ONCE MORE: THE NAMES OF DOMESTIC ANIMALS

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Summary

Animal domestication can be defined as the removal, by humans, of animals from their free-living communities, to live and breed under the control of and for the benefit of their captors; as a result these animals acquire domestic traits. From the biological viewpoint, animal domestication is a form of microevolution caused principally, if not entirely, by profound changes in selection. The available evidence indicates that this microevolution is, in essence, a monophyletic process, although introgression may have occurred sporadically or still occurs. However, this microevolutionary process has not resulted in reproductive isolation of domestic animals. The foregoing creates problems concerning the systematics and nomenclature of domestic animals which the author has reviewed in a previous paper. The present paper re-examines some of the existing proposals for a uniform nomenclature and the choices involved in coming to a consensus with regard to the adoption of unified concepts and Latin names for our domestic animals. Perhaps the principal question is whether archaeo(zoo)logists dealing with domestic animals consider it necessary and advantageous to adopt a uniform nomenclature.

Résumé

Encore une fois : les noms des animaux domestiques.

On peut définir la domestication animale comme l'extraction, par l'homme, d'animaux hors de leur population sauvage d'origine, afin de les faire vivre et reproduire sous la tutelle et pour le bénéfice de l'homme; de ce fait, ces animaux acquièrent des caractères domestiques. Du point de vue biologique, la domestication s'appréhende comme un phénomène microévolutif, causé principalement, voire intégralement, par des changements marqués de la sélection. Les données disponibles indiquent que cette microévolution est, essentiellement, un processus monophylétique, bien que des phénomènes d'introgression aient pu jouer ou jouent encore un rôle restreint. Toutefois, cette microévolution n'a pas abouti à l'isolement reproductif des animaux domestiques. De ce fait, la systématique et la nomenclature de ces animaux restent des questions difficiles, dont l'auteur a présenté un historique dans une publication antérieure. Le présent article examine quelques systèmes de nomenclature uniformisée qui ont été proposés et les choix qu'impliquerait un consentement général en vue de l'adoption de concepts et de noms latins unifiés applicables à nos animaux domestiques. Mais peut-être la question principale est-elle de savoir si les archéo(zoo)logues qui s'occupent d'animaux domestiques ressentent l'avènement d'une telle situation comme nécessaire et avantageuse.

Zusammenfassung

Noch einmal: Die Namen der Haustiere.

Die Domestikation von Tieren läßt sich so definieren, daß wildlebende Tiere vom Menschen ihren natürlichen Lebensräumen entzogen werden, um sie zum eigenen Nutzen zu halten. Ihre Fortpflanzung erfolgt unter der Kontrolle des Menschen. Durch diesen Vorgang erwerben die Tiere Domestikationsmerkmale. Aus biologischer Sicht kann man die Haustierwerdung als eine Art Mikroevolution betrachten, die hauptsächlich - wenn nicht gar ganz - auf der Selektion beruht. Es scheint daher, daß es sich bei dieser Mikroevolution im wesentlichen um einen monophyletischen Prozeß handelt, obwohl gelegentlich eine Introgression stattgefunden haben kann, bzw. stattfindet. Dieser mikroevolutionäre Vorgang führte aber nicht zu einer reproduktiven Isolation der Haustiere. Somit ergeben sich Probleme mit der systematischen Stellung der Haustiere und deren lateinische Namen, deren Geschichte vom Autor bereits in einem früheren Aufsatz zusammengefaßt wurde. Dieser Beitrag geht erneut auf einige Vorschläge und damit verbundene Auswahlmöglichkeiten bezüglich einer einheitlichen Nomenklatur ein. Wie auch immer - die Hauptfrage könnte darin bestehen, ob Archäo(zoo)logen, die sich mit Haustieren befassen, eine solche Lösung überhaupt für wünschenswert und vorteilhaft halten.

Key Words

Animal domestication, Nomenclature, Microevolution.

