Supplementary information for "*Paxilloboletus* gen. nov., a new lamellate bolete genus from tropical Africa"

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Fig. S1 ML tree of Boletineae based on LSU, *TEF*1−α, *RPB*1, and *RPB*2. Bootstrap support values >50 are shown near nodes. Names of lamellate taxa are red, and new sequences for this study are bold. Naming and coloring of subfamily-level clades within *Boletaceae* follow Wu et al. (2014).

Table S1 Additional reference sequences added to base four-gene alignment.
Table S2 Reference sequences for two-gene alignment.

Aureoboletus gentilis Pug1
Aureoboletus gentilis MG 372a
Aureoboletus sp. HKAS 53458
Aureoboletus duplicatoporus HKAS 50498
Aureoboletus moravicus Xle1
Aureoboletus moravicus MG 374a
Aureoboletus roxanae DS 626−07
Aureoboletus sp. HKAS 57581
Aureoboletus thibetanus HKAS 76655
Aureoboletus longicollis HKAS 53398
Aureoboletus shichianus HKAS 76852
Aureoboletus innixus MB 03−104
Aureoboletus projectellus AFTOL−ID 713
Aureoboletus mirabilis HKAS 57776
Aureoboletus russellii BD 391
Aureoboletus sp. HKAS 56317
Aureoboletus abruptibulbus 4588
Hemileccinum subglabripes 72206
Hemileccinum impolitum Bim1
Boletaceae sp. HKAS 75054
Boletaceae sp. HKAS 53421
Boletaceae sp. HKAS 67896
Corneroboletus indecorus HKAS 63126
Heimioporus aff. japonicus HKAS 52236
Heimioporus retisporus HKAS 52237
Heimioporus sp. HKAS 53451
Xerocomus morrisii 8206
Boletellus aff. emodensis HKAS 52678
Boletellus sp. HKAS 59536
Boletellus dissiliens REH 9435
Boletellus ananas Henkel 8819
Boletellus aff. ananas NY 815459
Boletellus sp. HKAS 58713
Boletellus sp. HKAS 74783
Boletellus sp. HKAS 53375
Boletellus chrysenteroides 3838
Boletellus sp. HKAS 74888
Boletellus sp. HKAS 53376
Xerocomoideae
Xerocomus magniporus HKAS 58000
Xerocomus perplexus MB 00−005
Xerocomus tenax REH 6871
Xerocomus sp. HKAS 52575
Xerocomus sp. HKAS 53387
Xerocomus sp. HKAS 76853
Xerocomus fulvipes HKAS 76666
Xerocomus aff. subtomentosus HKAS 58865
Xerocomus subtomentosus Xs1
Xerocomus sp. HKAS 74927
Xerocomus sp. HKAS 75076
Phylloporus luxiensis HKAS 75077
Phylloporus imbricatus HKAS 68642
Phylloporus sp. HKAS 63001
Phylloporus pelletieri Pp1
Phylloporus sp. HKAS 53422
Phylloporus rubrosquamosus HKAS 52552
Hourangia cheoi HKAS 74744
Hourangia cheoi HKAS 52269
Hourangia nigropunctata HKAS 76657
Hourangia sp. HKAS 53378
Hourangia sp. HKAS 68178
Leccinellum corsicum Buf 4507
Leccinellum sp. HKAS 57592
Leccinellum sp. HKAS 76658
Leccinellum sp. HKAS 53427
Leccinum sp. Muroi 361
Turmalinea chrysocarpa HKAS 70601
Rossbeevera vittatispora OSC 61484
Leccinellum crocipodium 930809/1
Octaviania tasmanica OSC 132097
Octaviania japonimontana KPM−NC 17812
Leccinum albellum MB 06−040
Leccinum variicolor HKAS 57758
Leccinum scabrum Ls1
Leccinum aff. scabrum HKAS 57266
Leccinum monticola HKAS 76669
Leccinum aurantiacum HKAS 63502
Leccinum sp. HKAS 52538
Spongiforma thailandica DED 7873
Borofutus dhakanus HKAS 73789
Tylocinum griseolum HKAS 50281
Leccinoideae
Retiboletus brunneolus HKAS 52680
Durianella echinulata AWW 240
Retiboletus griseus 202/97
Retiboletus zhangfeii HKAS 59699
Retiboletus griseus HKAS 63590
Retiboletus aff. ornatipes HKAS 63548
Castellanea pakaraimophila Henkel 9514
Strobilomyces parvirimosus HKAS 74911
Strobilomyces montosus HKAS 74809
Strobilomyces strobilaceus MB 03−102
Strobilomyces echinocephalus HKAS 59420
Strobilomyces latirimosus HKAS 53348
Strobilomyces latirimosus HKAS 74865
Strobilomyces sp. HKAS 59435
Strobilomyces aff. seminudus HKAS 59461
Strobilomyces verruculosus HKAS 55389
Strobilomyces sp. REH 8514
Indoporus shoreae AP 6697
Afroboletus luteolus 00−436
Imleria pallida 179/97
