

RHINO NOTES

A review of black rhino systematics proposed in *Ungulate Taxonomy* by Groves and Grubb (2011) and its implications for rhino conservation

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A new and comprehensive taxonomy of all groups of ungulates was recently published by Colin Groves and Peter Grubb (1935-2006). After an insightful introduction covering methods and species concepts, an arrangement is presented of all recent (and a few extinct) ungulate groups. In the Rhinocerotidae, the list includes six species: *Rhinoceros unicornis* (no subspecies), *R. sondaicus* (3 subspecies), *Dicerorhinus sumatrensis* (3 subspecies), *Diceros bicornis* (8 subspecies), *Ceratotherium simum* (no subspecies) and *C. cottoni* (no subspecies). This treatment is very similar to that in previous work by Groves, except for the recognition of the Nile rhinoceros (*C. cottoni*) as a separate species (Groves et al., 2010) and for the addition of an eighth subspecies of *D. bicornis* (*D.b.occidentalis*, separated from *D.b.minor*).

Focusing our attention on the black rhino, there is an obvious difference between the eight subspecies recognized by Groves & Grubb (2011) and the four subspecies recognized by the IUCN/SSC African Rhino Specialist Group (AfRSG) in Emslie and Brooks (1999). This gap between the two views is disconcerting, to say the least, because both conservation policies and taxonomic revisions are supposed to reflect the biodiversity in nature. This is not a situation which should be allowed to last, and it is high time that a solution is sought. Biodiversity must be preserved, as best as possible, while of course we should not be put in a self-made harness which makes us unable to fight the battle with any chance of success.

It is impossible to understand the current state of affairs without some knowledge of the historical

background. We do not need to go very far back. Until the middle of the last century, the black rhino was generally seen as a species with very little known variation. Certainly, many subspecies had been described over the years, often on an *ad hoc* basis whenever a new specimen appeared in a museum or in a zoo. Amazingly, there had even been proposals to differentiate two subspecies in one very small area in KwaZulu-Natal living sympatrically, where I refer to the *Rhinoceros bicornis minor* and *R.b. major* of Drummond (1876) and the *D.b. punyana* and *D.b. bicornis* of Potter (1947).

The revision by Hopwood (1939) was inadequate as it was based on a really very small sample of museum specimens, but it had the distinction of being the first review of black rhino sub-specification since the beginning of the century. A much more ambitious and large-scale synthesis was published by Zukowsky (1965), who studied all available evidence in literature, museum specimens and zoo animals. His work was a landmark study which is now rarely consulted, thereby missing much valuable data. Zukowsky concluded that there should be 17 subspecies of *Diceros bicornis*, all meticulously described and diagnosed, but unfortunately using an antiquated view of what a subspecies should be.

Before Zukowsky's work had a chance to be discussed, it was followed by a new study by Groves (1967) written with the stated aim to put Zukowsky's data in a more modern context. Groves reduced the number of subspecies to seven across the African continent. Although he did not state that one of those

(the nominal subspecies) was already extinct, this was implied from the reference to Zukowsky's treatment. It was also reinforced in the title of Rookmaaker & Groves (1978) which tried to collate all data, scarce as they are, about the black rhino which once lived in the region of the Cape of Good Hope.

It is certainly understandable that to most field workers the conclusions proposed by Groves (1967) resembled a bombshell. Where there were to all intents and purposes no subspecies before, now suddenly there were seven. Not only that, but a cursory look at his paper reveals a rather intricate discussion of clines in Kenya and Tanzania, illustrated by a bewildering array of dots and lines on a map of the region. The budding conservation society in East Africa all at once had to come to grips with the possibility that they would have to cope with a set of at least three subspecies with all kinds of intergrades. And of course, even the best observers of rhinos in the field would have felt unable to differentiate the various subspecies when observing the animals in the field. Rhinos differ in size of skulls and skeletons, but there was little to distinguish one from another in the bush.

At first, the classification by Groves (1967) was silently ignored by conservationists, but the issue was revived twenty years later during a workshop held in Cincinnati (Anon., 1987). Rhino numbers were declining very fast at the time, something needed to be done urgently, money had to be raised, and the last thing needed were complications introduced by academic theories of taxonomy and nomenclature. Although understandable, the response was also disappointing. During the workshop, Du Toit (1987) discussed the issue of black rhino taxonomy, deplored the small sample sizes on which Groves had based his results, and mentioned that AERSG had initiated a survey of black rhino skulls with (unstated) results showing some differences from those of Groves. Together with workshop participants, he concluded that taxonomic distinctions had been exaggerated, more data (biometric and ecological) should be collected. He proposed to concentrate on rhinos from either end and the middle of their range, which was expressed in one of the recommendations of the workshop to endorse – as an 'interim strategy' – four conservation units within the black rhino range.