Mots clés

Domestication animale, Nomenclature, Microévolution.

Schlüsselworte

Domestikation, Nomenklatur, Mikroevolution.

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Domestication of animals can be defined as the removal of animals, belonging to species with particular traits, from their free-living community to live and breed under human control and for the benefit of humans; as a result, they acquire necessarily domestic traits. In the recent past the cultural dimension of the phenomenon has been stressed, while little or no attention was often paid to its biological aspects. In my view, the foregoing loss of sight is a peculiar but perhaps exemplary development, illustrating how short the memory of science and its practioners may be or how communication between scientific communities may be hampered by differences in language and academic background. Naturalists of the 19th century were very much aware of the profound changes animals undergo in the course of domestication. The French naturalist Isidore Geoffroy Saint-Hilaire (1805-1861) who was involved in the efforts to acclimatize various foreign animals in France, insists on the fact that: "Les animaux domestiques sont de véritables ouvrages de l'homme: c'est lui qui, agissant d'abord légèrement sur les individus et à la longue profondément sur la descendance, a fini par les modifier profondément, spécifiquement, parfois même génétiquement, agissant de même sur leurs instincts et les pliant ainsi sous tous les points de vue, à ses besoins d'autant plus nombreux et plus variés que sa civilisation est plus avancée." (Geoffroy Saint-Hilaire *fide* Condorcet, 1947).

Much better known, but apparently also not always clearly remembered, is the fact that Charles Darwin developed the hypothesis of natural selection by looking at the work and results of artificial selection practised by animal breeders and that he was well acquainted with the variations in domestic animals (Darwin, 1859, 1868; Gautier, 1992b). Nevertheless it was in the English speaking world that, some decades ago, views took hold, which the following summarizes probably in a somewhat simplified manner. A domestic animal would not necessarily present typical domestic traits and, in the early phases of domestication, one has to distinguish between a domesticated animal, without domestic traits and therefore not recognizable by morphological means, and a domestic animal genetically changed by the protracted submission of its kin to *Homo sapiens*. This stance was largely responsible for the hypothesis that, in the past, quite a few animals had been domesticated which today are not or of which the domestication was discontinued to be started later again. For these occurrences the term episodic (intermittent) domestication was introduced (Higgs, 1976), to which the present writer added "forgotten domestications" in order to distinguish the two categories (Gautier, 1990; 1992a). As far as I can judge (Gautier, *ibid.*), sufficient and reliable data exist for none of these supposedly forgotten or episodic domestications, but they still linger in the minds of many archaeologists.

As to the distinction between an early domesticated animal without domestic traits and a fully domestic animal possessing several characteristics by which one can distinguish it from its wild ancestor, it may have limited practical value. The available biological and archaeozoological data indicate that a limited number of generations and therefore only a few centuries suffice for domestic traits to appear. Generally, our archaeological chronologies are not refined enough to focus on the domestic animal *in statu nascendi* and will perhaps never be, because of the nature of archaeological field evidence.

The loss of the biological dimension of the domestication phenomenon, no doubt, also played a role in the dissolution of the concept, its inappropriate use and the ensuing semantic squabbles. They explain why, in despair, Hecker (1982) proposed to drop the term domestication and replace it by that of cultural control. Hecker uses "cultural control" as a general term to describe activities interfering markedly with the behaviour, movements, reproduction and composition of wild animal populations. It goes beyond "cultural manipulation", another term used by Hecker, which does affect the normal life patterns of the species involved but minimally or not. A cooperative but opportunistic effort to drive a herd of game over a cliff and kill it off, is an example of cultural manipulation, but specialized culling practised by hunters would constitute cultural control since it interferes directly with demographic equilibriums.

