum number of individuals. In Tășnad and Turia (Haimovici 1992: 260) the pigs are missing. The percentages of the pigs differ, according to the number of the fragments, between 0.72% in Gura Baciului, Starčevo-Criș Culture, (generally, in the Early Neolithic placements the frequency of the pig is reduced) and 41.1% on the Dacian site from Sighișoara (El Susi 1996: 513). The biometric study has marked out the possible grouping of the individuals according to sex.

The height calculus for withers emphasizes the fact that the swine from the Neolithic sites were, on an average, smaller compared to the ones in Eneolithic and the Bronze Age. In most of the placements from the Dacian Age, the size of the domestic swine is more reduced than in the Bronze Age, but bigger than in the Neolithic.

Equus caballus (the horse): has over 1058 remains. The frequency of the horse in the sites from Transylvania is variable, starting, after the number of fragments, from 0.4% in the placement from Coțofeni, in Șincai, to 17.77% in the placement from Noua, in Iclod. Relatively high percents are reached also in Cicău (Georocanu, Lisovschi-Chelășanu, Georocanu 1978: 273-274), Coțofeni Culture, Mediaș – "Cetate", hallstadian placement and the Dacian sites from Porolissum (El Susi 1999: 391) and Covasna. The size of the majority of horses in the sites from Transylvania is under 140 cm (only 2 examples, one in Otomani and the other in Mediaș have the withers height over 140 cm).

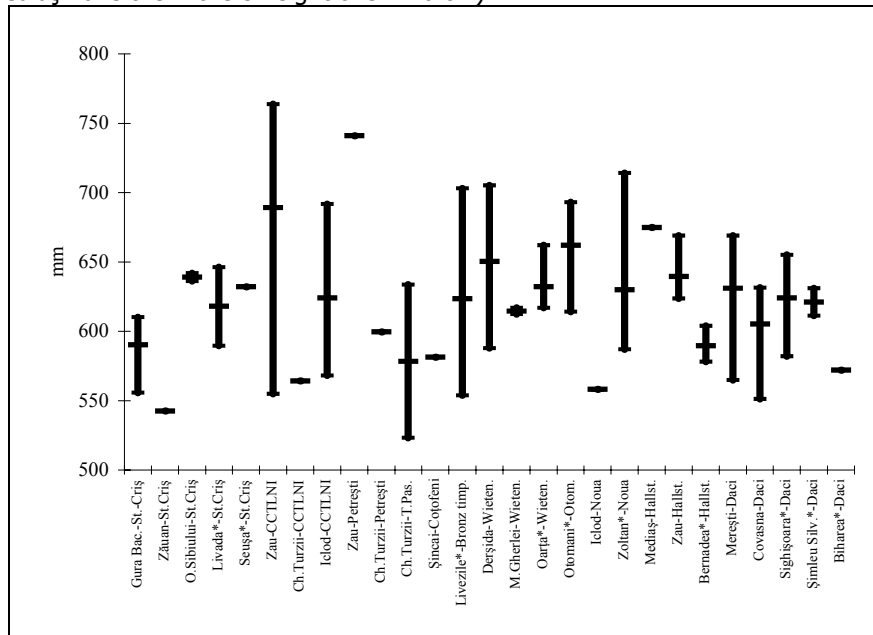


Fig.4 The size (minimum - maximum - average values) of *Ovis aries* in sites from Transylvania.

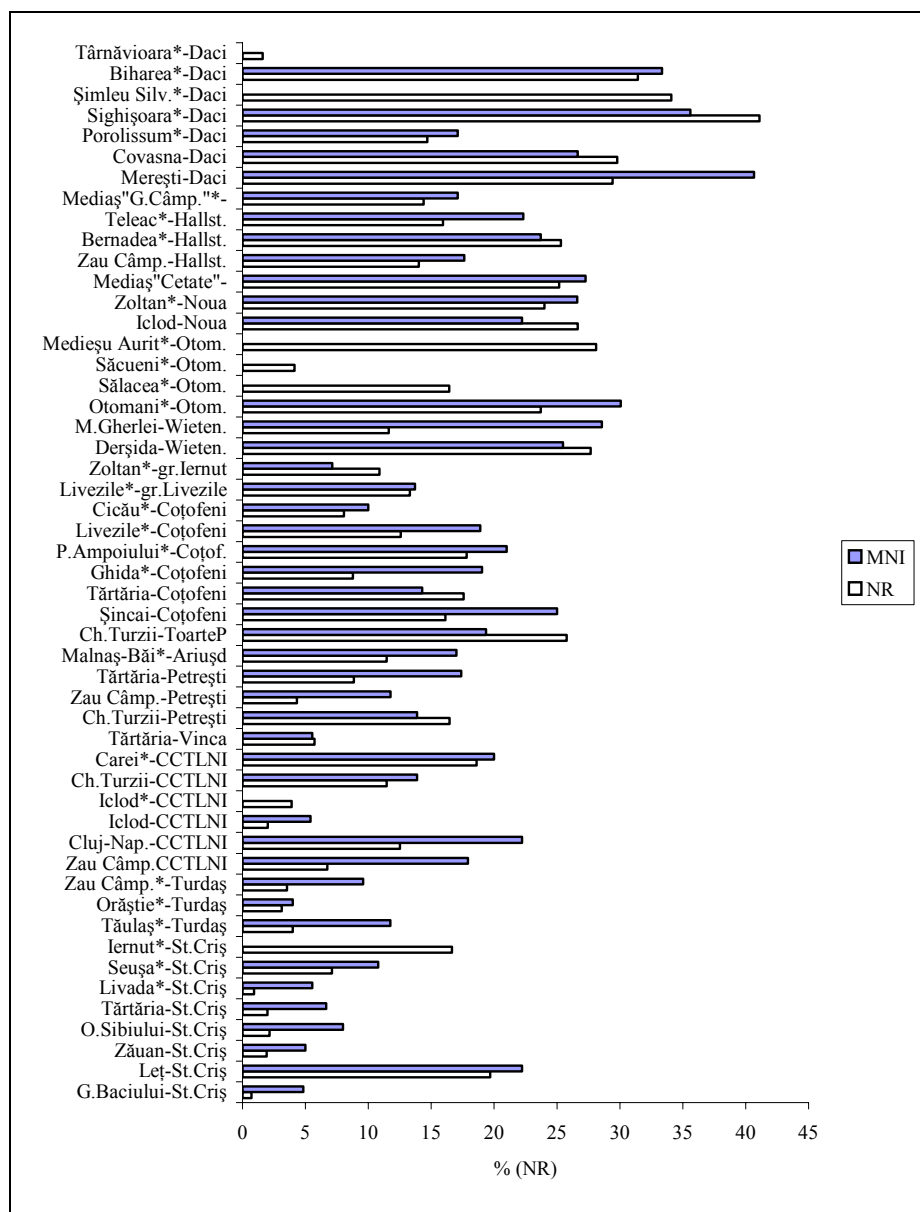


Fig. 5 The frequency of the *Sus scrofa domesticus* in sites from Transylvania.

