

Figure S1. Phylogeny constructed from mitochondrial three gene concatenated partitioned Maximum Likelihood analysis. Branches display bootstrap support values (note some branch tip values were omitted). Refer to Table S1 for details on tip labels.

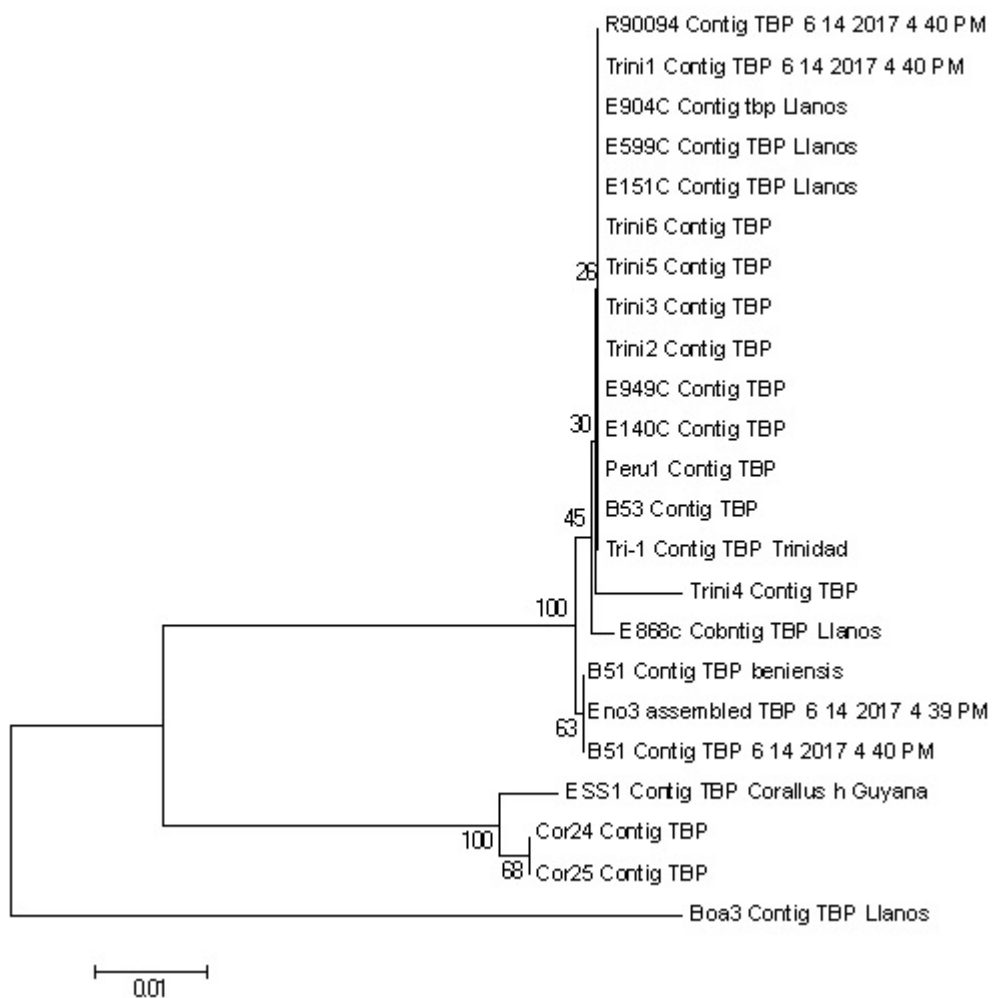


Figure S2. Maximum likelihood tree with TBP showing lack of resolution between the *E. murinus* samples and only a small difference between *E. murinus* and *E. notaeus*.