Perhaps the use of the term cultural control should be recommended to label those forms of human behaviour interfering markedly with the life patterns of animals but not causing the appearance of domestic traits. Domestication then can be viewed as those forms (or that single pattern?) of cultural control producing domestic animals, i.e. animals with domestic traits. The latter traits, which are hereditary, constitute evidence of the fact that the animals underwent changes of their genepools which belong to the domain of microevolution, i.e. evolution below or at the species level. These microevolutionary changes are the expression of the biological dimension of the phenomenon domestication. Especially the work by Herre (for an early reference, see Herre, 1943) and by the Institut für Haustierkunde in Kiel, Germany (Herre and Röhrs, 1973; 1990), has been vital in understanding the biology of animal domestication.

The typical variations seen in domestic animals would be caused primarily by profound changes in the selection processes to which the animals involved are exposed, as a

result of the unconscious or conscious interference of man the domesticator and affecting both the somatic and reproductive efforts of these animals. Two aleatory processes may also have played a role of animal domestication processes, especially if repeated in their early phases. The founder effect refers to the fact that the genepool of the animals involved may not reflect the complete genepool of the ancestor species, since it is only a restricted sample. These same samples may be subject to loss of poorly represented genes, as a result of non-selective, chance processes, the so-called Sewall-Right effect, random fixation or genetic drift. One can describe animal domestication metaphorically as the forced colonization of very special islands by restricted numbers of individuals of particular species. On these islands, the rules of the game of natural selection as played elsewhere are no longer valid. As a result, the genepools involved are allowed to reveal their potentialities, which remain normally hidden because of the exacting weeding out by what has been called the tyrant natural selection.

As to the ancestors of our silent slaves, the available evidence indicates that each animal domesticated has basically but one major ancestor species. At the species level, domestic animals are monophyletic but one species may well have evolved into two quite different domesticates. This would be the case of the humpless or taurine cattle and the humped or zebu cattle. As to the dromedary and the Bactrian camel, until now, they were considered to derive from one species in a way similar to what happened in the case of taurine and zebu cattle. However, recent osteological research of both domestic camelids revealed various persistent diagnostic differences which suggest they are derived from different species (Steiger, 1990). The case of the Neotropical camelids, the lama and the alpaca, is another bone of contention (see for example Benecke, 1994: 332-334), which we will discuss later.

A major disputed point concerns the results of the microevolutionary changes resulting in the existence of these special animal groups we consider domestic. In sexually reproducing animals, species are generally defined as groups of interbreeding natural populations that are reproductively isolated from other such groups. The fact has also been stressed that species play their particular role in ecological networks, occupying their very specific niche and that members of a same species will, in normal situations, recognize each other ("species recognition"). Evolutionary biologists and palaeontologists may further insist on the fact that species are reproductively interconnected, subsequent generations with their own evolutionary role, thus introducing the dimension of time. Reproductive isolation is brought about by mechanisms that preclude mating (pre-mating and pre-zygotic barriers) or interfere with normal development of the fertilized egg (post-mating and post-zygotic barriers). In the case of animal domesticates, reproductive isolation is not achieved, although certain barriers may have formed, mainly due to behavioural and somatic changes. A domestic horse stallion escaping human control may not be accepted by its wild cousins, but a domestic mare will find a place in a wild harem. A dwarf dog cannot mate with a wolf, but it is still genetically linked with that wolf via the many dogs of intermediate size. Such chains of incomplete reproductive isolation in nature are known as ring species.

The Kiel school considers domestic animals and their wild cousins to be conspecific, but one may also insist that they are incipient species to which the concept of semispecies can be applied (Hemmer, 1990: 185). Such cases of evolutionary intermediacy occur quite frequently in nature, as they should, if microevolution is a fact, but the concept of semispecies is not well defined (how much reproductive barrier is necessary?). Also no Latin labels are available for this taxonomic category and many "semispecies" appear to be concealed by the seemingly definiteness of species or subspecies designations. It means that even if we grant semispecies status to our domestic slaves, we still have to decide whether we wish to give them names as species or as subspecies.

