Supporting Information

Archibald et al. 10.1073/pnas.1323269111

SI Text

Data from Collections

California Academy of Sciences collections (CAS)
Arizona State University, Tempe collections (ASUT)
J. Romero Nápoles collections
G. E. Morse collections

Global Biodiversity Information Facility Data

Occurrence data accessed through the Global Biodiversity Information Facility (GBIF) data portal for the following taxa, published online at www.gbif.org by the institutions listed here below (all accessed December 19, 2012):

***Speciomerus giganteus*.**

Coleopteran specimens of Iwate Prefectural Museum
Texas A&M University Insect Collection
Especímenes INBio

***Pachymerus* Species.**

Snow Entomological Museum Collection
Peabody Entomology Distributed Generic Information Retrieval Service
National Museum of Natural History (NMNH) Entomology Collections
Royal Belgian Institute of Natural Sciences collections
Texas A&M University Insect Collection
Illinois Natural History Survey

***Caryobruchus marieae*.**

Texas A&M University Insect Collection

***Caryobruchus gleditsiae*.**

Texas A&M University Insect Collection
Lund Museum of Zoology–Insect collections

Occurrence data accessed through the GBIF data portal for the following taxa, published online there by the institutions listed (accessed April 17–August 18, 2013):

Brahea armata (synonym *Brahea elegans*) and *Brahea brandegeei*:

Missouri Botanical Garden
Herbario de la Universidad de Arizona
Herbario del Centro de Investigaciones Biológicas del Noroeste (HCIB)
Riqueza y distribución de especies
El complejo Brahea–Erythea (Palmae)
NMNH Botany Collections
University of Arizona (UA) Herbarium
Actualización de la base de datos del Herbario de la Universidad de Sonora (USON)
Nationaal Herbarium Nederland
Fairchild Tropical Botanic Garden

Phoenix abyssinica, Phoenix acaulis, Phoenix andamanensis, Phoenix caespitose, Phoenix canariensis, Phoenix dactylifera, Phoenix humilis, Phoenix loureiroi, Phoenix paludosa, Phoenix reclinata, Phoenix roebelenii, and *Phoenix theophrasti*:

Nationaal Herbarium Nederland
Wildlife Institute of India Herbarium Dataset
Royal Botanic Gardens, Kew
Database of the Botany Collection of the Museum of Evolution in Uppsala (UPS)
Universidad de Barcelona. Grup d'Investigació Geobotánica i Cartografía de vegetación a escala de
Universidad de Málaga: MGC-Cormof
Fundación Biodiversidad, Real Jardín
Jardín Botánico de Córdoba: Herbarium
Real Jardin Botanico (Madrid), Vascular
Tercer Inventario Forestal Nacional
Israel Nature and Parks Authority
Generalitat Valenciana. Banco de Datos
Herbario del Jardín Botánico–Histórico
Sistema de Información de la vegetación
Hortus Botanicus Sollerensis Herbarium
The Aarhus University Herbarium Database (AUU)
Missouri Botanical Garden
Herbario de la Universidad de Almeria
Royal Botanic Garden Edinburgh Herbarium (E)
Lund Botanical Museum (LD)

Washingtonia filifera:

US Department of Agriculture (USDA) PLANTS Database, USDA Natural Resources Conservation Service
iNaturalist research-grade observations
CAS Botany (CAS-BOT)
Consortium of California Herbaria
UA Herbarium

Occurrence data accessed through Australia's Virtual Herbarium (1) online, and analyzed using the ANUCLIM 6.1 climate surface software (2) for the following taxa (accessed April 14–20, 2013):

Livistona spp.
Arecaceae (all Australian genera combined, including *Livistona*)

Additional climate range data were accessed from Thompson et al. (3) for these palm taxa:

Rhapidophyllum hystrix
Sabal minor
Serenoa repens

Climate range data for *Rhopalostylis sapida* is from Reichgelt et al. (4), and for *Trachycarpus fortunei* the range data (minimum and maximum only) was from Walther et al. (5). South American Coccoseae and non-Coccoseae palm climate range data from Kissling et al. (6).