Table S1: Genetic samples analyzed in this study

ID	Species	Country	Cytb Accession # (X = no sequence)	ND2 Accession # (X=no sequence)	ND4 Accession # (X=no sequence)	Publication	Museum Specimen Voucher ID, Paratype, Lectotype
850041	<i>Eunectes murinus</i>	Peru	PP273560	PP334792	PP334848	Rivas et al. 2024 this paper	
AM236347	<i>Eunectes notaeus</i>	unknown	AM236347	AM236347	AM236347	Douglas et al., 2006	
B48	<i>Eunectes beniensis</i>	Bolivia	PP273561	PP334793	PP334849	Rivas et al. 2024 this paper	
B50	<i>Eunectes beniensis</i>	Bolivia	X	PP334794	PP334850	Rivas et al. 2024 this paper	
B51	<i>Eunectes beniensis</i>	Bolivia	PP273562	PP334795	PP334851	Rivas et al. 2024 this paper	
B52	<i>Eunectes beniensis</i>	Bolivia	PP273563	PP334796	PP334852	Rivas et al. 2024 this paper	
B53	<i>Eunectes murinus</i>	Bolivia	PP273564	PP334797	PP334853	Rivas et al. 2024 this paper	
B54	<i>Eunectes deschauenseei</i>	Bolivia	PP273565	PP334798	PP334854	Rivas et al. 2024 this paper	
B56	<i>Eunectes beniensis</i>	Bolivia	PP273566	PP334799	PP334855	Rivas et al. 2024 this paper	
B57	<i>Eunectes beniensis</i>	Bolivia	PP273567	PP334800	PP334856	Rivas et al. 2024 this paper	
B58	<i>Eunectes beniensis</i>	Bolivia	PP273568	PP334801	PP334857	Rivas et al. 2024 this paper	
B59	<i>Eunectes murinus</i>	Bolivia	PP273569	PP334802	PP334858	Rivas et al. 2024 this paper	
Bcor	<i>Corallus hortulanus</i>	Bolivia	PP273570	PP334803	PP334859	Rivas et al. 2024 this paper	
Boa3	<i>Boa constrictor</i>	Venezuela	PP273571	X	PP334860	Rivas et al. 2024 this paper	
BrMS01	<i>Eunectes murinus</i>	Brazil, Mato Grosso do Sul	PP273572	PP334804	PP334861	Rivas et al. 2024 this paper	
BrMS02	<i>Eunectes murinus</i>	Brazil, Mato Grosso do Sul	PP273573	PP334805	PP334862	Rivas et al. 2024 this paper	
BrMS03	<i>Eunectes murinus</i>	Brazil, Mato Grosso do Sul	X	PP334806	PP334863	Rivas et al. 2024 this paper	
BrMS04	<i>Eunectes murinus</i>	Brazil, Mato Grosso do Sul	PP273574	PP334807	PP334864	Rivas et al. 2024 this paper	
BrMS05	<i>Eunectes murinus</i>	Brazil, Mato Grosso do Sul	PP273575	PP334808	PP334865	Rivas et al. 2024 this paper	
BrMS06	<i>Eunectes murinus</i>	Brazil, Mato Grosso do Sul	PP273576	PP334809	PP334866	Rivas et al. 2024 this paper	
BrMTA6	<i>Eunectes murinus</i>	Brazil, Mato Grosso	PP273577	X	PP334867	Rivas et al. 2024 this paper	
BrMTC9	<i>Eunectes murinus</i>	Brazil, Mato Grosso	PP273578	PP334810	PP334868	Rivas et al. 2024 this paper	
BrMTI4	<i>Eunectes murinus</i>	Brazil, Mato Grosso	PP273579	PP334811	PP334869	Rivas et al. 2024 this paper	
BrMTI9	<i>Eunectes murinus</i>	Brazil, Mato Grosso	PP273580	PP334812	PP334870	Rivas et al. 2024 this paper	
BrPA1	<i>Eunectes murinus</i>	Brazil, Para	PP273581	PP334813	PP334871	Rivas et al. 2024 this paper	
BrPA2	<i>Eunectes murinus</i>	Brazil, Para	PP273582	PP334814	PP334872	Rivas et al. 2024 this paper	
BrPA3	<i>Eunectes murinus</i>	Brazil, Para	PP273583	PP334815	PP334873	Rivas et al. 2024 this paper	
BrPA4	<i>Eunectes murinus</i>	Brazil, Para	PP273584	PP334816	X	Rivas et al. 2024 this paper	
BrPA5	<i>Eunectes murinus</i>	Brazil, Para	PP273585	PP334817	PP334874	Rivas et al. 2024 this paper	
BrPA6	<i>Eunectes murinus</i>	Brazil, Para	PP273586	PP334818	PP334875	Rivas et al. 2024 this paper	MPEG:27428, <i>E. murinus</i> lectotype
BrPA7	<i>Eunectes murinus</i>	Brazil, Para	PP273587	PP334819	PP334876	Rivas et al. 2024 this paper	
Cor23	<i>Corallus ruschenbergerii</i>	Venezuela	PP273588	PP334820	PP334877	Rivas et al. 2024 this paper	
E688C	<i>Eunectes akayima</i>	Venezuela	PP273589	PP334821	PP334878	Rivas et al. 2024 this paper	
E698C	<i>Eunectes akayima</i>	Venezuela	PP273590	PP334822	PP334879	Rivas et al. 2024 this paper	
E756C	<i>Eunectes akayima</i>	Venezuela	PP273591	PP334823	PP334880	Rivas et al. 2024 this paper	
E864C	<i>Eunectes akayima</i>	Venezuela	PP273592	PP334824	PP334881	Rivas et al. 2024 this paper	
E866C	<i>Eunectes akayima</i>	Venezuela	PP273593	PP334825	PP334882	Rivas et al. 2024 this paper	
E867C	<i>Eunectes akayima</i>	Venezuela	PP273594	PP334826	PP334883	Rivas et al. 2024 this paper	
E949C	<i>Eunectes akayima</i>	Venezuela	PP273595	PP334827	PP334884	Rivas et al. 2024 this paper	
E952C	<i>Eunectes akayima</i>	Venezuela	PP273596	PP334828	PP334885	Rivas et al. 2024 this paper	
E955C	<i>Eunectes akayima</i>	Venezuela	PP273597	PP334829	PP334886	Rivas et al. 2024 this paper	

