**Appendix 1.** List of individuals studied for each species and list of morphological characters added to the matrix

MATERIALS:

A total of 203 *Phymaturus* specimens were examined for morphological study, representing nine recognized species (including the one described in the present publication). Institutional abbreviations follow Sabaj Pérez (2012), with the following additions: IBIGEO (Instituto de Bio y Geociencias del Noa- Salta, Argentina); REE–CSUN, Robert E. Espinoza, California State University, Northridge, California, USA. Skeletonized specimens are indicated by CS (cleared and stained skeletons).

*Phymaturus antofagastensis* (N= 19): MCN-UNSa 309–10, road to Paso San Francisco, Antofagasta Department, Catamarca Province, Argentina. MCN-UNSa 1429–36, 130 km from Fiambalá on the road to Paso San Francisco; Antofagasta Department, Catamarca Province, Argentina. SDSU 1991, Agua de los Pocitos, Antofagasta Department, Catamarca Province, Argentina. MACN 44599-44600. Márgenes del Arroyo Aguas Calientes, between "El Chorro" and "Vega Tamberías". 3880 m a.s.l: -27.343577º; -68.331313º. Antofagasta Department, Catamarca Province, Argentina. FML 2019–10 and FML 2019–13 (CS) destacamento Las Grutas – 20 km east of Paso San Francisco, 4100 m a.s.l., Tinogasta Department, Catamarca Province, Argentina. FML 1861–5, M1861–11 (CS) Las Grutas, 4200 m a.s.l., Gendarmería Station, 20 km east of Paso San Francisco, Tinogasta Department, Catamarca Province, Argentina. FML 2094-1, 2094-2, Las Grutas (4200m) a 20 km del Paso san Francisco, Tinogasta Department, Catamarca province. Argentina.

*Phymaturus damasense* (N= 13) (*P.* cf. *palluma* EP, *P.* sp3., *P*. sp pla in Lobo and Quinteros, 2005; Lobo et al 2012; Lobo et al 2016): MNHN 2352, 2460-61. Baños del Campanario (1500 m a.s.l), Talca, San Clemente. MNHN 3505-09. Curicó Puesto Militar San Pedro, Pichuante, Cuesta Vergara. Chile. 35°10’S; 70°36’W. MNHN 1632-33, 1638. El Planchón (Int. Curicó). MNHN1643 (CS).

*Phymaturus denotatus* (N= 43): MACN 40512 (holotype) and MACN 40513–17, MCN-UNSa 3159, MCN-UNSa 3160–61, 3170, 3176–79, 3181, 3183, 3186–89 (paratypes). Laguna Blanca, (26°34′09′S, 66°56′40′W, 3440 m a.s.l.). Belén Department, Catamarca Province, Argentina. IBIGEO 5206-5226. 33,6 km desde el pueblo de Laguna Blanca hacia Aguas Calientes (23,5 km desde Aguas Calientes hacia Laguna Blanca). 26º28'20,3''S; 66º42'39,7''. 3689 m a.s.l. Belén Department, Catamarca Province, Argentina. MACN 11940. Laguna Blanca. Catamarca, Argentina.

*Phymaturus laurenti* (N= 64): MCN-UNSa 2855 (holotype), MCN-UNSa 2838–54, 2856–62 (paratypes), 10 km south of El Peñón on rocky outcrops 300 m east of Provincial Road 43 (26°39′40.6′S, 67°13′26.3′W, 3815 m a.s.l.), Antofagasta Department, Catamarca Province, Argentina. MCN-UNSa 306–07, 323–27, Cuesta de Calalaste; Antofagasta Department, Catamarca Province, Argentina. MCN-UNSa 313–17, 320, 322, Cuesta de Randolfo; Antofagasta Department, Catamarca Province, Argentina. MCN-UNSa 1919–21, north Antofagasta de la Sierra (25°38′06″S, 67°13′53.65″W), Antofagasta Department, Catamarca Province, Argentina. MCN-UNSa 3133, east of El Peñón, road to Cerro Galán, Antofagasta de la Sierra (26°20′28.88′S, 67°08′1.51′W), Antofagasta Department, Catamarca Province, Argentina. IBIGEO 5131-5150. 26 km desde Antofagasta de la Sierra hacia Salar del Hombre Muerto, RP 43. 25º51'11,1''S;67º18'49,2''W; 4059 m a.s.l. Antofagasta Department, Catamarca Province, Argentina.