As known, the classical, zoological nomenclature of domestic animals is not uniform. Some domesticates have separate specific names, others have to do without. This suggests to people unaware of the classification limbo in which our domesticates suffer, that some domestic animals are good species while others have not yet achieved such status. In the already mentioned paper (Gautier, 1993), I have tried to summarize briefly the history of the various Latin and other labels proposed for our domesticates. Understandably, lack of insight in the nature of domestication processes and an overly typological approach to biological reality characterize the earliest attempts to name these creatures. When their basically monophyletic origin became clear, various authors attempted to produce a uniform Latin nomenclature. It seems to me that the debate regarding the merits and disadvantages of the various proposals was not always devoid of mere, be it unconscious, unwillingness to understand other views, unnecessary polarization, pusillanimous arguments and poor understanding of the phenomenon of domestication or the rules of the *International Code of Zoological Nomenclature*. Anyhow, until recently, only two naming systems have attracted the attention.

The first system was proposed by Bohlken in 1958 and revised in 1961. It accepts the conspecificity of domestic

animals and their wild ancestors and cousins, adopts the name of the wild species even if it is not protected by the priority rule and adds an infrasubspecific designation consisting of the Latin word for form, *forma* followed by the species name of the domestic animal involved, if such a name exists, or the epithet *domestica*, if the domestic form had no separate name. The system was promoted by the Kiel school (Herre and Röhrs 1973; 1993) and adopted by various scholars in Germany, Eastern Europe and the present author. The main objection against it is that it flounts the priority principle, in case the separate name of the domestic form is older than that of the wild form; according to the priority rule, the former should be used.

The second system was proposed by Dennler de la Tour in 1959 and 1968. His criticism of the Bohlken system strikes me as somewhat unfair, but, as the latter, his proposal accepts conspecificity of animal domesticates and their wild ancestors. It also prefers the name of the wild form, even if it is younger than the name of the domestic form, adding "*familiaris*" (between inverted commas) to indicate that we are not dealing with a subspecific category. As far as I could find out, many scholars know about this labelling system, but are less well acquainted with the labels Dennler de la Tour proposed for domesticates of which the subspecific origin would be precisely known, cases of incipient domestication, feral domesticates and particular breeds. Perhaps this profusion of labels is one of the reasons why the system was not adopted.

Summing up, at this moment two major labelling systems are in use. The first and older one treats domestic animals as separate species or as still conspecific with their wild ancestors, the second is the Bohlken system. With regard to the latter, I would like to repeat a comment I already made (Gautier, 1993). It concerns the use of the third and infra-subspecific part of the proposed labels and applies also *mutatis mutandis* in the case of other labelling systems. In his original proposal, Bohlken (1958) labelled domestic animals as subspecies adding their species name or *domestica* to the binomen of the wild ancestor. Later on, he came to the conclusion, probably after discussing the matter with other scholars, that animal domesticates should perhaps not be attributed subspecific status. They are the result of an artificial isolation process and it may not be wise to treat them as natural entities. Also, living in the special econiche created by people, they are polytopic and not confined to a particular region. According to Mayr (1970: 210), the subspecies is basically a pigeonholing device for the practising taxonomist, grouping similar populations within a species. It is customary to distinguish geographical and ecological species on the basis of range and ecology, but Mayr (1970) considers as a third subspecific category the polytopic race composed of widely separated but phenotypically identical populations which may possess genepools with appreciable differences related to their wide range. Mayr concludes that no terminology is suitable to express this fact. However, if subspecies are pigeonholing devices, I do not see why the category should not be applicable in case of marked polytopy. The latest edition of the *International Code for Zoological Nomenclature* (International Commission for Zoological Nomenclature, 1985: 45; article 45f *partim)* states that "Under the Code, the original rank of an infraspecific name is deemed to be ... subspecific, if the author, when establishing a name as a third name of a trinomen, stated that the taxon was characteristic of a particular geographical area, or environmental or ecological context, or host species ...". In the light of the foregoing, attributing a subspecific status to domestic animals may be less difficult than has been assumed on the basis of older philosophies about subspecies, provided that we do not set apart domestic animals as artificial, not "natural" entities.