Lepus europaeus (the hare) has 80 bony remains. The frequency of the hare is reduced, under 2%. In most of the sites is represented through a single fragment. A great number of fragments has been discovered in Zoltan, Noua Culture, 20 remains (El Susi 2002: 165). The hare has the highest percentage in Zoltan, Iernut group – 1.98% (Moise 1997: 241). The metric data of the hare differ very little among the sites or from one placement to another.

Ursus arctos (the brown bear) has 61 remains. The percentages of this species differ, in most sites, between 0.02% in Zoltan, Noua Culture (El Susi 2002: 165) and 0.63% in the hallstattian site from Mediaş – “Cetate”. Only on one site, from the Dacian Age – Şimleul Silvaniei, the frequency of the bear reaches an even higher percentage of 1.6% (El Susi 2000b: 305). The metric data proceeded are few, thus they cannot be submitted to a comparative study.

Castor fiber (beaver) has 57 remains. The percentages of the beaver are relatively high in Cheile Turzii (especially in the layer of the CCTLNI Culture and the Pastellated handles Culture). It exceeds 1% only in Mediaş Aurit, Otomani Culture (Bader 1978: 131).

There have been identified other species in the fauna samples on the territory of Transylvania, with reduced importance: *Canis lupus* (the wolf), *Meles meles* (the badger), *Vulpes vulpes* (the fox), *Felis silvestris* (the wild cat), *Martes martes* (the forest marten), *Lynx lynx* (the lynx), *Equus s* (the wild horse), *Alces alces* (the moose), *Cervus dama* ? (spoon bill), *Bison bonasus* ? (bison); some fragments (among which also specifically undetermined) have been registered in the Orders *Rodentia*, *Insectivora*, *Chiroptera*.

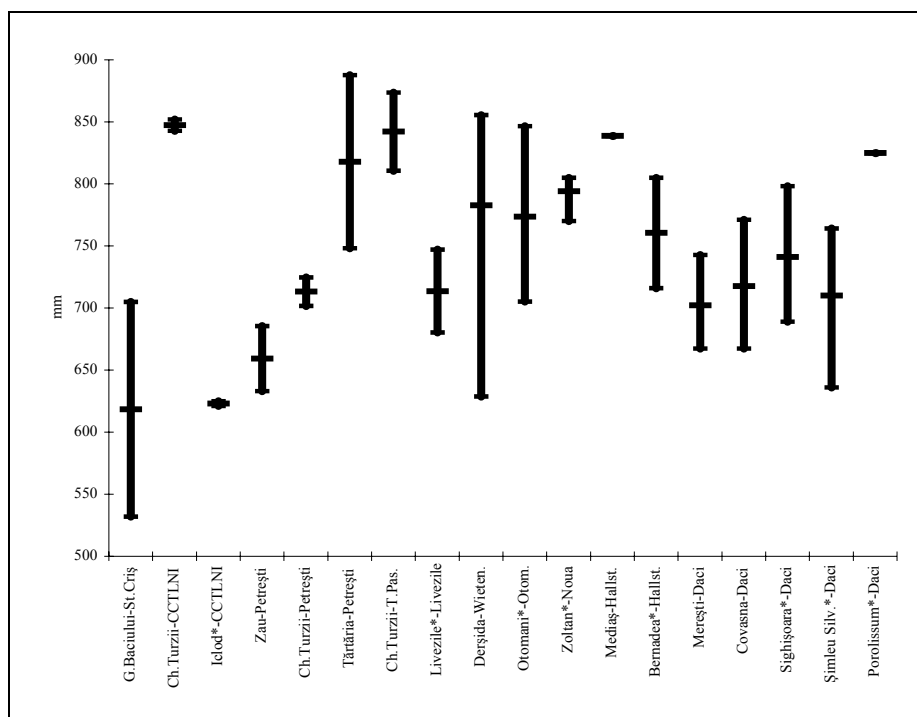


Fig.6 The size (minimum - maximum - average values) of *Sus domesticus* in sites from Transylvania.

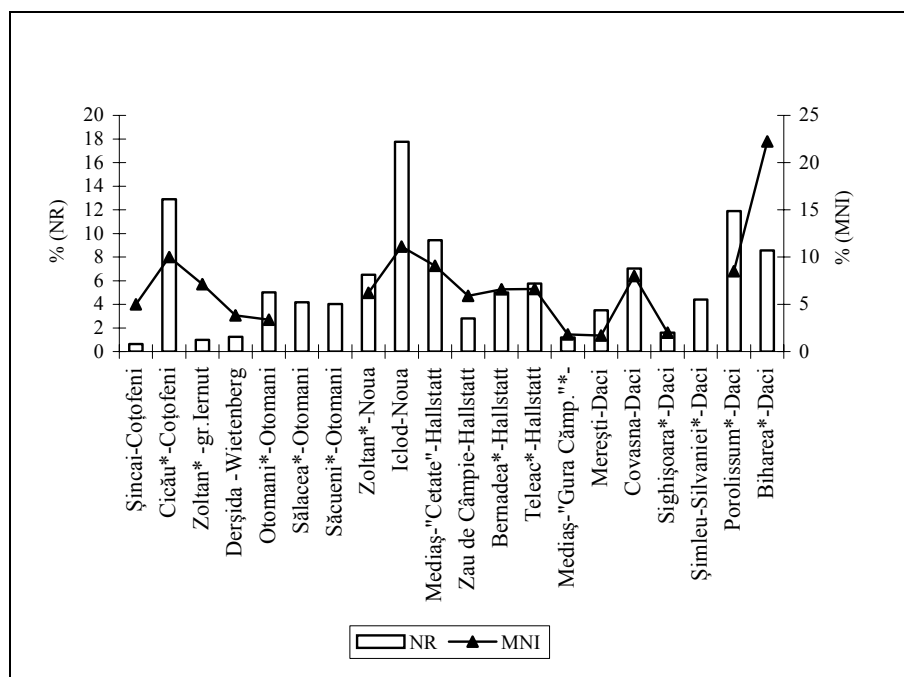


Fig.7 The frequency of *Equus caballus* in sites from Transylvania.