Du Toit's criticism of Groves (1967) was rather too harsh, especially as it was submitted after a period of twenty years. Groves, or any other working

taxonomist, would have wholeheartedly agreed that it would be preferable to have more data to fine-tune an existing classification. Anybody who has tried to decipher the nature of variation in the black rhino has come up to this hurdle, which is almost certainly never going to be taken, as the material of many of the (nearly-) extinct populations is extremely scarce. The twenty year period between Groves (1967) and the workshop had not produced any further studies, nor were the data collected in the 1980s (Du Toit, 1987) ever published – and if they still exist at all, they may be now gathering dust on somebody's shelf, after another delay of a quarter of a century.

The wording of the recommendations of the Cincinnati workshop was, however, very carefully chosen. The four conservation units were roughly defined and given vernacular names based on parts of the rhino's range. If I had attended that meeting, I more than likely would have agreed with the procedure, because obviously conservation action and policy cannot always wait until academics in whatever discipline have settled their differences or have come to a 'final' conclusion (which in science obviously does not exist, as we learn more about nature daily and refine our procedures). In hindsight, I might have urged for a more positive attempt to reconcile the conservation units with the subspecific taxa of Groves. Considering that some of the populations (subspecies) were no longer existing, this might have worked to some extent, but would of course have run into serious trouble in East Africa and possibly Namibia. A further study specifically for those regions should have been among the recommendations at the time, or at least the message could have been submitted to the academic community.

There has been no change in the recognition of the four conservation units of the black rhino by conservation agencies in the past quarter century between 1987 and the present. It has been generally upheld by the members of AfRSG, the conservation community and zoo professionals. However, there has been one serious shift in the use of the four units. When Cumming et al. (1990) put the units in a more formal context, they found that it was inadequate to have only vernacular names for these groups, because they had to be incorporated into national action plans, laws to regulate wildlife traffic and crime, and lists maintained by conservation agencies. They therefore called them 'ecotypes' and attached trinominal subspecific names

to them. Although it is not impossible that the term 'ecotype' had already been used for other mammals, I have never seen it defined, and suggest that it was introduced to stay clear of any taxonomic connotation. Although an ecologically based division sounds acceptable, when superimposed on a geographic grid it becomes almost immediately meaningless. I do not think that many people would agree that the arid plains of Tsavo have the same ecological structure as the wet montane forests of the Aberdares and Mt Kenya or the lacustrine bush surrounding the lakes in the Rift Valley – and all those were combined in one ecotype of the black rhino. Trinominal names, equivalent to taxonomic subspecific names, were loosely attached to the ecotypes. Obviously, when one set of names has two widely different meanings, as an ecotype on the one hand or as a subspecies on the other, the confusion is immediate and damaging. A quick search on the internet will show that during the past ten years alone, there have been at least fifty scientific papers using trinominal names of the black rhino where probably they meant to differentiate a conservation unit or ecotype rather than a subspecies. Hence, to all accounts and purposes, the conservation units have become synonymous with the subspecies. As long as we remember that this division was pragmatic and has no actual scientific basis.

There has been no change in the recognition of seven subspecies of the black rhino by taxonomists across the world. Taxonomic work on the black rhino has been limited to some small scale studies. Groves (1993) added a summary of his analysis of a larger data set via new statistical packages, with some interesting conclusions, which have remained largely unheeded. Genetic research has so far focused on regional samples and has not attempted to include comparisons with the extinct or marginal populations. In most recent taxonomic surveys, the subspecific subdivisions proposed by Groves (1967) have been upheld and used in determinations of museum specimens.

This dichotomy between taxonomic studies and conservation policies makes one feel as if taxonomists and conservationists live in two parallel universes. To enable us to fully understand the agreements and discrepancies between the various options I have combined them in a table, where for each country, or part thereof, the most likely conservation unit or subspecies is listed (Table 1). I have limited the

table to data presented in just two publications for ease of reference: Emslie and Brooks (1999) where trinomens could be substituted by the vernacular names of conservation units, and the new synthesis by Groves and Grubb (2011). The geographic range is the one found in publications by Cumming et al. (1990) and Emslie and Brooks (1999). A careful analysis of table 1 should also give insight in the new taxonomic treatment of the black rhino proposed by Groves and Grubb (2011).