Porphyrellus holophaeus HKAS 50508
Porphyrellus holophaeus HKAS 74894
Porphyrellus nigropurpureus HKAS 74938
Porphyrellus sp. HKAS 75078
Porphyrellus sp. HKAS 53366
Porphyrellus porphyrosporus MB 97−023
Porphyrellus porphyrosporus HKAS 76671
Afrocastellanoa ivoryana Arora 126
Tylopilus cyanogranulifer REH 9508
Guyanaporus albipodus Henkel 8848
Xanthoconium affine var. maculosum BD 217
Xanthoconium stramineum 3518
Xanthoconium purpureum BD 228
Tengioboletus reticulatus HKAS 53426
Tengioboletus sp. HKAS 76661
Tengioboletus glutinosus HKAS 53425
Imleria badia HKAS 74714
Imleria badia Xb2
Imleria badia MB 03−098a
Imleria obscurebrunnea HKAS 52557
Imleria subalpina HKAS 74712
Tylopilus ferrugineus MB 06−053
Tylopilus badiceps 78206
Tylopilus vinaceipallidus HKAS 50210
Tylopilus sp. HKAS 74925
Tylopilus felleus HKAS 54926
Tylopilus atripurpureus HKAS 50208
Tylopilus plumbeoviolaceus MB 06−056
Tylopilus microsporus HKAS 59661
Tylopilus otsuensis HKAS 53401
Tylopilus cf. balloui HKAS 59700
Tylopilus alpinus HKAS 55438
Tylopilus brunneirubens HKAS 53388
Jimtrappea guyanensis Henkel 9163
Boletus aereus REH 8721
Boletus subalpinus 27882
Boletus reticuloceps HKAS 57671
Boletus edulis HMJAU 4637
Boletus variipes var. fagicola A.H. Smith 4249
Boletus sp. HKAS 52235
Boletus edulis Be3
Boletus violaceofuscus HKAS 62900
Boletus separans DPL 2704
Boletus violaceofuscus HKAS 50325
Boletus semigastroideus PBM 3076
Boletus sp. HKAS 62903
Paxilloboletus africanus gen. et. sp. nov. SAB 0716 TYPE
Paxilloboletus africanus gen. et. sp. nov. SAB 0715
Paxilloboletus africanus gen. et. sp. nov. ADK 5006
Paxilloboletus latisporus gen. et. sp. nov. ADK 5072 TYPE
Hortiboletus subpaludosus HKAS 59608
Hortiboletus sp. HKAS 50466
Hortiboletus sp. HKAS 51239
Hortiboletus cf. rubellus MB 03−033
Hortiboletus sp. HKAS 51292
Hortiboletus sp. HKAS 76673
Xerocomellus chrysenteron Xch1
Xerocomellus atropurpureus REH 8724
Xerocomellus communis HKAS 50467
Xerocomellus cisalpinus AT 2005034
Xerocomellus cisalpinus PDD 94421
Xerocomellus chrysenteron HKAS 56494
Heliogaster columellifer KPM−NC 23012
Nigroboletus roseonigrescens ZT 13553
Xerocomellus sp. HKAS 56311
Boletoideae
Parvixerocomus aff. aokii HKAS 52633
Parvixerocomus aokii HKAS 59812
Harrya chromapes HKAS 50527
Harrya chromapes ND 4
Harrya atriceps REH 7403
Chiua viridula HKAS 74928
Chiua virens HKAS 76678
Hymenoboletus luteopurpureus HKAS 46334
Royoungia boletoides Trappe 27456
Royoungia boletoides AWC 4137
Royoungia boletoides REH 8774
Royoungia palumana REH 6791
Royoungia rubina HKAS 53379
Zangioideae
Zangia erythrocephala HKAS 75046
Zangia roseola HKAS 51137
Zangia olivacea HKAS 45445
Zangia citrina HKAS 52684
Zangia olivaceobrunnea HKAS 52275
Phylloporopsis boletinoides Farid 617
Phylloporopsis boletinoides CORT 010991
Bothia castanella MB 03−053
Solioccasus polychromus REH 9417
Austroboletus aff. fusisporus HKAS 53461
Austroboletus aff. fusisporus HKAS 52683
Austroboletus fusisporus HKAS 75207
Austroboletus aff. mutabilis HKAS 53450
Austroboletus sp. HKAS 59624
Austroboletus olivaceoglutinosus HKAS 57756
Boletaceae sp. HKAS 50229
Mucilopilus castaneiceps HKAS 75045
Veloporphyrellus gracilioides HKAS 53590
Austroboletus gracilis 112/96
Austroboletoideae
Veloporphyrellus alpinus HKAS 57490
Fistulinella prunicolor REH 9502
Mackintoshia persica Trappe 28216
Boletaceae sp. HKAS 53367
Caloboletus panniformis HKAS 55444
Caloboletus inedulis MB 06−044
Caloboletus aff. calopus HKAS 74739
Caloboletus calopus Bc1
Caloboletus sp. HKAS 53353
Caloboletus firmus MB 06−060
Caloboletus yunnanensis HKAS 74864
Rubroboletus sinicus HKAS 68620
Rubroboletus rhodosanguineus 4252
Rubroboletus dupainii JAM 0607