Birds. The *Gallus gallus domestica* (hen) species appears in a certainly domestic state on the Dacian sites from Covasna and Șimleul Silvaniei (El Susi 2000b: 300). The wild birds present a great variety, 40 species discovered in 24 archeological sites. The identifies species are: at Gura Baciului – *Scolopax rusticola* (woodcock), *Corvus monedula* (jackdaw), *Grus grus* (crane), *Anser s*; at Ocna Sibiului – *Otis tarda* (bustard), at Zăuan – *Cygnus cygnus* (winter swan), at Cheile Turzii, Petrești Culture (Kessler, Gál 1998: 10) – *Pelecanus onocrotalus* (white pelican), *Haliaeetus albicila* (white-tailed eagle), *Grus grus* (crane), *Anas acuta* (spear duck), *Anser anser* (summer goose), *Falco subbuteo* (sparrow falcon), *Tetrao urogallus* (blackcock), *Lyrurus tetrix* (black grouse), *Coturnix coturnix* (quail), *Oriolus oriolus* (bigwig), *Cinclus cinclus* (black bird), *Turdus viscivorus* (thrush), *Turdus philomelos* (singing thrush), *Corvus cornix* (crow), *Corvus monedula* (jackdaw); at Cheile Turzii (Pastellated handles Culture) – *Anas platyrhynchos* (wild duck), *Galerida cristata* (crested lark), *Coturnix coturnix* (quail); at Șincai (Coțofeni Culture) – *Lyrurus tetrix* (black grouse); at Derșida (Wietenberg Culture) – *Anas platyrhynchos* (wild duck), *Nyctea scandiaca* (polar eagle owl), *Falco s* (falcon); at Covasna (Dacian site) – *Corvus corax* (raven).

From **reptiles** and **amphibians** remained very few remains: 3 fragments - *Emys orbicularis* (European pond tortoise), respectively 1 fragment - *Pelobates fuscus* (brown earth frog).

Fish. The remains of fish which have been identified belong to the following species: at Tărtăria, in the Starčevo-Criș Culture layers – mandible of *Esox lucius* (pike) and Vinča – a vertebra from a Teleostei great size (*Cyprinus carpio* or *Silurus glanis*), at Otomani (Haimovici 1987: 38) – *Silurus glanis* (catfish), *Esox lucius* (pike), *Perca fluviatilis* (perch), *Carassius carassius* (gold fish); at Sălacea

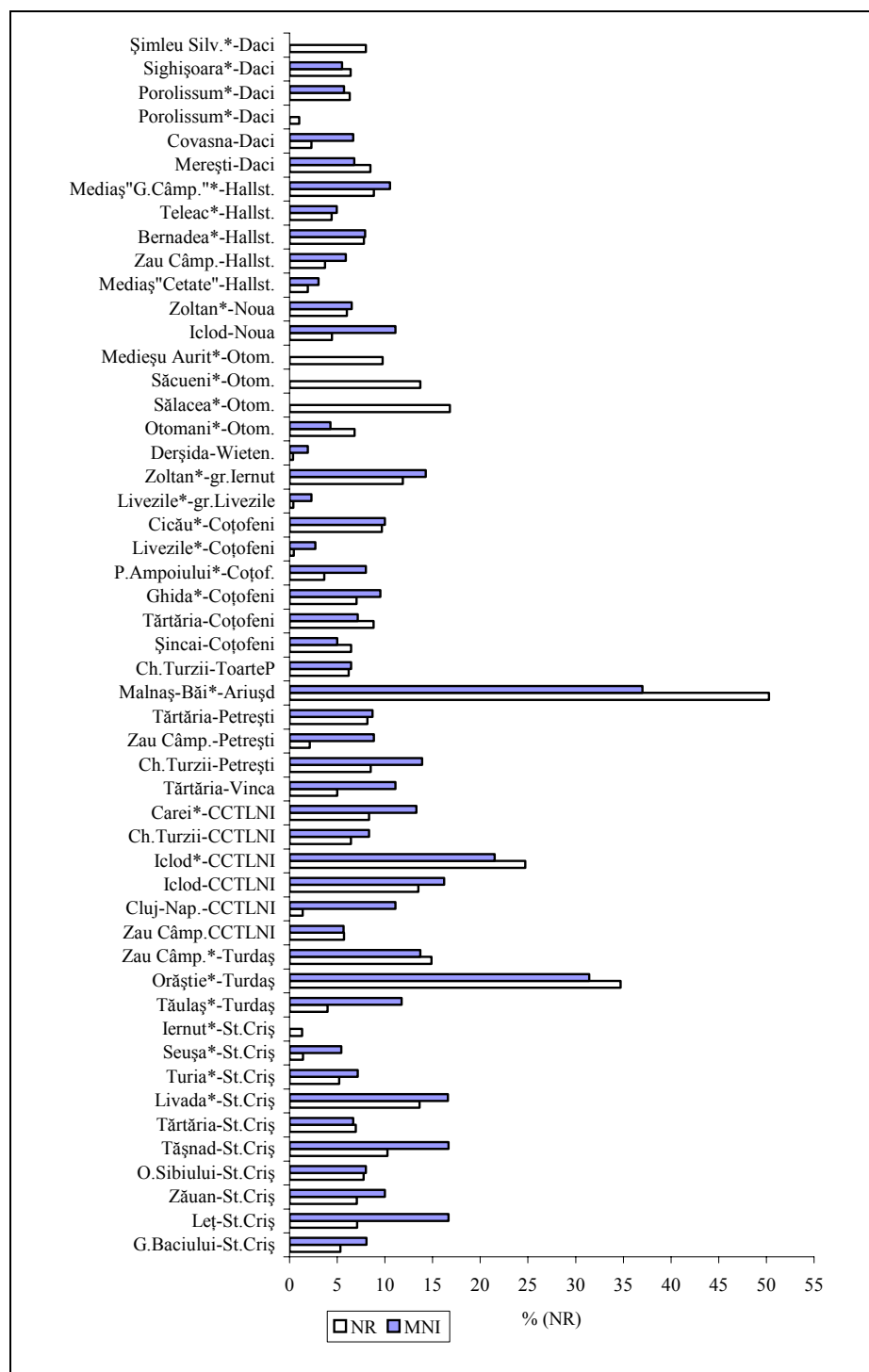


Fig.8 The frequency of *Cervus elaphus* in sites from Transylvania.

(Bader 1978: 131) – *Silurus glanis*; at Săcueni (Bader 1978: 131) – *Silurus glanis*, *Cyprinus carpio* (carp); at Oarța de Sus, Wietenberg Culture (Haimovici 2003: 58) – *Tinca tinca* (tench), *Silurus glanis*; at Mediaș- "Cetate", hallstattian site – 1 vertebral body that had belonged to a Teleostean fish; at Bernadea (El Susi 2001: 238) – cyprinids.

The **mollusks** are the only invertebrates present in the materials proceeded from the archeological diggings. They are frequent in the placements from Transylvania, the great majority belonging to the *Helix* (gastropods) and *Unio* (lamellibranchiate) genres. The highest number appears at Malnaș-Băi (László, Haimovici 1996: 511) and Gura Baciului.

* * *

The socio-economic evolution of the peoples from the territory of Transylvania, from Neolithic to the formation of the Roman Dacia, through the information given by the fauna materials study has permitted the outlining of some aspects referring to the exploitation of some domestic animals and the hunt practicing in the pre- and proto-history.