1. Council of Heads of Australasian Herbaria (2013) Australia's Virtual Herbarium. Available at http://avh.chah.org.au. Accessed April 20, 2013.
2. Xu T, Hutchinson M (2013) New developments and applications in the ANUCLIM spatial climatic and bioclimatic modelling package. *Environ Model Softw* 40:267–279.
3. Thompson RS, et al. (2012) *Atlas of Relations Between Climatic Parameters and Distributions of Important Trees and Shrubs in North America – Modern Data for Climatic Estimation from Vegetation Inventories* (US Geol Surv, Denver), US Geol Surv Prof Pap 1650–F.

4. Reichgelt T, et al. (2013) Quantitative palaeoclimate estimates for Early Miocene southern New Zealand: Evidence from Foulden Maar. *Palaeogeogr Palaeoclimatol Palaeoecol* 378:36–44.
5. Walther G-R, et al. (2007) Palms tracking climate change. *Glob Ecol Biogeogr* 16(6): 801–809.
6. Kissling WD, et al. (2012) Cenozoic imprints on the phylogenetic structure of palm species assemblages worldwide. *Proc Natl Acad Sci USA* 109(19):7379–7384.

Fig. S1. Modern low-statured aquatic palms. *S. repens*, Florida (*Left* and *Right*); a low-statured palm closely related to the Eocene palm *Uhlia allenbyensis* in an aquatic setting as modeled for the Princeton Chert (Okanagan Highlands, BC, Canada) by Erwin and Stockey (1).

1. Erwin DW, Stockey RA (1991) Silicified monocotyledons from the Middle Eocene Princeton chert (Allenby Formation) of British Columbia, Canada. *Rev Palaeobot Palynol* 70:147–162.