Rubroboletus sp. HKAS 68679
Crocinoboletus rufoaureus HKAS 59820
Crocinoboletus rufoaureus HKAS 53424
Crocinoboletus laetissimus HKAS 59701
Pulveroboletus sp. HKAS 74933
Pulveroboletus aff. ravenelii HKAS 53351
Pulveroboletus sp. HKAS 57665
Pulveroboletus sp. HKAS 58860
Xerocomus aff. mcrobbii HKAS 56280
Suillellus amygdalinus 112605ba
Suillellus subamygdalinus HKAS 57262
Neoboletus tomentulosus HKAS 53369
Neoboletus hainanensis HKAS 59469
Neoboletus multipunctatus HKAS 76851
Neoboletus brunneissimus HKAS 52660
Neoboletus sanguineoides HKAS 55440
Neoboletus rubriporus HKAS 57512
Neoboletus luridiformis AT 2001087
Neoboletus thibetanus HKAS 57093
Neoboletus sp. HKAS 76660
Neoboletus sp. HKAS 50351
Neoboletus venenatus HKAS 57489
Neoboletus magnificus HKAS 74939
Neoboletus magnificus HKAS 54096
Neoboletus sp. HKAS 68587
Sutorius eximius REH 9400
Sutorius aff. eximius HKAS 56291
Sutorius aff. eximius HKAS 52672
Sutorius australiensis REH 9280
Boletus sp. HKAS 59660
Boletus sp. HKAS 63598
Butyriboletus peckii 3959
Butyriboletus pulchriceps DS 4514
Butyriboletus appendiculatus Bap1
Butyriboletus sp. HKAS 63528
Butyriboletus regius 11265
Butyriboletus roseoflavus HKAS 54099
Butyriboletus yicibus HKAS 55413
Butyriboletus roseopurpureus MB 06−059
Boletus aff. speciosus HKAS 59467
Butyriboletus frostii NY 815462
Frostiella russellii BDCR 0418
Butyriboletus sp. HKAS 52661
Butyriboletus sp. HKAS 52525
Butyriboletus sp. HKAS 59814
Butyriboletus sp. HKAS 57774
Erythrophylloporus paucicarpus OR 1151
Erythrophylloporus suthepensis SV 0236
Erythrophylloporus cinnabarinus GDGM 70536
Erythrophylloporus aurantiacus REH 7271
Erythrophylloporus fagicola Garay 215
Erythrophylloporus flammans LE 312491
Rugiboletus brunneiporus HKAS 68586
Rugiboletus aff. extremiorientalis HKAS 56359
Rugiboletus extremiorientalis HKAS 63635
Rugiboletus sp. HKAS 55373
Pulveroboletus group
Cyanoboletus pulverulentus MG 628a
Cyanoboletus pulverulentus MG 456a
Cyanoboletus pulverulentus MG 126a
Cyanoboletus pulverulentus 9606
Cyanoboletus sp. HKAS 52639
Cyanoboletus sinopulverulentus HKAS 59609
Cyanoboletus sp. HKAS 63504
Cyanoboletus sp. HKAS 76850
Cyanoboletus instabilis HKAS 59554
Phylloboletellus chloephorus XAL 3388
Cupreoboletus poikilochromus TO HG 10091987
Cupreoboletus poikilochromus MG 367a
Cupreoboletus poikilochromus MG 271a
Cupreoboletus poikilochromus GS 11008
Cupreoboletus poikilochromus GS 10070
Cupreoboletus poikilochromus AQUI 7195
Boletaceae sp. HKAS 52601
Boletaceae sp. HKAS 50292
Lanmaoa carminipes MB 06−061
Lanmaoa asiatica HKAS 54094
Lanmaoa pseudosensibilis DS 615−07
Lanmaoa borealis 2858
Lanmaoa angustispora HKAS 74765
Lanmaoa flavorubra NY 775777
Lanmaoa sp. HKAS 52518
Baorangia pseudocalopus HKAS 75081
Baorangia pseudocalopus HKAS 63607
Baorangia rufomaculata 4414
Baorangia bicolor MB 07−001
Gymnogaster boletoides REH 9455
Pseudoboletus parasiticus Xpa1
Chalciporus aff. piperatus HKAS 50214
Chalciporus piperatus MB 04−001
Chalciporus sp. HKAS 74779
Chalciporus amarellus DS 4640−3
Chalciporus sp. HKAS 53400
Buchwaldoboletus lignicola HKAS 76674
Buchwaldoboletus lignicola Pul1
Boletaceae
Chalciporoideae
Boletineae
Gyrodon sp. HKAS 57588
Gyrodon lividus REG Gl1
Gyrodon sp. HKAS 59448
Paxillus obscurisporus Po1
Paxillus vernalis MB 062
Paxillus filamentosus Pf1
Paragyrodon sphaerosporus MB 06−066
Paxillaceae
Phlebopus portentosus Php1
Phlebopus portentosus HKAS 52855
Boletinellus merulioides AFTOL−ID 575
Boletinellaceae
Gyroporus sp. HKAS 52520
Gyroporus sp. HKAS 63505
Gyroporus castaneus HKAS 76672
Scleroderma sp. HKAS 50286
Sclerodermataceae
Suillus aff. granulatus HKAS 57622
Suillus aff. luteus HKAS 57748
Suillineae