The placements' study from the **Early Neolithic** reveals the fact that the economy of the communities from those times was not a unitary one, based on the exploitation of certain types of animal alimentary resources. Two categories of sites can be described, one, where the caprovines predominate and the other one where the main exploited group is the one of cattle. In the first category can be included the placements from Gura Baciului, the first two horizons, and the site from Seușa (El Susi 2000a: 49), and in the second one the remaining placements from Transylvania. Thus it has been proved that even from the beginning of the Neolithic the domestic bovine had an important role in the economy of the communities, and the morphological types identified demonstrate the fact that the local domestication had already taken place long before, thus being a process that was continuing through the intercrossing between domestic and wild forms. The highest number of cattle appears in Transylvania, at Tărtăria, over 80%. At Tășnad and Turia (Haimovici 1992: 260), the cattle also have high numbers, over 75%, but the sheep/goat and the pig are absent (probably accidentally). The pig is mildly represented; it did not represent one of the species constantly grown by the Early Neolithic populations. A relatively important occupation was hunting. Hunting for alimentary purposes firstly aimed the great or medium size animals – the red deer, the aurochs, the roe deer, the wild boar. In Transylvania the highest frequencies of the wild mammals are at Tășnad and Turia (Haimovici 1992: 260), but they not overcome 25% from the total of mammals, as it happens in some the placements outside the Transylvanian space, where this practice was of major importance in food provision.

By synthesizing the archaeozoological data provided by the sites belonging to the **Developed Neolithic**, it can be said that the main occupation of the communities in those ages (exception – in the Herpály culture) was growing animals, especially bovine, that are situated on first place. Their highest numbers can be found at Tărtăria, Vinča culture, Tăulaș, Turdaș culture (Bulai-Știrbu 1984: 45), Iclod (personally analyzed material), Cluj-Napoca and Zau de Câmpie, these last three placements belonging to the cultural complex CCTLNI. In these Transylvanian sites the cattle exceed 70% from the total of mammals. The second

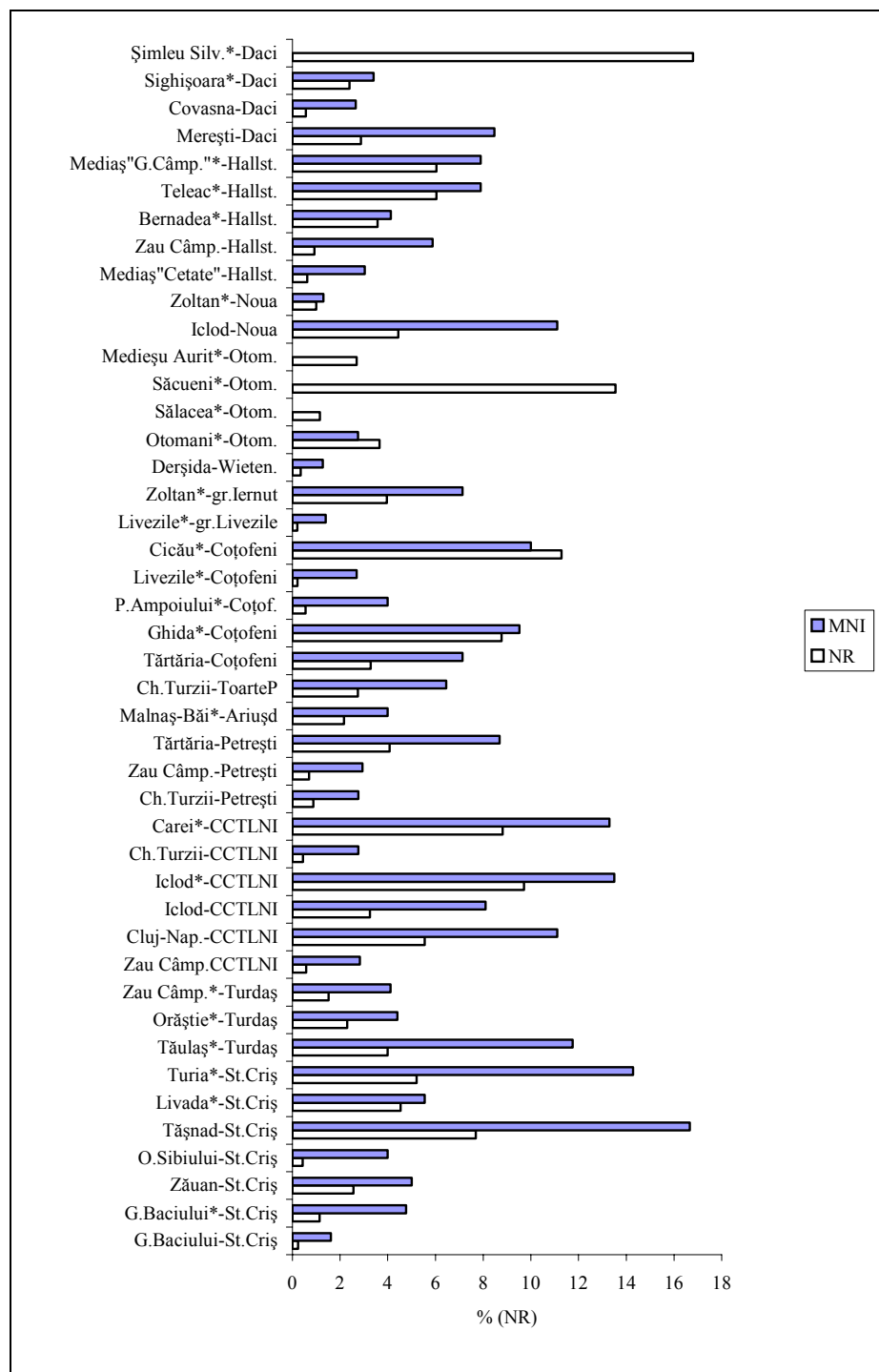


Fig.9 The frequency of *Sus scrofa ferus* in sites from Transylvania.