The nomenclature, recently proposed by Uerpmann (1993), is totally different from the ones discussed here until now. Uerpmann argues that for archaeozoologists and archaeologists, a stable nomenclature unrelated to the zoological one would be very practical. He proposes the use of uninominal labels generally derived from existing Latin names for domestic animals, to be printed in italic capitals. Uerpmann borrowed the idea for his nomenclature from botany, where a similar labelling system would be used to designate domestic plants, but he does not provide references. As far as I could find out until now, few (paleoethno) botanists are acquainted with a special labelling system in their field. Anyhow, the combination of the proposed uninominal labels and some additional terms would allow one to describe succinctly bastardized forms and particular kinds of domestic animals. The system was applied in the analysis of the bone remains from Qala'at al Bahrain (Uerpmann and Uerpmann, 1994). In Uerpmann's view, Latin labels, such as the ones of the Bohlken system and essentially in agreement with the rules of the zoological nomenclature, are subject to much change and still express too often subjective views. The origin of several domestic animals would not yet be clearly established and the taxonomic status of various ancestral forms not settled.

In my opinion, Uerpmann overrates the instability of a Latin nomenclature of the Bohlken type and the supposed lack of consensus among mammalogists dealing with animal domesticates and/or their ancestors. Another argument

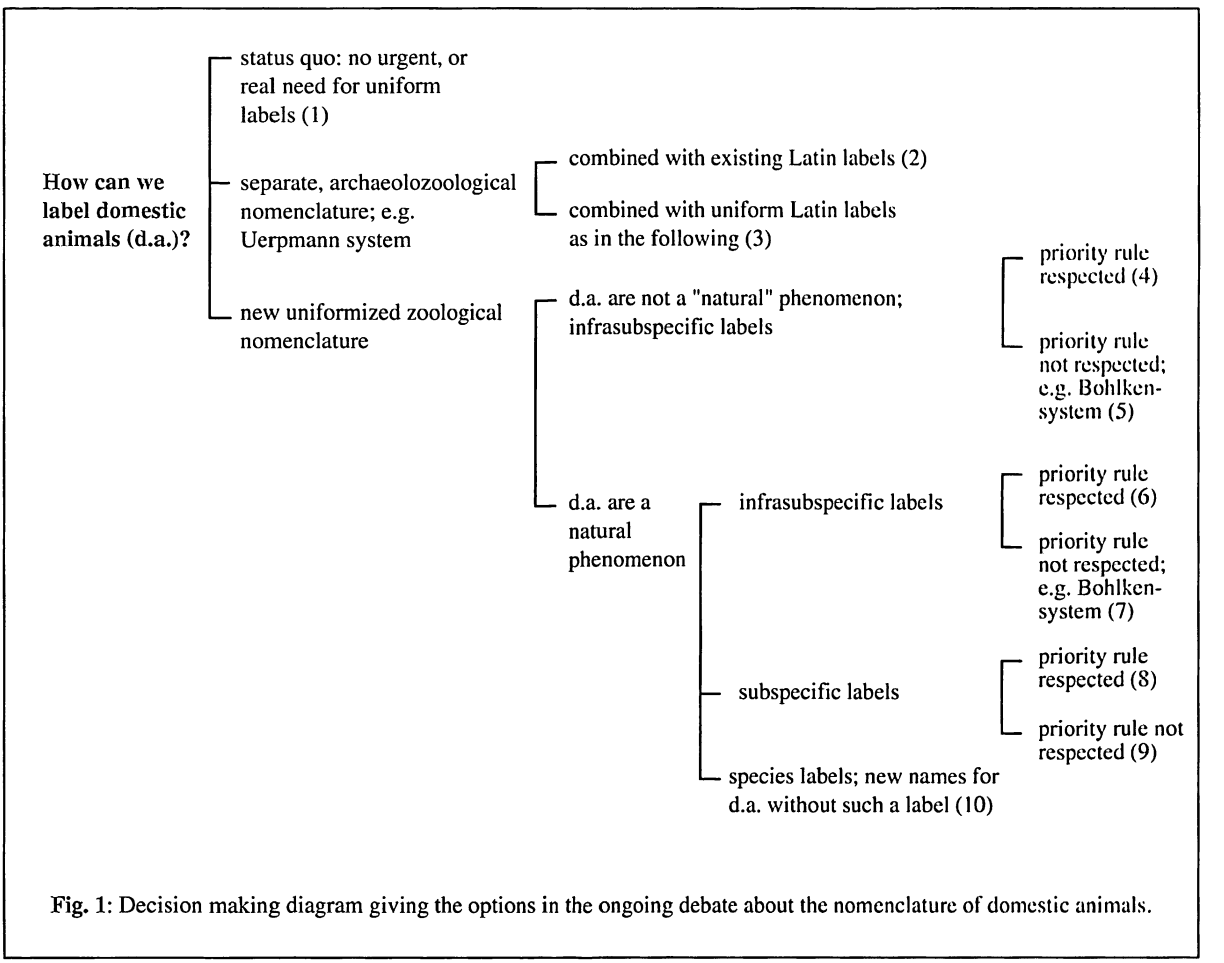

Fig. 1: Decision making diagram giving the options in the ongoing debate about the nomenclature of domestic animals.

advanced by Uerpmann appears more serious at first sight. It concerns the exchange of genetic material between domesticates and a related wild species. Put differently and more generally, what is the systematic position of domesticates affected by introgression? In the case of the Neotropical domestic camelids, the foregoing phenomenon may have played a decisive role. The classical view was that the lama and the alpaca have different ancestors, respectively the guanaco and the vicuna. However pleasing this view may be, the available evidence goes against it and the Kiel school considers