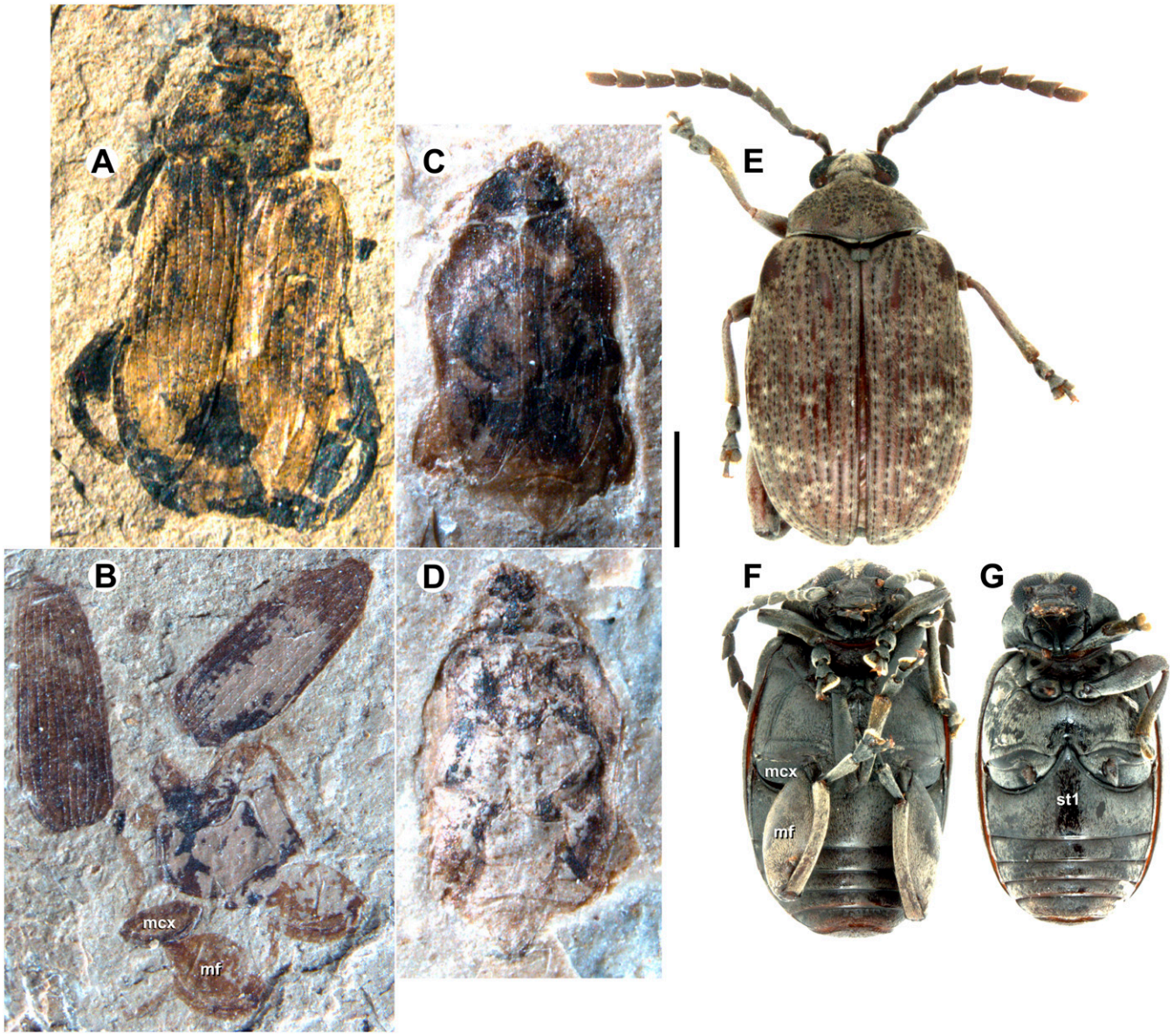

Fig. S2. Fossil and modern Pachymerina dorsal and ventral aspects. Fossil Pachymerina from Quilchena [(*A*) Q-0061, dorsal aspect] and McAbee [(*B*) F-1543, ventral aspect]. (*C*) F-1540 (dorsal) and (*D*) F-1541 [(counterpart of F-1540, same insect), ventral aspects]; and modern Pachymerina, *C. gleditsiae*: (*E*) dorsal, (*F*) ventral, and (*G*) ventral (legs and antennae removed) aspects. Note pecten *mesad* tibia in the flexed hind legs in *F*, a condition found in *Caryobruchus* and *Speciomerus* species. The metacoxae (mcx) are less than half the width of the metafemora (mf) and sternite 1 (st1), which is diagnostic of Pachymerini (*B*, *D*, *F*, and *G*). Metafemorae in *F* are depicted at an oblique angle. Pecten on fossils may often be seen through overlaying tibia as an artifact of preservation; ventral anatomy in general is sometimes visible, impressed through a mostly dorsal aspect fossil (e.g., Fig. 5 *A* and *F*). (Scale bar: 2 mm, all to scale.)