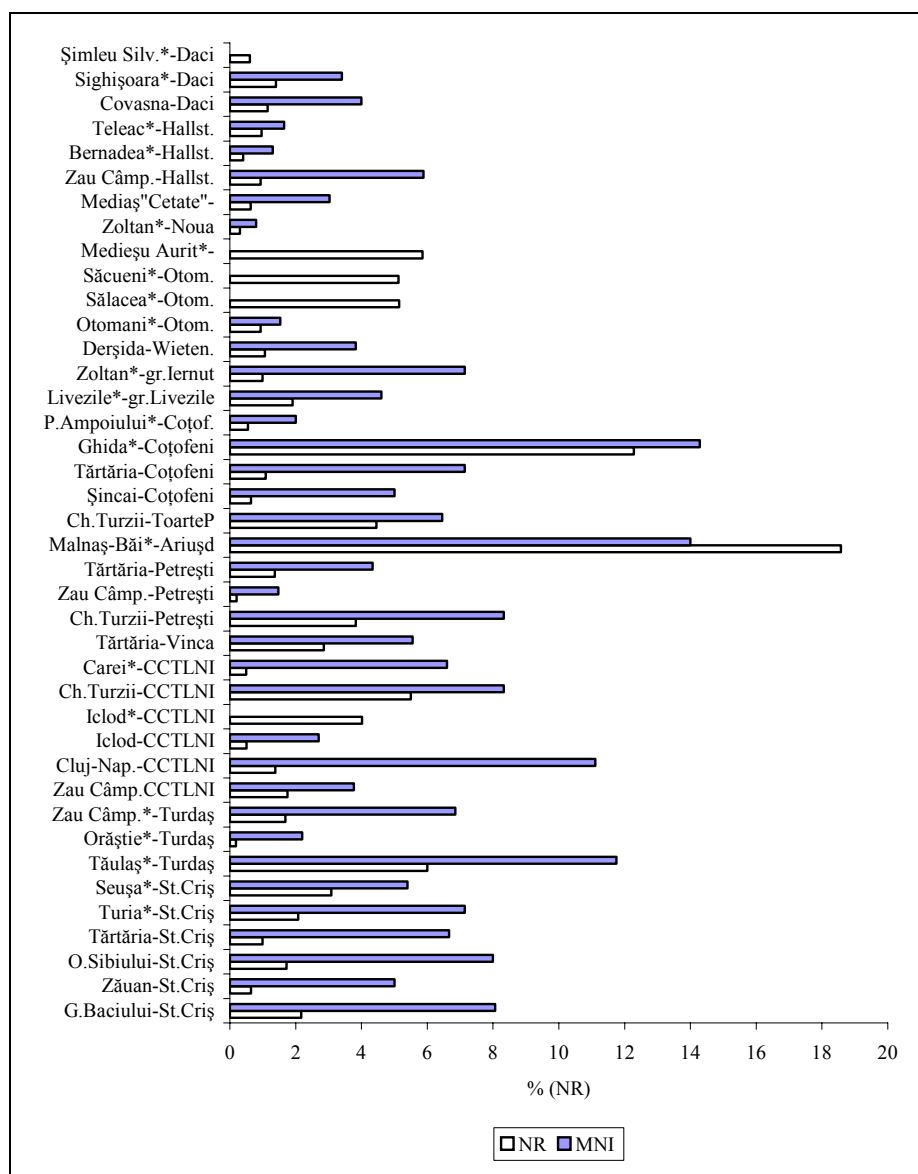


Fig.10 The frequency of *Capreolus capreolus* in sites from Transylvania.

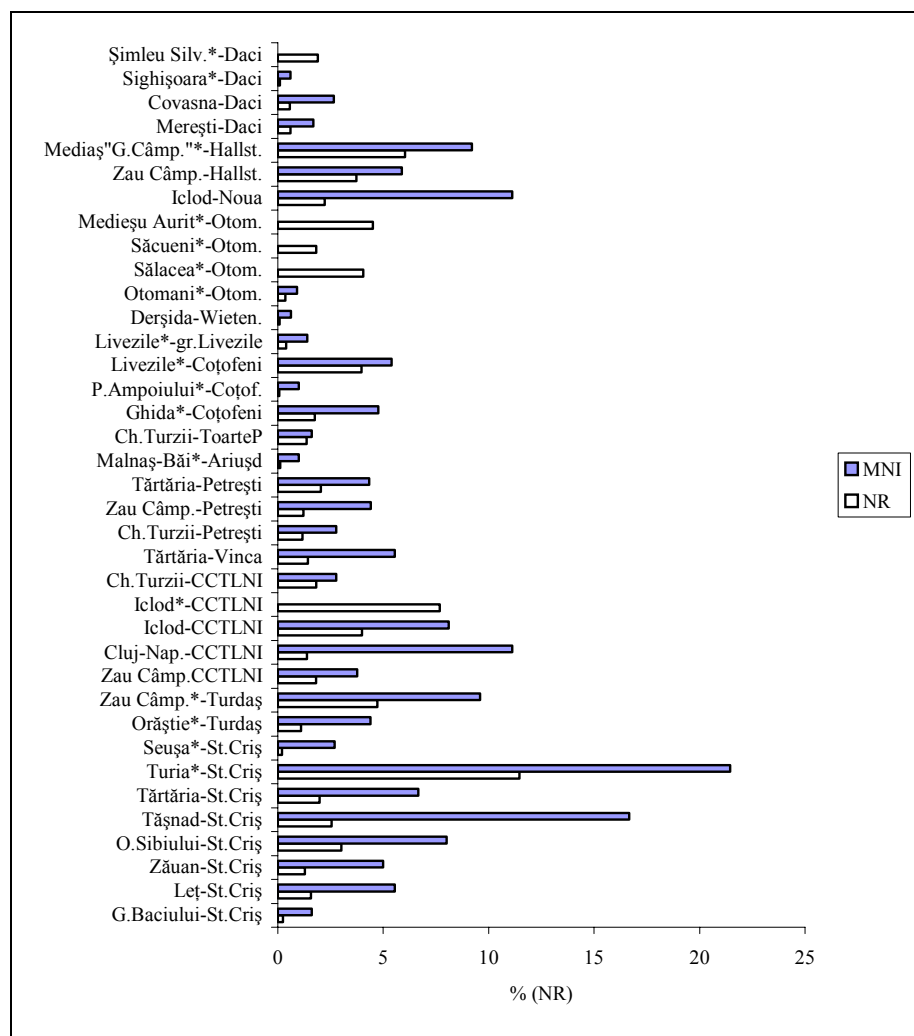


Fig.11 The frequency of *Bos primigenius* in sites from Transylvania.

place among the domestic mammals is disputed between caprovines and the pigs. There is no placement in Transylvania during the Developed Neolithic, where the group of sheep/goat (or that of the pigs) prevails in the detriment of the cattle. Often, in what concerns the animal rising, an equal interest was shown for the caprovines and the swine, this situation being illustrated through the close proportion of the two groups, like in Tărtăria, Tăulaș, Orăștie, Iclod, Zau de Câmpie. In most of the Neolithic placements in Transylvania hunting took a secondary place. Red deer were hunted, and they hold the highest numbers, for example at Orăștie (El Susi 1997a: 79), Iclod, Zau de Câmpie. In other placements it can be marked the preference for wild swine: Carei (El Susi 1997b: 59), Peștiș (Ignat 1973: 482), Cluj-Napoca. The hunters were also interested in aurochs, roe deer, and also other species with reduced alimentary role. In the wild fauna from the Developed Neolithic there were also horses. Occasionally there appeared fishing and mollusk picking.

