



Back in 2013 a team of scientists published a paper announcing a new species of tapir to the world. The first such announcement since the mountain tapir was discovered by western science in 1865. It was termed the Kabomani Tapir (*Tapirus kabomani*).

At that point one of my very good clients and now close friend contacted me asking for me to organise a way to see it. He has a special target of photographing the world's rarest and most incredible wildlife for his website (www.christofftravel.com) and he has certain 'sets' he wants to complete such as bears, rhinos and of course tapirs. So I set to work to try and make this possible. It took around 4 years but eventually by becoming part of an expedition team with 3 scientists (a palaeontologist, a geneticist and ecologist); and funding the expedition we were able to go and look for these animals for ourselves in the location they were described from.

The species status is disputed however; at the time of our trip and up until our return from the trip we believed the disputed status to be unfair. Our opinion of the criticism was largely concerned with the lax and limited information that is often used to separate species in other areas of zoology. But since our return in late 2018 new evidence suggests the disputed status is warranted and perhaps the Kabomani tapir is not so special after all.

At the time of our expedition the information known about the Kabomani tapir and its status was as follows:

Following an accidental discovery in the skull measurements of a 'lowland' tapir, from a student and hearing the various anecdotal evidence from locals and hunters such as Theodore Roosevelt the team went to work on finding out if there is anything in this possible 4th species of tapir.

The work of the scientists involved looking at three different aspects of the species (genetics, morphology and local anecdotal evidence); I disregard the local anecdotal evidence as there is too much hearsay and not enough hard data. So I focus on the morphology and genetics; the morphological differences are slight but distinct, the major ones are the ratio of the femur to the mandible (which for all tapirs barring an extinct species is around the same length or longer; for the Kabomani (and an extinct species) the femur is significantly shorter than the mandible; the second is the position of the sagittal crest (and external mane) which in the lowland tapir is large and high and comes down to above the eyes, in the Kabomani tapir the mane is lower and starts distinctly posterior to the eyes. The interorbital space is also wider on the Kabomani than the lowland tapir. However these are subtle and in some respects (when seeing the animal in life) are tough to confirm; what is not in doubt is the genetic evidence which places the Kabomani tapir as very distinct from the lowland and the mountain tapir. In fact the mountain tapir is very much closer genetically to the lowland tapir than the Kabomani.

Even a paper published to refute the species status claim could not doubt this finding, but instead challenged that the mountain tapir was not a distinct species and that the sample size was too small and that the 'wrong' DNA was used. However the sample size at the time of publication was 7 and is larger now and the DNA used was cytochrome B which is widely accepted and used for such studies and animals are described on as few as 1 sample in some cases.

The major problem I personally have with the refuting of the species in this paper (I have links to the original description paper, the refuting claim and then a counter claim below) is two fold (1) the main author of the refuting claim is a curator of the museum that has a skull specimen shot by Theodore Roosevelt and he didn't notice these differences and has refused for the skull to be tested (2) the claim that because he doesn't want to accept the Kabomani tapir as a species means that the mountain tapir is also not a distinct species. But an ecomorph of the lowland tapir makes no sense to me.

However since these papers and our trip to Brazil a very comprehensive (the most conclusive) taxonomic study of tapirs was undertaken and there is little doubt as to the sample size and authority of the paper. This latest study suggests that the Kabomani tapir is nothing more than a 'poorly differentiated extension of the morphospace occupied by the lowland tapir'. So myself and Chris have decided to not claim the sighting a new species here (the Kabomani tapir) but if things change in the future or with more data we are pleased to have seen this subspecies, eco-morph, race, species (whatever it may or may not turn out to be) in the wild (and the differences morphologically were enough for us to be able to see the difference in the field).

But this whole exercise, since the initial 2013 paper and Chris's determination for me to make this trip happen; it has led me to question what makes a species a species, this is something I have always thought about as it seems to arbitrary but also completely necessary. Some of the questions and thoughts I have had over the last couple of years since looking into the Kabomani tapir are below:

- Why should the same genetic criteria be accepted for some species and not for others, I thought that science was meant to be indifferent to opinion and based on procedure and accepted uniform models etc. The problem with species is that it is all subjective, there are at least 3 definitions of a species I know and I am not an expert in this and it appears that all are on grounds that are subjective. As there is no clear definition of a species in nature (that is not the way nature or evolution works), it is a human-made construct.
- And so when I look at what is a species and what isn't I used to go off IUCN, their statuses was all it took for me to understand what was accepted and what wasn't. However this changed when the African forest elephant came along and genetically, morphologically, behaviourally etc they are distinct. But still (over a decade since the first announcement) the species is still not recognised by IUCN. So I started to look further into the definitions of what a species is and I came to the conclusion that for me, it is whatever makes the most logical sense based on the current data. That could change in the future and lists do contract and expand when further data is available. So I do my best to gather as much data as possible for 'dubious' species and make my own mind up. This seems to be the way many people work nowadays and with publications such as the new Phillips guide to Mammals of Borneo splitting the palm civet, which is now accepted without any other authorities officially accepting, I think this is an acceptable approach.
- So taking the Kabomani as a distinct species (which was our thoughts whilst in the field looking for them), our thoughts were; some people may disagree (as to their species status), as this is a very similar animal to the lowland tapir, they are sympatric in areas (particularly the location we were in (which has to be remain undisclosed unfortunately)) and whilst Chris and I got reasonably good as telling the two apart at a distance, they are similar. However no less similar than many species of vole, mouse-lemur or mouse (not to mention some colubrid snakes or the bird world and its little brown jobbies) that we readily accept as different species.
- My last point on this is that I do not intend to start a debate, I don't intend to even start a discussion, I don't think it will get anywhere. My opinion will not change on how I read the data and assess myself what I deem to be an acceptable species or not.
- I also do not intend to convert people to also believing. I solely wanted to place some background to my thinking and how I have come to this conclusion above and leave the 4 papers which argue this point with better science and data than I can muster here. People are free to read these papers and come to their own conclusions. I don't believe there is a right or wrong answer when it comes to species definitions anymore, it is all subjective and what makes the most sense to the individual.

Links to articles:

1. Original description paper – *Cozzoul et al 2013*
<https://academic.oup.com/jmammal/article/94/6/1331/904034>
2. Refuting paper – *Voss et al 2014*
<https://bioone.org/journals/Journal-of-Mammalogy/volume-95/issue-4/14-MAMM-A-054/Extraordinary-claims-require-extraordinary-evidence--a-comment-on-Cozzuol/10.1644/14-MAMM-A-054.full>
3. Counter claim – *Cozzoul et al 2014*
<https://academic.oup.com/jmammal/article/95/4/899/888891>
4. Latest conclusive work on tapir taxonomy to date – *Dumba et al 2018*
<https://link.springer.com/article/10.1007/s10914-018-9432-2>

So before we hooked up with the rest of the tapir team we headed to the southern Pantanal to try and see the giant armadillo and some other species for a few days. Below is a species list of what we saw on a day to day basis.

We also didn't try particularly hard for birds, reptiles or amphibians – the ones we did get were incidental.

15	Limpkin	<i>Aramus guarauna</i>
16	Great egret	<i>Ardea alba</i>
17	Cocoi heron	<i>Ardea cocoi</i>
18	White-headed marsh-tyrant	<i>Arundinicola leucocephala</i>
19	Burrowing owl	<i>Athene cunicularia</i>
20	Yellow-chevroned parakeet	<i>Brotogeris chiriri</i>
21	Great-horned owl	<i>Bubo virginianus</i>
22	Cattle egret	<i>Bubulcus ibis</i>
23	Zone-tailed hawk	<i>Buteo albonotatus</i>
24	Black-collared hawk	<i>Buteogallus nigricollis</i>
25	Striated heron	<i>Butorides striata</i>
26	Muscovy duck	<i>Cairina moschata</i>
27	Ameythyst woodstar	<i>Calliphlox amethystina</i>
28	Green-barred woodpecker	<i>Caloptes melanochloros</i>
29	Spot-tailed nightjar	<i>Caprimulgus maculicaudus</i>
30	Southern crested-caracara	<i>Caracara plancus</i>
31	Red-legged seriema	<i>Cariama cristata</i>
32	Rufous casiornis	<i>Casiornis rufus</i>
33	Turkey vulture	<i>Cathartes aura</i>
34	Greater yellow-headed vulture	<i>Cathartes melambrotus</i>
35	Lesser yellow-headed vulture	<i>Cathartes burrovianus</i>
36	Amazon kingfisher	<i>Chloroceryle amazona</i>
37	Green kingfisher	<i>Chloroceryle americana</i>
38	Least nighthawk	<i>Chordeiles pusillus</i>
39	Maguari stork	<i>Ciconia maguari</i>
40	Boat-billed heron	<i>Cochlearius cochlearius</i>
41	Campo flicker	<i>Colaptes campestris</i>
42	Feral pigeon	<i>Columba livia</i>
43	Picui ground dove	<i>Columbina picui</i>
44	Scaled dove	<i>Columbina squammata</i>
45	Ruddy ground-dove	<i>Columbina talpacoti</i>
46	Black vulture	<i>Coragyps atratus</i>
47	Bare-faced currawong	<i>Crax fasciolata</i>
48	Smooth-billed ani	<i>Crotophaga ani</i>
49	Undulated tinamou	<i>Crypturellus undulatus</i>
50	Purplish jay	<i>Cyanocorax cyanomedas</i>
51	White-faced whistling duck	<i>Dendrocygna viduata</i>
52	Black-bellied whistling duck	<i>Dendrocygna autumnalis</i>
53	Red-shouldered macaw	<i>Diopsittaca nobilis</i>