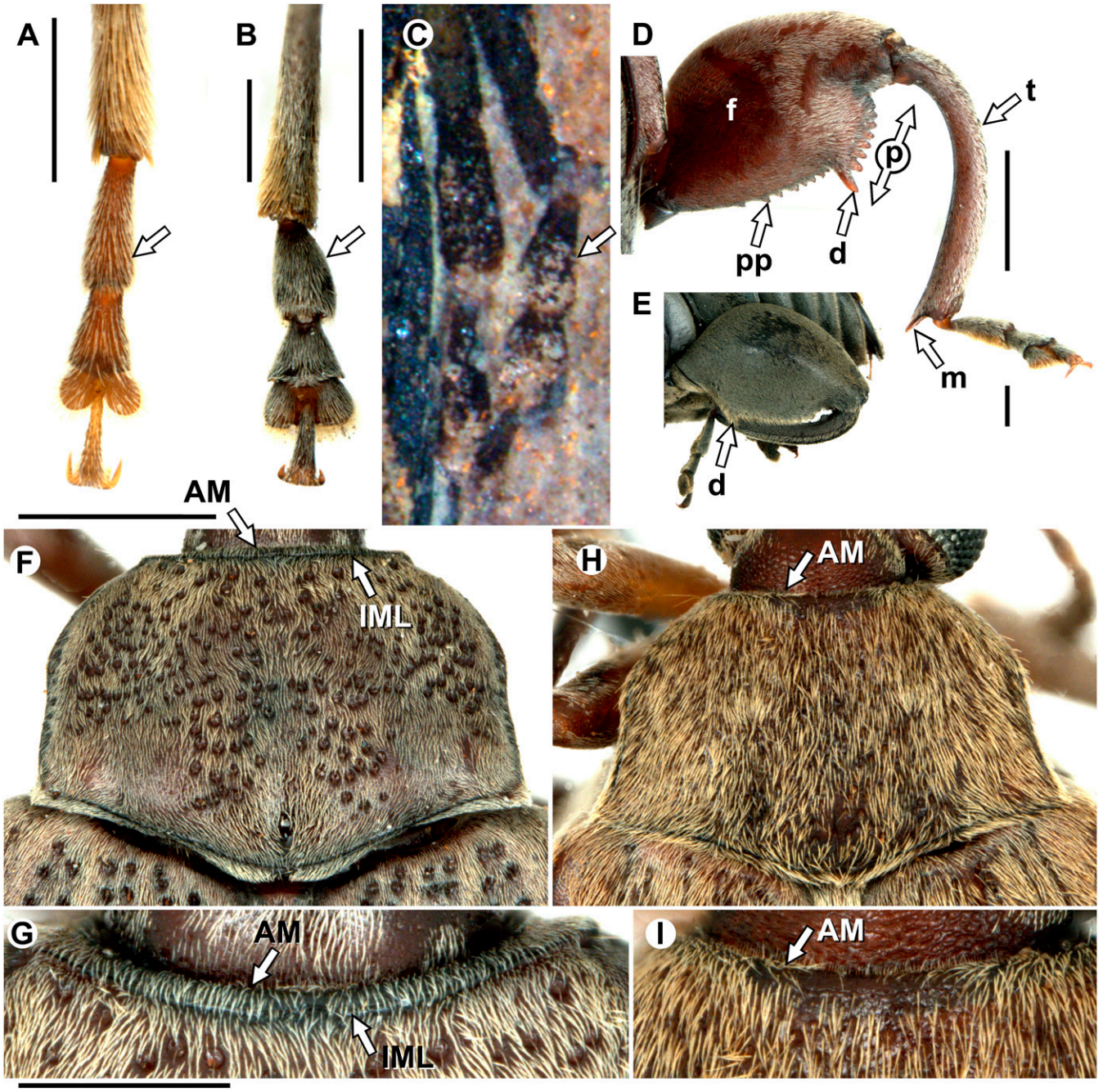

Fig. S3. Characters of the leg and pronotum of Pachymerina. (*A*–*C*) Mesotarsus of (*A*) *Caryedon serratus* (Pachymerini: Caryedontina), with elongate, narrow tarsomere 1 (arrow); and (*B*) *C. gleditsiae* (Pachymerini: Pachymerina), with short, broadly triangular tarsomere 1 (arrow), diagnostic of Pachymerina (fore- and midlegs). (*C*) Tarsus of fore- or midleg of Quilchena Q-0061, with morphology as in *B*. (*D*) Hind leg of *C. gleditsiae*. d, denticle 1 (basal-most part of pecten); f, metafemur; m, mucro; p, pecten; pp, prepectenal ridges; t, metatibia. (*E*) Hind leg of *Pachymerus cardo* showing pecten positioned *laterad* (outside of) metafemur when leg flexed. Note that pecten extends *basad* midfemur. d, denticle 1. (*F*–*I*) Dorsal aspect of pronotum of (*F*) *C. gleditsiae* (Pachymerina) showing and impressed marginal line (IML) along the anterior margin (AM), diagnostic of Pachymerina. (*G*) Close-up of the specimen in (*F*). (*H*) Pronotum of *C. serratus* (Caryedontina) lacking the IML on the AM. (*I*) Close-up of the specimen in *G*. (Scale bars: 1 mm in *A*–*F* and *H* and 500 μm in *G* and *I*.)