Table. S1 Additional reference sequences added to base four-gene alignment.

Species	Voucher	Location	LSU	*RPB*1	*RPB*2	*TEF*1−α	reference
Afrocastellanoa ivoryana	Arora 126	Zimbabwe	KX685721	–	–	KX685715	Orihara & Smith, 2017
Castellanea pakaraimophila	Henkel 9514	Guyana	KC155381	–	–	–	Smith et al. 2015
Durianella echinulata	AWW240	Malaysia	EU293062	–	–	–	Desjardin et al. 2008
Erythrophylloporus aurantiacus	REH7271	Costa Rica	–	–	MH614761	MH614715	Vadthanarat et al. 2019
Erythrophylloporus cinnabarinus	GDGM 70536	China	MH374045	MH374031	MH374035	MH378802	Zhang & Li 2018
Erythrophylloporus fagicola	Garay215	Mexico	–	–	MH614762	MH614716	Vadthanarat et al. 2019
Erythrophylloporus flammans	LE312491	Vietnam	–	–	–	MT293596	Haelewaters et al. 2020
Erythrophylloporus paucicarpus	OR1151	Thailand	–	–	MH614765	MH614719	Vadthanarat et al. 2019
Erythrophylloporus suthepensis	SV0236	Thailand	–	–	MH614767	MH614721	Vadthanarat et al. 2019
Guyanaporus albipodus	Henkel 8848	Guyana	LC043081	LC043082	LC043083	–	Henkel et al. 2016
Heliogaster columellifer	KPM-NC 23012	Japan	KX685724	–	–	KX685718	Orihara et al. 2010
Indoporus shoreae	AP 6697	India	MK123976	–	MK243368	–	Parihar et al. 2018
Jimtrappea guyanensis	Henkel 9163	Guyana	LC053660	LC053661	–	–	Smith et al. 2015
Mackintoshia persica	Trappe28216	Zimbabwe	KC905034	–	–	–	Smith et al. 2015
Nigroboletus roseonigrescens	ZT 13553	China	KT220589	KT220592	KT220594	KT220596	Gelardi et al. 2015
Phylloboletellus chloephorus	3388	Mexico	DQ534658	–	–	–	Binder & Hibbett, 2006
Phylloporopsis boletinoides	CORT010991	USA	MH571716	–	–	MH588317	Farid et al. 2018
Phylloporopsis boletinoides	Farid 617 (USF296126)	USA	MG817715	MG820263	–	–	Farid et al. 2018

Table. S2 Reference sequences for two-gene alignment.

Species	Voucher	Location	ITS	LSU	*RPB*2	Reference
Boletus edulis	Be3 / TZ12*	Germany/Czechia	LN714527	KF030282	GU187774, LN714632	Větrovský et al 2016; Nuhn et al. 2013; Binder et al. 2010
Porphyrellus porphyrosporus	MB97−023	Germany	DQ534563	DQ534643	GU187800	Binder & Hibbett 2006; Binder et al. 2010
Strobilomyces strobilaceus	MB03−102	not given	AY854068	AY684155	AY786065	Matheny et al. 2007

***** because no ITS sequence and long *RPB*2 sequence were available from the same specimen, a composite of two specimens were used. Both were collected in Central Europe, and were nearly identical in the overlapping region of *RPB*2.

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