It is high time that the discrepancy in the understanding of subspecific differentiation in the black rhino is resolved (Rookmaaker, 1995, 2005). It should not be allowed to continue any longer. Groves and Grubb (2011) have presented a classification of the recent rhinos, which is certainly the best achievable reflection of their diversity. It is based on sound theoretical premises, correct application of modern methodologies, accurate adherence to the rules of nomenclature, a wealth of morphometric data from the majority of available specimens, a wide-ranging knowledge of the literature and life-long interests in the biology of the rhinoceros. We must now deal with their results and cherish the great biodiversity in nature. We need to engage in a meaningful dialogue to identify the large areas of common ground as well as the few points of friction between the new classification and current conservation practice. The discussion will profitably include the other rhino species as well to allow best conservation practice. The adjustments may require difficult decisions and maybe investigations of some of the smaller details. If this results in a pragmatic combination of modern taxonomy and the challenges encountered in the field, this will allow us to proceed in the knowledge that everything is done to work towards the preservation of the remnant rhino populations across the world.

In an age when rhinos are killed in great numbers and when we are uncertain if any population, subspecies or species will get to see the next decennium, our task is enormous. Funding is ever insufficient for all the goals that need to be achieved to save individual rhinos in Africa and Asia, and even *ex-situ* in zoos, in ecologically and genetically meaningful ways. Taxonomy and nomenclature may not be the highest priority on anybody's agenda, but a good understanding of the issues is imperative to preserve adequately the little that is still left.

Table 1. A comparison of the conservation units of black rhino in Emslie & Brooks (1999) with the subspecies in Groves & Grubb (2011). Names refer to subspecies of *Diceros bicornis*. Countries are listed in a logical sequence from West to South Africa.

Country or region	Emslie & Brooks (1999)	Groves & Grubb (2011)
Senegal	Shown on map; absent ¹	
Guinea	Shown on map; absent ¹	
Sierra Leone	Shown on map; absent ¹	
Mali	Shown on map; absent ¹	
Liberia	Shown on map; absent ¹	
Ivory Coast	Shown on map; absent ¹	
Burkina Faso	Shown on map; absent ¹	
Ghana	Shown on map; absent ¹	
Togo	Shown on map; absent ¹	
Benin	Shown on map; absent ¹	
Niger	longipes	longipes
Nigeria	longipes	longipes
Cameroon	longipes	longipes
Chad	longipes	longipes
Central African Republic	no subspecies (extinct)	longipes
Sudan – West of Nile	michaeli	longipes
Sudan – East of Nile	michaeli	brucii
South Sudan – Bahr el Ghazal	michaeli	brucii
South Sudan – East of Nile	michaeli	ladoensis
Eritrea	michaeli	brucii
Ethiopia	michaeli	brucii
Somalia	michaeli	brucii
Kenya - SW border	michaeli	minor
Kenya - E Kenya (incl. Tsavo and Guaso Nyiro)	michaeli	michaeli
Kenya – Rift Valley	michaeli	ladoensis
Uganda – Northern part	michaeli	ladoensis
Uganda – Southern part	michaeli	minor
Rwanda	michaeli (introduced)	not listed
Burundi	species absent	species absent
Congo – Southern part	minor	minor
Tanzania – North central	michaeli	michaeli
Tanzania – West and South	minor	minor
Zambia	minor	minor
Malawi	minor	minor
Mozambique	minor	minor
Zimbabwe	minor	minor
Swaziland	minor	minor
Lesotho	species absent	species absent
South Africa – KwaZulu Natal	minor	minor
South Africa – East central	minor	bicornis (extinct)
South Africa – Western part	bicornis	bicornis (extinct)

Botswana – Eastern part	minor	minor
Botswana – western part	bicornis	minor
Botswana – Okavango region	bicornis	chobiensis
Namibia – extreme South	bicornis	bicornis (extinct)
Namibia – Central and North	bicornis	occidentalis
Angola	bicornis	occidentalis

¹ The distribution in western Africa was reviewed by Rookmaaker (2004).

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