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	4	1	2										
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4	4	2					7						
	7	~65	~53			21	~10						
2	~343	~105	~135			~100		3					
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54	Black-capped donacobius	<i>Donacobius atricapilla</i>
55	Lineated woodpecker	<i>Dryocopus lineatus</i>
56	Little blue heron	<i>Egretta caerulea</i>
57	Snowy egret	<i>Egretta thula</i>
58	Wedge-tailed grassfinch	<i>Emberizoides herbicola</i>
59	Common waxbill	<i>Estrilda astrild</i>
60	Sunbittern	<i>Eurypyga helias</i>
61	Aplomado falcon	<i>Falco femoralis</i>
62	American kestrel	<i>Falco sparverius</i>
63	Pale-legged hornero	<i>Furnarius leucopous</i>
64	Rufous hornero	<i>Furnarius rufus</i>
65	Chopi blackbird	<i>Gnorimopsar chopi</i>
66	Guira cuckoo	<i>Guira guira</i>
67	Savanna hawk	<i>Heterospizias meridonalis</i>
68	Black-winged stilt	<i>Himantopus himantopus</i>
69	Barn swallow	<i>Hirundo rustica</i>
70	Scissor-tailed nightjar	<i>Hydropsalis torquata</i>
71	Plumbeous kite	<i>Ictinia plumbea</i>
72	Jabiru	<i>Jabiru mycteria</i>
73	Wattled jacana	<i>Jacana jacana</i>
74	Narrow-billed woodcrepper	<i>Lepidocolaptes angustirostris</i>
75	White-tipped dove	<i>Leptotila verreauxi</i>
76	Ringed kingfisher	<i>Megaceryle torquata</i>
77	White woodpecker	<i>Melanerpes candidus</i>
78	Green ibis	<i>Mesembrinibis cayennensis</i>
79	Yellow-headed caracara	<i>Milvago chimachima</i>
80	Chalk-browed mockingbird	<i>Mimus saturninus</i>
81	Shiny cowbird	<i>Molothrus bonariensis</i>
82	Giant cowbird	<i>Molothrus oryzivorus</i>
83	Wood stork	<i>Mycteria americana</i>
84	Streaked flycatcher	<i>Myiodynastes maculatus</i>
85	Great potoo	<i>Nyctibius grandis</i>
86	Common potoo	<i>Nyctibius griseus</i>
87	Black-crowned night-heron	<i>Nycticorax nycticorax</i>
88	Common pauraque	<i>Nyctidormus albicollis</i>
89	Chaco chachalaca	<i>Ortalis canicollis</i>
90	Yellow-billed cardinal	<i>Paroaria capitata</i>
91	Pale-vented dove	<i>Patagioenas cayennensis</i>
92	Picazuro pigeon	<i>Patagioenas picaxuro</i>