The **Eneolithic** period is little studied from the archaeozoological point of view in Transylvania. In almost all the placements there is a predominance of the domestic mammals, another proof that the main occupation of the communities was rising animals. Thus, at Zau de Câmpie there is the highest number of cattle in Eneolithic, reaching 84.8% from the total of mammals; the rising of the sheep/goat (6.4%) and of the pigs (4.3%) was realized only subsidiary. The site at Cheile Turzii, Petrești Culture, is part of the category with placements where the rising of the cattle represented an important occupation, but along this, there was also the rising of the caprovines and the pigs. Hunting had a reduced importance in most of the Eneolithic Transylvanian sites and was directed, firstly, towards the great sized animals, such as the red deer, that is placed first among the wild mammals. At Malnaș-Băi (László, Haimovici 1996: 511) hunting had a primordial importance in the placement economy, the red deer exceeding half of the determined material quantity (50.28%); the roe deer has also high percentage, 18.57%. This economic model individualizes the eneolithic placement at Malnaș-Băi, among the other Cucutean sites. Rarely were hunted aurochs, boars and roe deer, and occasionally bears, hares, wolves, foxes, beavers and other rodents. At Cheile Turzii during the Petrești Culture, the birds hunting seems to have had an important role, represented by 5.48%, close to the red deer percentage, 6.11%, according to the total of the determined remains. Desultory there was fishing at Zau de Câmpie, the discovered fish quantity being small (23 fragments, unfortunately specifically undetermined) compared to the existing offer, probably in the neighboring lakes. The mollusk picking had a certain importance in the inhabitants' alimentation from Tărtăria, where the lamellibranchiate fragments represent 7.8% from the total determined remains.

The studies certify important economic differences between different communities of the **Cotofeni** Culture (the transition period between Eneolithic and the Bronze Age). Hunting was more or less important in the sites from Transylvania, the highest numbers of the wild mammals being registered at Cicău, 21% (Georocanu, Lisovschi-Chelășanu, Georocanu 1978: 276) and Ghida, 29.39% (Haimovici 1994: 404). In a series of placements, the primordial place in animal husbandry was held by the domestic bovine, and in others, by the caprovines. The predominance of the swine was not registered in any placement. In Transylvania at Tărtăria, Șincai, Ghida (Haimovici 1994: 404) and Cicău (Georocanu, Lisovschi-Chelășanu, Georocanu 1978: 276), the cattle held the

economic predominance, varying between 50-55%, and were followed either by the caprovines (Șincai) or by the domestic swine (Tărtăria). In opposition, a series of Transylvanian sites had as a main occupation rising small bovine. Thus, at Livezile (Becker 2000: 75), the sheep/goat reached 74.3%, at Țebea and Boiu they exceeded 60% (Andrițoiu 1992: 132) and at Poiana Ampoiului it was registered 54% (Becker 2000: 70). The domestic horse, which became more abundant in this period compared to the Eneolithic, was accentuated in Transylvania at Șincai, Poiana Ampoiului and Cicău, the latter registering an important percentage of 12.9%. While in some sites the red deer was mostly hunted, in others they hunted either the aurochs, or the wild boar or even the roe deer. A reduced economic importance had, on the Transylvanian territory, hunting (catching) wild birds and mollusk picking.

From the **Early Bronze Age** on the Transylvanian territory there are few paleo-fauna data, all of them from bibliographic sources. The domestic mammals are very well represented in the sites from Transylvania. At Livezile (El Susi 1997c: 45), the ovicaprine totally prevail, with 65.2% (compared to 16.5% bovine). At the Șoimuș, the cattle register the highest numbers from the early period of the Bronze Age, 83.3% (Andrițoiu 1992: 132). At Țebea, the cattle represent half from the total of mammals (Andrițoiu 1992: 132). In all Transylvanian sites the pigs are placed third. The horse was present only at Zoltan (Moise 1997: 241), in a very reduced percentage (0.9%). Hunting had a very reduced role in Transylvania. Only at Zoltan the economic role of the red deer, boar and in a small proportion of the roe deer seems to have been better established. The mollusk picking and hunting of wild birds have probably been practiced only exceptionally in the Early Bronze Age.

For the **Middle Bronze Age** the studies referring to the fauna on the Transylvanian territory are numerous. The cattle have the primordial place in the animal economy practiced by most of the sites in Transylvania. At Săcueni (Bader 1978: 131-132) the number of cattle is the highest with 59.2%, at Otomani (Haimovici 1987: 53) the bovine represent 40.2% from the total of mammals. The spectrum of domestic mammals is alike in the Transylvanian sites from Sălcea and Medieșu Aurit, where the number of the cattle is under 40%, and on second place are the pigs (Bader 1978: 131-132). At Derșida, although the cattle are on first place (35.8%), they are closely followed by sheep/goat (29.1%) and the pig (27.6%). At Mintiu Gherlei the number of cattle is reduced (20.9%), the caprovines having a great percentage (65.1%). Generally the pig have a well defined role in the economy of the Transylvanian sites from Middle Bronze Age, except the Săcueni (Bader 1978: 131-132), where their frequency is very low, 4.1%. The horse appears in almost all the sites; its frequency varies between 1-5%.

From the **Late Bronze Age** only two archaeozoological samples from Transylvania have been studied (Iclod and Zoltan). They both belong to the Noua Culture. The ratio domestic species/wild species show similar situations in the two placements: 88.9/11.1% at Iclod and 92.1/7.9% at Zoltan (El Susi 2002: 165). In what concerns the representation of the main domestic mammals, at Iclod and Zoltan, the cattle have a relatively reduced frequency (about 30%), while other species have a rather high number. In what concerns the wild mammals, they generally are very low represented in the Late Bronze Age. It can somehow be appreciated that in the Transylvanian sites the number of the hunted animals is a little higher compared to other placements belonging to Noua Culture.

In the **hallstattiene** sites from Transylvania the main occupation was animal husbandry, a proof being the predominance of the domestic mammals with a percentage between 79.1-96.2%, the primordial place being held by the cattle. At Teleac (Vasiliev, Aldea, Ciucudean 1991: 162) and Bernadea (El Susi 2001: 223) the pigs are placed second. A special situation can be found in Mediaş – “Cetate” where the caprovines are predominant with 30.1%, followed rather closed, by the cattle, 26.4% and the pig, 25.1%. The horse has rather low numbers (under 6%), with an exception in Mediaş – “Cetate” where it reaches 9.4%. Hunting for alimentary purposes, although it was not very much practiced in the Transylvanian Hallstatt, seems to have had a certain importance at Mediaş – “Gura Câmpului” (Blăjan, Stoicovici, Georocanu 1979: 37; 1980: 211) where the stag registered a 8.8% frequency, and the aurochs and the wild boar 6%; also at Bernadea (El Susi 2001: 228) the main hunted mammal was the red deer, 7.8%. In the others Transylvanian placements, Teleac (Vasiliev, Aldea, Ciucudean 1991: 162), Zau de Câmpie and Mediaş – “Cetate”, the numbers of the main wild mammals are generally reduces, under 2%, and occasionally they exceed 3-4%. Fishing was probably seldom in the hallstattian placements from Transylvania (few remains of fish were discovered at Mediaş – “Cetate” and Bernadea), just like wild bird hunting. Mollusk remains have been identified at Zau de Câmpie and Bernadea in small quantities. But at Teleac, inside a dwelling there were discovered lamellibranchiate shells in a great quantity.