Ed1	<i>Eunectes deschau-enseei</i>	French Guiana	PP273598	PP334830	PP334887	Rivas et al. 2024 this paper	MHNT:QM325
EmPe01	<i>Eunectes murinus</i>	Peru	PP273599	PP334831	X	Rivas et al. 2024 this paper	
EmPe03	<i>Eunectes murinus</i>	Peru	PP273600	PP334832	PP334888	Rivas et al. 2024 this paper	
EmPe05	<i>Eunectes murinus</i>	Peru	PP273601	PP334833	PP334889	Rivas et al. 2024 this paper	
Eno4	<i>Eunectes notaeus</i>	Unknown	PP273602	X	X	Rivas et al. 2024 this paper	
Eno6	<i>Eunectes notaeus</i>	Unknown	PP273603	X	X	Rivas et al. 2024 this paper	
Eno7	<i>Eunectes notaeus</i>	Unknown	PP273604	X	X	Rivas et al. 2024 this paper	
Eno8	<i>Eunectes notaeus</i>	Unknown	PP273605	X	X	Rivas et al. 2024 this paper	
ENU69810	<i>Eunectes notaeus</i>	unknown	U69810	X	X	Campbell 1997 Dissertation Queens Univ	
Epi1	<i>Epicrates cenchria</i>	Venezuela	PP273606	X	PP334890	Rivas et al. 2024 this paper	
FG1	<i>Eunectes murinus</i>	French Guiana	PP273607	PP334834	PP334891	Rivas et al. 2024 this paper	MHNT:QM328
FG2	<i>Eunectes akayima</i>	French Guiana	PP273608	PP334835	PP334892	Rivas et al. 2024 this paper	MHNT:AF1590
FG3	<i>Eunectes murinus</i>	French Guiana	PP273609	PP334836	PP334893	Rivas et al. 2024 this paper	MHNT:AF1584
OK065103	<i>Eunectes beniensis</i>	unknown	OK065103	X	X	Tarkhnishvili et al. 2022	
OK065104	<i>Eunectes deschau-enseei</i>	unknown	OK065104	X	X	Tarkhnishvili et al. 2022	
OK065105	<i>Eunectes notaeus</i>	unknown	OK065105	X	X	Tarkhnishvili et al. 2022	
OK065107	<i>Eunectes deschau-enseei</i>	unknown	OK065107	X	X	Tarkhnishvili et al. 2022	
R80009	<i>Eunectes akayima</i>	Guyana	PP273610	PP334837	PP334894	Rivas et al. 2024 this paper	
R90094	<i>Eunectes akayima</i>	Guyana	PP273611	PP334838	PP334895	Rivas et al. 2024 this paper	
RGRNot1	<i>Eunectes notaeus</i>	unknown	KC329953	X	KC329978	Reynolds et al. 2013 Mol Phy Evo	
Rv075	<i>Eunectes akayima</i>	Guyana	PP273612	PP334839	PP334896	Rivas et al. 2024 this paper	
S20768	<i>Eunectes akayima</i>	Suriname	PP273613	PP334840	PP334897	Rivas et al. 2024 this paper	RMNH.RENA.20768 , <i>E. akayima</i> paratype
S20769	<i>Eunectes akayima</i>	Suriname	PP273614	PP334841	PP334898	Rivas et al. 2024 this paper	RMNH.RENA.29769
TRI1	<i>Eunectes akayima</i>	Trinidad	PP273615	PP334842	PP334899	Rivas et al. 2024 this paper	
Trini1	<i>Eunectes akayima</i>	Trinidad	PP273616	PP334843	PP334900	Rivas et al. 2024 this paper	
Trini2	<i>Eunectes akayima</i>	Trinidad	PP273617	PP334844	PP334901	Rivas et al. 2024 this paper	
Trini5	<i>Eunectes akayima</i>	Trinidad	PP273618	PP334845	PP334902	Rivas et al. 2024 this paper	
Trini6	<i>Eunectes akayima</i>	Trinidad	PP273619	PP334846	PP334903	Rivas et al. 2024 this paper	
ZC2124	<i>Eunectes akayima</i>	Ecuador	PP273620	X	PP334904	Rivas et al. 2024 this paper	
ZC2125	<i>Eunectes akayima</i>	Ecuador	PP273621	PP334847	PP334905	Rivas et al. 2024 this paper	