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93	Neotropical cormorant	<i>Phalacrocorax brasilianus</i>
94	Lesser kiskadee	<i>Philohydor lictor</i>
95	Bare-faced ibis	<i>Phimosus infiscatus</i>
96	Squirrel cuckoo	<i>Piaya cayana</i>
97	Capped heron	<i>Pilherodius pileatus</i>
98	Great kiskadee	<i>Pitangus sulphuratus</i>
99	Roseate spoonbill	<i>Platalea ajaja</i>
100	Nacunda nighthawk	<i>Podager nacunda</i>
101	Golden-collared macaw	<i>Primolius auricollis</i>
102	Grey-breasted martin	<i>Progne chalybea</i>
103	Brown-chested martin	<i>Progne tapera</i>
104	Crested oropendula	<i>Psarocolius decumanus</i>
105	White-eyed parakeet	<i>Psittacara leucophthalma</i>
106	Chestnut-eared aracari	<i>Pteroglossus castanotis</i>
107	Vermillion flycatcher	<i>Pyrocephalus rubinus</i>
108	Silver-beaked tanager	<i>Ramphocelus carbo</i>
109	Toco toucan	<i>Ramphastos toco</i>
110	Greater rhea	<i>Rhea americana</i>
111	Red-winged tinamou	<i>Rhynchotus rufescens</i>
112	Snail kite	<i>Rostrhamus sociabilis</i>
113	Roadside hawk	<i>Rupornis magnirostris</i>
114	Greyish saltator	<i>Saltator coerulescens</i>
115	American comb duck	<i>Sarkidiornis sylvicola</i>
116	Little nightjar	<i>Setopagis parvula</i>
117	Double-collared seedeater	<i>Sporophila caerulescens</i>
118	Rufous-rumped seedeater	<i>Sporophila hypochroma</i>
119	Tawny-bellied seedeater	<i>Sporophila hypoxantha</i>
120	White-bellied seedeater	<i>Sporophila leucoptera</i>
121	Crowned eagle	<i>Stephanoaetus coronatus</i>
122	Whistling heron	<i>Syrigma sibilatrix</i>
123	Least grebe	<i>Tachybaptus dominicus</i>
124	White-winged swallow	<i>Tachycineta albiventer</i>
125	Plumbeous ibis	<i>Theristicus caerulescens</i>
126	Buff-necked ibis	<i>Theristicus caudatus</i>
127	Blue-crowned parakeet	<i>Thectocercus acuticaudatus</i>
128	Palm tanager	<i>Thraupis palmarum</i>
129	Rufescent-tiger heron	<i>Tigrisoma lineatus</i>
130	Masked tityra	<i>Tityra semifasciata</i>
131	Common tody-flycatcher	<i>Todirostrum cinereum</i>

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								3					

132	Solitary sandpiper	<i>Tringa solitaria</i>
133	Rufous-bellied thrush	<i>Turdus rufiventris</i>
134	Tropical kingbird	<i>Tyrannus melancholicus</i>
135	Fork-tailed flycatcher	<i>Tyrannus savanna</i>
136	Long-tailed ground-dove	<i>Uropelia campestris</i>
137	Pied lapwing	<i>Vanellus cayanus</i>
138	Southern lapwing	<i>Vanellus chilensis</i>
139	Blue-black grassquit	<i>Volatinia jacarina</i>
140	Grey monjita	<i>Xolmis cinereus</i>
141	White-rumped monjita	<i>Xolmis velatus</i>

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							2	1	3		
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Reptiles (* = heard or signs only)

	Common Name	Binominal Name
1	Yacre caiman	<i>Caiman yacare</i>
2	Red-footed tortoise	<i>Chelonoidis carbonaria</i>
3	Mussurana	<i>Clelia clelia</i>
4	Green iguana	<i>Iguana iguana</i>
5		<i>Phyllopsezus polycaris</i>
6	Guarani spiny lizard	<i>Tropidurus guarani</i>
7	Golden tegu	<i>Tupinambis teguixin</i>

September											
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Amphibians (* = heard or signs only)

	Common Name	Binominal Name
1	Cane toad	<i>Bufo marinus</i>
2		<i>Dendropsophus nanus</i>
3		<i>Leptodactylus elenae</i>
4		<i>Leptodactylus fuscus</i>
5		<i>Rhinella bergi</i>
6		<i>Scinax fuscomarginatus</i>

September											
16	17	18	19	20	21	22	23	24	25	26	27
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7		<i>Scinax fuscovarius</i>
8	Lesser-snouted tree frog	<i>Scinax nasicus</i>

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						4		1	4		

Fishes (* = heard or signs only)

	Common Name	Binominal Name
1	Red-bellied piranha	<i>Pygocentrus nattereri</i>

September											
16	17	18	19	20	21	22	23	24	25	26	27
					~40						