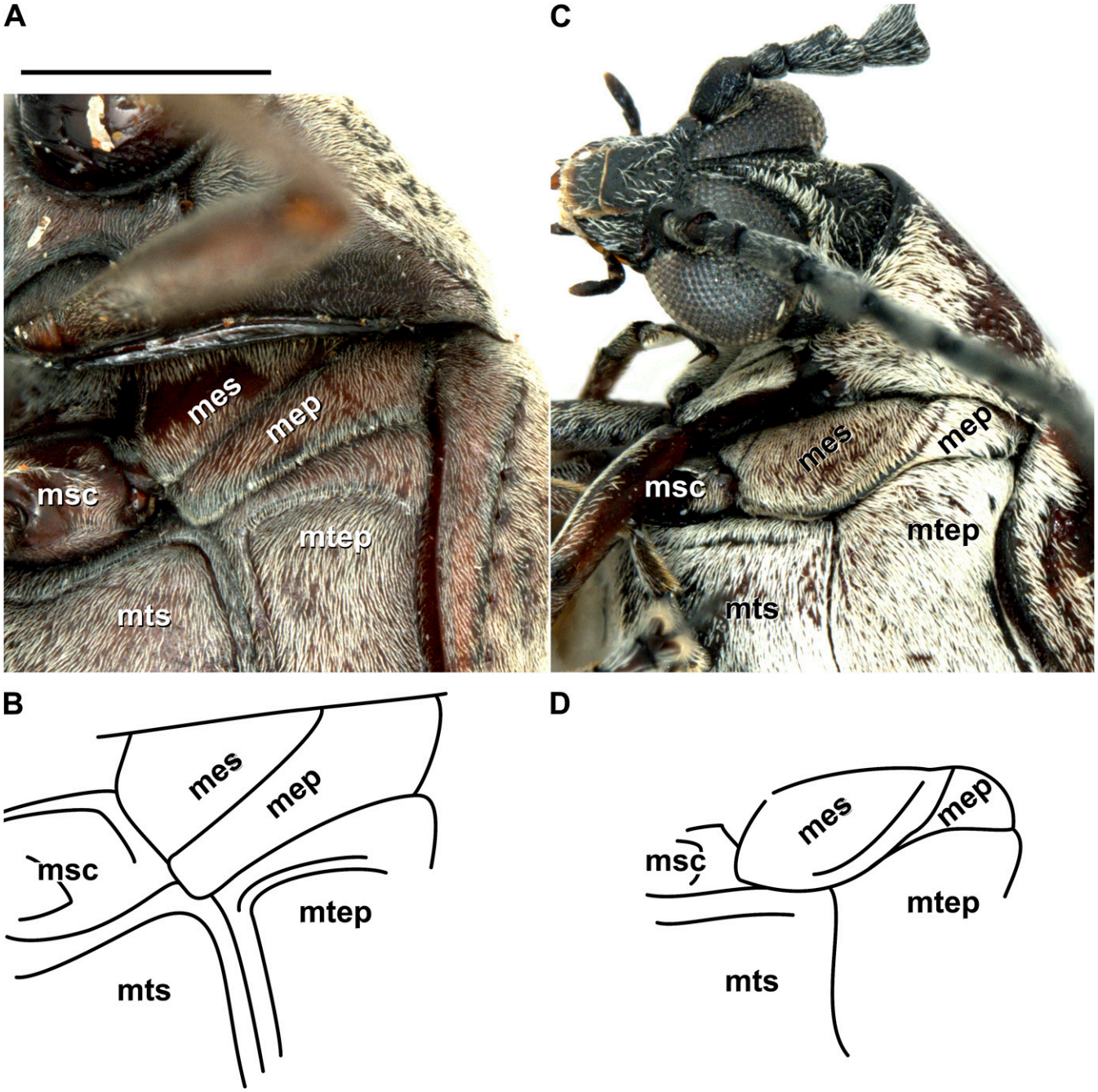

Fig. S4. Pachymerini mesepimeral morphology. Ventrolateral portion of thorax of *C. gleditsiae* (Bruchinae: Pachymerini: Pachymerina) [(*A*) photograph and (*B*) drawing] and *Megacerus discoidus* (Bruchinae: Bruchini: Megacerina) [(*C*) photograph and (*D*) drawing], showing difference in the size, shape, and location of the mesepimeron and mesopleuron. mep, mesepimeron; mes, mesopleuron; msc, mesocoxal cavity; mtep, metepisternum; mts, metasternum. *C. gleditsiae* shows the plesiomorphic condition of the mesepimeron expanded mesally, connecting broadly with the mesocoxa and/or metasternum, contrasted with the derived state seen in *M. discoidus*, where the mesepimeron narrows and may not reach the mesocoxa and/or metasternum. This mesally expanded mesepimeron is not itself diagnostic of Pachymerini or Pachymerina; it appears in other tribes of Bruchinae (Amblycerini, Eubaptini, and Rhaebini); however, this is only found in the Pachymerini in combination with the incrassate metafemur and metatibia carinate (the incrassate metafemur and metatibia carinate without the mesally expanded mesepimeron occurs convergently in a lineage of Bruchini). (Scale bar: 1 mm, all to scale.)