Watching the domestic/wild species ratio in the sites belonging to the **La Tène Age**, it can be said that in the most Transylvanian sites, animal keeping was the main occupation; the highest frequency is held by the wild mammals in Transylvania at Şimleul Silvaniei 29.3% (El Susi 2000b: 306). Importance was held by the cattle rising at Porolissum (Haimovici 1993: 15; El Susi 1999: 513) and at Biharea (Haimovici 1988: 121). The domestic mammals spectrum was very much alike in the two Dacian sites from the south - east of Transylvania: Mereşti and Covansa. In both sites and in what concerns the number of fragments it can be observed that the bovine prevail, with about 38%, and for the minimum number of individuals, the majority are the domestic swine. Also, the caprovines have rather high percentages (15-19%). In other two Transylvanian placements, the primordial place in the mammal exploitation is held by the pigs. Thus at Sighişoara and Şimleu Silvaniei the swine exceed the cattle with over 12%. The horse appears in all Dacian sites (except Târnăvioara, Georocanu, Blăjan, Georocanu, Lisovschi 1980: 72). It was an animal used in alimentation but also for riding and several agricultural works. At Covasna and Şimleu Silvaniei (El Susi 2000b: 306) have been discovered remains of domestic hen. These are the first signals of this species (in a certainly domestic stage) in Transylvania. Hunting was not a very well determined practice in the Dacian settlements from Transylvania. The highest frequencies are held by the red deer at Mereşti, 8.4% and Şimleul Silvaniei, 8% (El Susi 2000b: 306). In the latter site also the wild boar represented a special importance, its numbers being of 16.8%. The aurochs and the roe deer are species with low representation in the archaeozoological samples. Sporadically, it appeared bear hunting, beavers and hares. The wild birds species are rarely met in the Dacian sites. Only in Covansa it has been discovered a raven reminder. The remains of fish and mollusk are missing from the fauna samples in Transylvania.

The way of exploiting the domestic species in the placements is reflected in the ages at which animals were sacrificed. It has been proven the animal use firstly for

their primary product (meat), but also for a series of secondary products such as: leather, wool, horns and bones as primary material for manufacturing tools; a proof for this are the discovered bony fragments that bear the sign of an anthropic intervention, some of them being in the finite stage of a tool, others being in different stages of work (cut up, polished, incised). At the same time, some animals sample were maintained for assuring a reproductive stock, reaching maturity or senility.

There are also some fauna materials as results of some ritual manifestation of the population, such as meat offering - Gura Baciului; deposition of some body parts - Zau de Câmpie and Carei (El Susi 1997b: 59); domestic remains from a possible funerary banquet connected to some home foundation and protection - Dersida; skeleton deposition - Tureni and Oarța de Sus (Haimovici 2003: 58-59, 62); pits with "incinerated remains" - Porolissum (Haimovici 1993: 16).

From the ecologic point of view, the presence of the wild species from the "forest" in a relatively high percentage, in almost all the studied sites, proves that the living area of these species was, at the beginning of Holocene, much more extended than it is today. The distribution of the red deer, wild boar and brown bear, species that are specific to compact, thick forests, in the placements from where the archaeozoological material has been studied, proves that their living area, during the pre- and proto-historic periods was much more extended than the present one. The red deer and the bear, by narrowing their living area have secondary become mountainous species. In the past they were forest animals, but they were also living at lower altitudes. From the ecological point of view the greatest part of the identified bird species lives in the forest.

References

- Andrițoiu, I. 1992. *Civilizația tracilor în sud-vestul Transilvaniei în epoca bronzului*, București.
- Bader, T. 1978. *Epoca bronzului în nord-vestul Transilvaniei*, București.
- Becker, C. 2000. Subsistenzstrategien während der frühen Metallzeit im zentralkarpatischen Raum-neue archäozoologische Daten zur Coțofeni- und Monteoru Kultur. *Praehistorische Zeitschrift* 75: 63-92.
- Bindea, D., Sângerean, C. 1996. Câteva observații asupra materialului faunistic de la Cheile Turzii – "Peștera Ungurească". *Acta Musei Napocensis* 33 (1): 477-509.
- Bindea, D. 1999. Studiu arheozoologic asupra așezării dacice de la Merești (jud. Harghita). *Angvstia* 4: 83-103.
- Bindea, D. 2000. Studiu arheozoologic asupra așezării dacice de la Merești (jud. Harghita). In Viorica Crișan, *Dacii din estul Transilvaniei*, Sfântu-Gheorghe: 159-180.
- Bindea, D. 2003. Materialul faunistic de la Zăuan (jud. Sălaj) aparținând culturii Starčevo-Criș. In *Cum scriem istoria? Apelul la științe și dezvoltările metodologice contemporane*, Actele simpozionului „Tineri istorici”, IV, 2002, (coord. R. Mârza, Laura Stanciu), Alba Iulia: 49-57.
- Bindea, D., Haimovici, S. (in press). Resturile paleofaunistice din așezarea hallstattiană timpurie de la Mediaș – "Cetate". *Corviniana* VIII.