the wool producing alpaca as a specialized form which evolved out of the lama (Herre and Röhrs, 1973; 1993). Hemmer (1976; 1993) thinks differently: occasional interbreeding of lamas and vicunas kept in captivity by the Incas, because of their special coat colour, brought the alpaca into being. Personally I find the theory advanced by the Kiel scholars most satisfying, because the available data indicate that introgression is not an important causal factor in animal domestication processes. Anyhow, even if we accept that introgression played a role in the origin of the alpaca, the lama remains its main ancestor. The same can be said about, for example, the smuggling of genetic material of coyotes, jackals, yaks, bisons or other cattle-like creatures etc. into the genepools of respectively dogs and cattle. Introgression occurs regularly in nature, but the two species involved continue to play their separate ecological and evolutionary role before and after the fact and no right minded taxonomist will want to change their labels. Natural history is about populations, not about genes or DNA.

As a summary, I have attempted to fit the various issues raised in the recent debate about the labels for our animal domesticates, in a decision making diagram (fig. 1). The result is that eight final decisions lead to at least seven alternative Latin labelling systems, of which the first pleads for the maintenance of the existing nomenclature. The deci-

sion to establish a separate, archaeozoological system allows me to introduce a final remark. If we, as archaeozoologists or archaeologists, vote for such a system, we may still wish to see a uniform Latin zoological nomenclature, reflecting the microevolutionary processes involved in animal domestication and their results. The choice of a non-zoological labelling system can therefore be combined with seven alternative zoological systems. However, the foregoing is mostly a theoretical game. My experience tells me that, in general, archaeozoologists do not care much or at all about the labels they attach to the remains of domestic animals they analyse. Therefore the only merit of this contribution may be that it helps to focus more clearly on what is involved in the debate about our silent friends' labels.

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