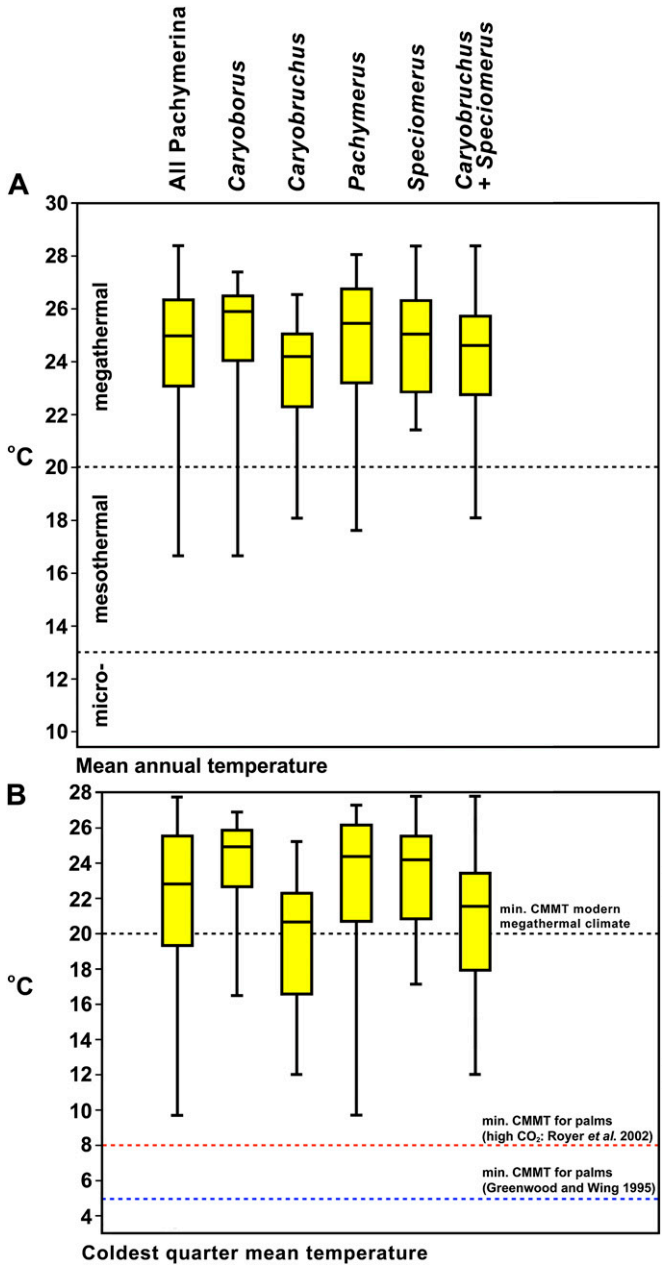

Fig. S5. Climatic profiles for modern Pachymerina; median, quartiles, and maximum and minimum values plotted for each. (*A*) Mean annual temperature (MAT) and (*B*) coldest quarter mean temperature (CQMT) for Pachymerina [CQMT is ~1–2 °C warmer than the coldest month mean temperature (CMMT)]. Fossils reported here are from microthermal to lower mesothermal climates. *B* shows the minimum CMMT for modern megathermal climates (black dashed line); the range of some Pachymerina extends outside of megathermal climates (the tropics) (Fig. S6). The blue dashed line is the minimum modern CMMT for palms (1), with very few exceptions (Fig. 1). The red dashed line shows the minimum CMMT as modeled for the high CO_2 conditions of the Eocene (2, 3). Fossils are assigned to Pachymerina (Republic, McAbee, and Quilchena) and some to *Caryobruchus* + *Speciomerus* (Republic and McAbee), or likely Pachymerina and if so, *Caryobruchus* + *Speciomerus* (Driftwood Canyon). Data from Table S4.