- Bindea, D. (in press). Așezarea dacică de la Covasna; studiu arheozoologic preliminar. *Angustia* 10.
- Blăjan, M., Stoicovici, E., Geoceanu, P. 1979 Contribuții la cunoașterea vieții economice a populației hallstattiene din zona Mediaș (jud. Sibiu). *Sargeția* XIV: 35-44.
- Blăjan, M., Stoicovici, E., Geoceanu, P. 1980. Contribution à la connaissance de la vie économique de la population hallstattienne de la zone de Mediaș (dé de Sibiu, Roumanie). In *Actes du I^{er} Congrès International de Thracologie*, I, București: 203-214.
- Bulai-Știrbu, M. 1984. Studiul resturilor de faună neolitică din stațiunea Tăulaș. *Acta Musei Napocensis* XXI: 45-47.
- El Susi, G. 1989-1993a. Resturile de faună din așezarea neolitică de la Livada (jud. Cluj). *Acta Musei Napocensis* 26-30 I (2): 333-336.
- El Susi, G. 1989-1993b. Studiul faunei din așezarea neolitică de la Iclod (jud. Cluj). *Acta Musei Napocensis* 26 – 30 I (1): 187-204.
- El Susi, G. 1996. Fauna din așezarea dacică de la Sighișoara „Wietenberg” (județul Mureș). *Acta Musei Napocensis* 33 (I): 511-524.
- El Susi, G. 1997a. Analiza resturilor de faună din așezarea neolitică de pe „Dealul Pemilor”. In S. A. Luca, *Așezări neolitice de pe Valea Mureșului (I). Habitatul turdășean de la Orăștie – Dealul Pemilor (punct X₂)*, BMA IV, Alba – Iulia: 78-95.
- El Susi, G. 1997b. Resturile de faună din groapa neolitică târzie de la Carei – Cozard (G₂), județul Satu – Mare. *Satu-Mare. Studii și Comunicări* XIV: 59-62.
- El Susi, G. 1997c. Analiza resturilor faunistice din așezarea de la Livezile – „Baia”. In H. Ciucudean, *Cercetări privind epoca bronzului și prima vârstă a fierului în Transilvania*, BMA VII, Alba-Iulia: 45-64.
- El Susi, G. 1999. Archaeozoological report on the animal bones at Porolissum – „Măgura Moigradului”. A Dacian settlement in NW of Transilvania. *Thraco-Dacica* XX (1-2): 387-396.
- El Susi, G. 2000a. Determinarea resturilor faunistice dintr-o locuință neolitică timpurie de la Seușa – „La Cărarea Morii” (jud. Alba). *Banatica* 15 (I): 49-57.
- El Susi, G. 2000b. Studiul preliminar asupra resturilor de faună din așezarea dacică de la Șimleu Silvaniei – „Cetate” (jud. Sălaj). *Acta Musei Porolissensis* XXIII (I): 299-315.
- El Susi, G. 2001. Studiul resturilor de faună din așezarea hallstattiană de la Bernadea (com. Bahnea, jud. Mureș). *Thraco-Dacica* XXII (1-2): 223-246.
- El Susi, G. 2002. Cercetări arheozoologice în așezarea de epoca bronzului (cultura Noua) de la Zoltan (jud. Covasna). *Angustia* 7: 153-172.
- El Susi, G. 2004. Expertise ostéologique sur deux squelettes de cheval et de chien de l'époque La Tène de Seușa – „La Cărarea Morii” (Départament d'Alba). In *Festschrift für Florin Medeleț* (P. Rogozea, V. Cedică eds), Timișoara: 273-285.
- Geoceanu, P., Lisovschi-Chelășanu, C., Geoceanu, M. 1978. Cercetări asupra faunei din așezarea Cicău – „Săliște”. *Acta Musei Napocensis* XV: 273-286.
- Geoceanu, P., Blăjan, M., Geoceanu, M., Lisovschi, C. 1980. Fauna din unele castre și așezări romane din Transilvania (II). Fauna din așezarea antică de la Târnăvioara – „Cetate” (jud. Sibiu). *Marisia* X: 69-78.

- Haimovici, S., Man, V. 1986. Studiul preliminar al faunei aparținând culturii neolitice Turdaș descoperită în așezarea de la Zau de Câmpie (jud. Mureș). *Studii și Cercetări de Istorie Veche și Arheologie* XXXVII (4): 333-338.
- Haimovici, S. 1987. Studiul paleofaunei din așezarea eponimă a culturii Otomani – epoca bronzului. *Crisia* XVII: 37-54.
- Haimovici, S. 1988. Studiul materialului paleofaunistic provenit din stațiunea arheologică de la Biharea (jud. Bihor). *Crisia* VIII: 121-130.
- Haimovici, S. 1989. Studiul materialului paleofaunistic descoperit în două nivele arheologice din Peștera Lesiana (com. Șuncuius, jud. Bihor). *Crisia* XIX: 393-395.
- Haimovici, S. 1992. Cercetări arheozoologice privind materialul provenit din așezarea de la Turia (jud. Covasna) aparținând culturii Criș. *Carpica* XXIII: 259-268.
- Haimovici, S., Man, V. 1992. Studiul preliminar al faunei aparținând culturii neolitice Turdaș descoperită în așezarea de la Zau de Câmpie (jud. Mureș). *Marisia* XV-XXII (1985-1992): 21-27.
- Haimovici, S. 1993. Considerațiuni pe marginea materialului osteologic descoperit în gropile dacice de pe Măgura Moigradului. *Analele Universității Oradea* III: 12-17.
- Haimovici, S. 1994. Notă privind materialul arheozoologic de cultură Coțofeni găsit în apropierea satului Ghida (La Țigănuș), județul Bihor. *Crisia* XXIV: 401-404.
- Haimovici, S. 2003. Resturile animale și umane dintr-o groapă de cult (Groapa 4) a culturii Wietenberg de la Oarța de Sus – Ghiile-Botii. *Marmația* 7 (1): 57-64.
- Ignat, D. 1973. Contribuții la cunoașterea neoliticului din Bihor. *Acta Musei Napocensis* X: 477-491.
- Ignat, D. 1979. Așezarea neolitică de la Suplacu de Barcău. *Materiale și Cercetări Arheologice* XIII: 45-54.
- Kessler, E., Gál, E. 1998. Resturi fosile și subfosile de păsări în siturile paleolitice și neolitice din Cheile Turzii și Cheile Turenilor (județul Cluj). *Angustia* 3: 9-12.
- László, A., Haimovici, S. 1996. Nature et culture en Transylvanie Orientale dans l'énéolithique; contribution archéologique et archaéozoologique à la connaissance du développement de la civilisation Ariușd-Cucuteni-Tripolye. In M. Otte (eds.), *Nature et Culture*, Actes des Colloque International de Liège 13-17 décembre 1993, ERAUL, 68, I: 499-528.
- Lazarovici, Gh., Maxim, Z. 1995. *Gura Baciului. Monografie arheologică*. Cluj-Napoca.
- Moise, D. 1997. *The faunal remains from Zoltan. Thraco-Dacica* XVIII (1-2): 239-241.
- Rusu, D. 1995a. Analiza materialului faunistic provenit din așezarea Starcevo-Criș de la Gura Baciului. Rapoarte de săpături, Campania 1994. *Acta Musei Napocensis* 32 (1): 499-506.
- Rusu, D. 1995b. Câteva observații asupra materialului faunistic din Cluj-Napoca – Statuia Memorandiștilor. *Acta Musei Napocensis* 32 (1): 191-197.
- Rusu, D., Tarcea, L., Maxim, Z. 1989-1993. Gropi rituale din epoca bronzului la Tureni – Poderei. Date osteologice. *Acta Musei Napocensis* 26-30 I (1): 229-238.
- Vasiliev, V., Aldea, I., Ciucudean, H. 1991. *Civilizația dacică timpurie în aria intracarpatică a României. Contribuții arheologice: așezarea fortificată de la Teleac*, Cluj-Napoca.
- Vlassa, N. 1976. Săpăturile de salvare de la Iernut. In *Neoliticul Transilvaniei*, Cluj-Napoca: 107-112.