Table S2: Mean pairwise genetic distances between and within known and candidate species of the *Eunectes* species complex. *E. notaeus* of individual genes .

CytB	<i>E. murinus</i>	<i>E. akayima</i>	<i>E. notaeus1</i>	<i>E. beniensis</i>	<i>E. deschauenseei</i>
<i>E. murinus</i>					
<i>E. akayima</i>	5.24%				
<i>E. notaeus1</i>	11.40%	10.76%			
<i>E. beniensis</i>	11.80%	11.84%	2.54%		
<i>E. deschauenseei</i>	10.99%	10.66%	0.71%	2.56%	
<i>E. notaeus 2</i>	10.92%	10.30%	0.75%	2.38%	0.81%
ND2	<i>E. akayima</i>	<i>E. murinus</i>	<i>E. notaeus 1</i>	<i>E. beniensis</i>	
<i>E. akayima</i>					
<i>E. murinus</i>	5.27%				
<i>E. notaeus 1</i>	10.45%	10.38%			
<i>E. beniensis</i>	10.39%	10.29%	1.24%		
<i>E. deschauenseei</i>	10.53%	10.25%	0.50%	1.60%	
ND4	<i>E. akayima</i>	<i>E. murinus</i>	<i>E. notaeus 1</i>	<i>E. beniensis</i>	
<i>E. akayima</i>					
<i>E. murinus</i>	5.19%				
<i>E. notaeus 1</i>	11.38%	10.76%			
<i>E. beniensis</i>	11.63%	10.77%	1.26%		
<i>E. deschauenseei</i>	11.04%	10.35%	0.70%	0.76%	

Table S3. Paratypes designated in this study

Voucher Number	Collection	Collector	Location	Date	Species	
MCNG 1042	UNELLEZ Museo de Ciencias Naturales	Jesús Rivas	Hato El Cedral, Los Llanos, Venezuela	1994	<i>E. akayima</i>	Holotype
MBUCV 7189	Museo de Biología, Universidad Central de Venezuela	A. Marcano	Rio Cabrutica	09/2006	<i>E. akayima</i>	Paratype
RMNHE.RENA.20768	Netherlands	M.S. Hoogmoed & J.J.P. Paats	Suriname, Nickerie, Weg Amotopo, Kabalebo-rivier, Devis val.	1980	<i>E. akayima</i>	Paratype
MPEG 27428	Museo Emilio Goldi	Emil Hernandez	Brasil, Pará, Altamira, Sítio Andirobal de propriedade de dona Francisca. Igarapé que passa pelo sítio. Lat =-39°16'' Long= -52°14'11''	10/2011	<i>E. murinus</i>	Lectotype