1. Greenwood DR, Wing SL (1995) Eocene continental climates and latitudinal temperature gradients. *Geology* 23(11):1044–1048.
2. Royer DL, Osborne CP, Beerling D (2002) High CO2 increases the freezing sensitivity of plants: Implications for paleoclimatic reconstructions from fossil floras. *Geology* 30(11):963–966.
3. Sluijs A, et al. (2009) Warm and wet conditions in the Arctic region during Eocene Thermal Maximum 2. *Nat Geosci* 2(11):777–780.

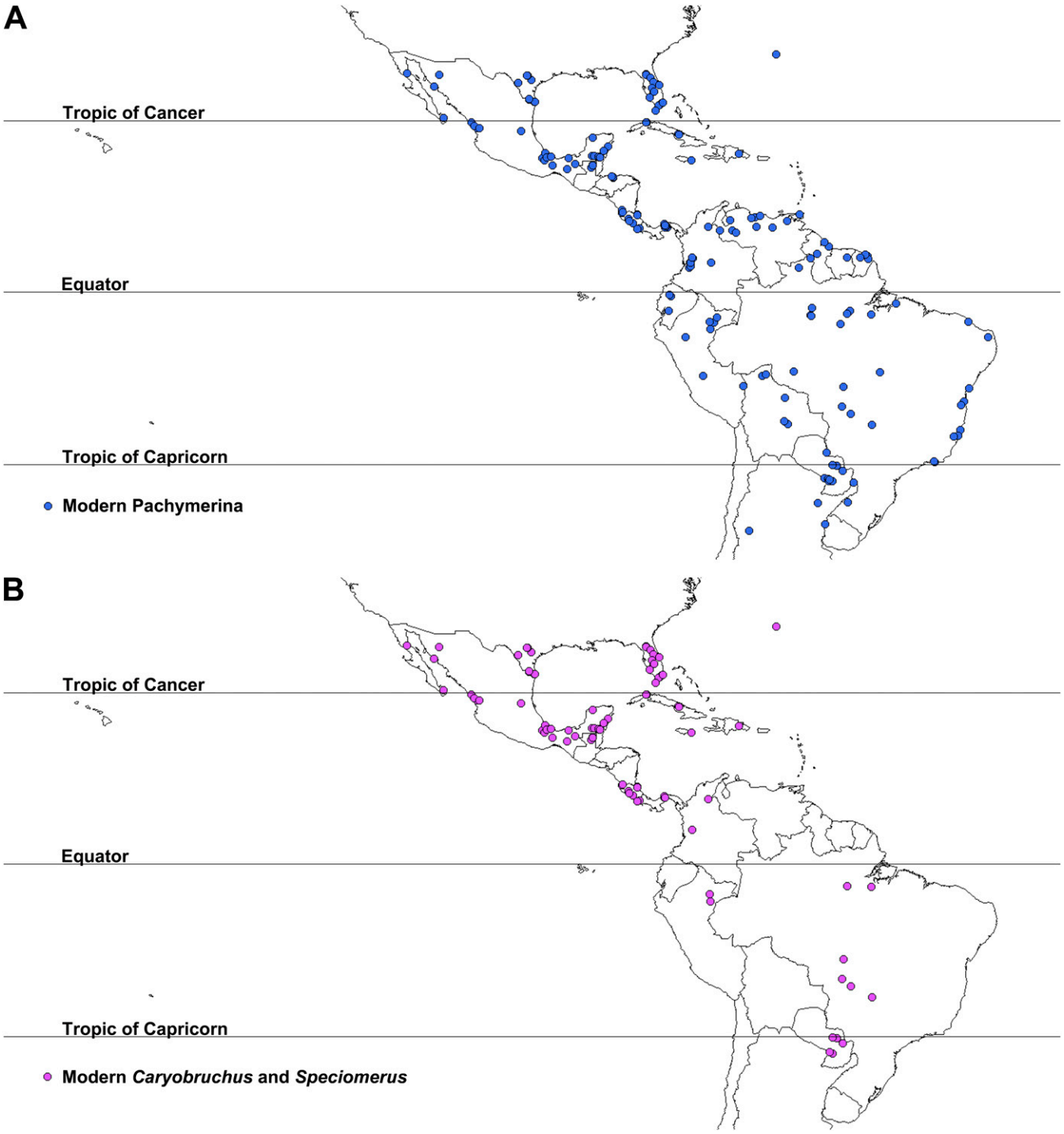

Fig. S6. Maps of modern Pachymerina occurrences. (*A*) modern occurrences of Pachymerina, and (*B*), modern occurrences of *Caryobruchus* + *Speciomerus* species: Both are data from Table S4.

Table S1. Pachymerina occurrence MATs

Group	Minimum	25th	Median	75th	Maximum
All Pachymerina	16.74	23.13	25.04	26.39	28.43
Caryoborus	16.74	24.10	25.96	26.54	27.45
Caryobruchus	18.16	22.36	24.25	25.11	26.60
Pachymerus	17.69	23.26	25.51	26.80	28.10
Speciomerus	21.48	22.91	25.10	26.37	28.43
Caryobruchus + *Speciomerus*	18.16	22.81	24.67	25.78	28.43

MAT values in °C. Data from Table S4.

Table S2. Pachymerina occurrence winter temperatures

Group	Minimum	25th	Median	75th	Maximum
All Pachymerina	9.70	19.40	22.90	25.65	27.87
Caryoborus	16.52	22.72	25.00	25.94	26.98
Caryobruchus	12.02	16.60	20.72	22.35	25.30
Pachymerus	9.70	20.74	24.45	26.24	27.37
Speciomerus	17.17	20.88	24.24	25.60	27.87
Caryobruchus + *Speciomerus*	12.02	17.95	21.60	23.48	27.87

CQMT values in °C. Data from Table S4.