*Phymaturus mallimaccii* (N= 17): FML 21114. Camino entre Famatina y Mina la Mejicana, 3460 m a.s.l. 28°58'45,9"; S67°42'58,1"W. FML 21117. Camino entre Alto Carrizal y Cueva de Pérez, pasando Famatina 8 kms al sur. 3460 m a.s.l. 28°58'45,9"S; 67°42'58,1"W. FML 1721. (6 ejemplares) Nevado de Famatina, Cueva de Pérez. 3800-4000 m a.s.l. MCN-UNSa 920 (LA 2779) on the road to La Mejicana (28°54′43′S, 67°42′47′W, 3430 m a.s.l.), Sierra de Famatina, Famatina Department, La Rioja Province, Argentina. MCN-UNSa 1483-84 (LA 2035 2002). Camino a la Mejicana, 3430 m a.s.l. 28°54’43”S; 67°42’47”W. Dpto. Famatina. Prov. de La Rioja (CS). MCN-UNSa 1741, Cueva de Pérez, Famatina Department, La Rioja Province, Argentina. MCN-UNSa 3567 (LA 2196). Camino a Mina La Mejicana, 3420 m a.s.l. 28º54´43´´S; 67º42´47´´W. Famatina Department, Prov. La Rioja. MLP 5360. Quebrada de Ampallados, Cerro de la Cueva de Pérez. S 28 99798; W 67 73719. REE–CSUN 183, 489–491, Sierra de Famatina, Cueva de Pérez, Famatina Department, La Rioja Province, Argentina.

*Phymaturus maulense* (N= 2)(Maule, Chile) MVZ 232506-07. On the road to Laguna del Maule (Los Cóndores Pass), Talca Prov.; elevation 1800 m a.s.l. Region VII (= Region del Maule), Chile.

*Phymaturus timi* (N= 19)MCN-UNSA 4751 (holotype). Área Natural Protegida Auca Mahuida, accessing from Provincial Road N°6, 37°42′06.3″S; 68°51′29.5″W, 1569 m a.s.l, Pehuenches department, Neuquén province, Argentina.Paratypes:MCN-UNSA 4750, 4752, 4753, 4754, 4755, 4756. Same data as holotype. MACN 48025, MACN 48027, MACN 48029, MACN 48032, MACN 48033, MACN 48036. At the side of the road in Área Natural Protegida Auca Mahuida between La Aguada 1801 m a.s.l (37°44′56.48′′S; 68°53′46.55′′W) and Risco Alto 1937 m a.s.l (37°45′38.23′′S; 68°55′52.32′′W), Añelo department, Neuquén province, Argentina.MACN 48026, MACN 48028, MACN 48030, MACN 48031, MACN 48034, MACN 48035. At the side of the road in Área Natural Protegida Auca Mahuida between La Aguada 1801 m a.s.l (37°44′56.48"S; 68°53′46.55"W) and Risco Alto 1937 m a.s.l (37°45′38.23"S; 68°55′52.32"W), Añelo department, Neuquén province, Argentina.

*Phymaturus vociferator* (N= 7) *(P.* cf. *palluma* CH, *P* sp2., *P*. sp chiin Lobo and Quinteros, 2005; Lobo et al 2012; Lobo et al 2016). MVZ 199435-38 & 230992. Hotel Termas de Chillán. Región VIII (= Región del Bío Bío), Chile. MCZ 165456. Cordillera de Chillán. Chile. MCZ 169935. Chile.

CHARACTERS:

The following characters were added to data matrixes of *Phymaturus* after recent analyses in Lobo et al. (2016) and Lobo et al. (2018).

**254-**Scale organs in supralabials: 0)absent, 1) present.

**255**- Scale organs in infralabials: 0) absent 1) present. POL

**256**- Scale organs in rostral: 0) absent, 1) present/absent, 2) present.

**257**- Scale organs in mental: 0) absent, 1) present/absent, 2) present.

**258**- Scale organs in posmentals: 0) absent, 1) present. POL

**259**- Scale organs in gulars: 0) absent, 1) present/absent, 2) present.

**260**- Number of scale organs in flanks (counted in a head length). Species means considered. 0) 18-21, 1) 12-17, 2) 6-11.

**261**- Scale organs in medial supracarpals: 0) absent, 1) present.

**262**- Scale organs in distal supratarsals: 0) absent, 1) present.

**263**- Scale organs in lateral supratarsals: 0) absent, 1) present.

**264**- Number of scale organs in temporal region (species means considered): 26-35=0, 36-45=1, 46-55=2, 56-65=3, 66-75=4.

**265**-Number of scales with two or more scales organs (species means considered): 0) 0-5, 1) 6-10, 2) 11-15, 3) 16-20, 4) 21-28.

**266**- Number of scales with one scale organ in the tail (counted in a head length at the mid length of the tail) Species means considered: 0) 0-30, 1) 31-60, 2) 61-90.

**267**- Number of scales with two scale organs in the tail (counted in a head length at the mid length of the tail) Species means considered: 0) 0-20, 1) 21-40, 2) 41-50.

**268**- Dark sides of neck speckled with small white spots. 0) absent; 1) present. Variation detected within the *mallimaccii* subclade

**269**- Dorsum background color light-brown to cream. 0) absent; 1) present. Variation detected within the *mallimaccii* subclade

**270**- Mixed dorsal pattern formed by small and medium sized white spots: 0) absent, 1) present.Variation detected within the *patagonicus* group. Shared by *P. etheridgei* and *P. yachanana.*

**271**- Occasional presence of small scale structures gland alike over cloaca and ventral surfaces of thighs of males. 0) absent, 1) present. Variation detected within the *patagonicus* group.