Table S3. Pachymerina occurrence mean annual precipitation

Group	Minimum	25th	Median	75th	Maximum
All Pachymerina	115	1,258	1,538	2,285	5,033
Caryoborus	539	1,612	2,327	2,711	3,766
Caryobruchus	115	941	1,275	1,437	2,777
Pachymerus	150	1,267	1,717	2,168	2,855
Speciomerus	1,348	1,535	1,915	2,690	5,033
Caryobruchus + *Speciomerus*	115	1,238	1,411	1,874	5,033

Mean annual precipitation (MAP) values in millimeters per year. Data from Table S4.

Table S4. Pachymerina occurrence and climate data used in Tables S1–S3

Species	Country	Latitude	Longitude	MAT	CQMT	MAP	Source
Caryoborus chiriquensis	Ecuador	−0.4356	−78.9656	16.74	16.52	2,341	1
Caryoborus chiriquensis	Ecuador	−0.2542	−79.1725	23.13	22.53	2,706	1
Caryoborus chiriquensis	Honduras	15.5333	−86.8000	18.93	16.62	1,650	2
Caryoborus chiriquensis	Panama	9.3494	−79.9044	26.74	26.10	3,256	3
Caryoborus gracilis	Bolivia	−11.3175	−66.5789	26.30	25.00	1,599	1
Caryoborus gracilis	Bolivia	−17.8000	−63.1667	23.95	20.63	1,244	1
Caryoborus gracilis	Brazil	4.7167	−60.0167	23.78	23.40	1,261	1
Caryoborus gracilis	Brazil	−10.6667	−62.3000	24.20	23.57	1,923	1
Caryoborus gracilis	Colombia	4.1014	−73.5647	25.85	25.00	3,568	1
Caryoborus gracilis	Ecuador	−0.2542	−79.1725	23.13	22.53	2,706	1
Caryoborus gracilis	French Guiana	4.8167	−53.2667	25.23	24.63	2,664	1
Caryoborus gracilis	Peru	−11.2542	−74.6367	23.53	22.67	1,754	1
Caryoborus gracilis	Peru	−4.9081	−73.6667	26.83	26.25	2,632	4
Caryoborus gracilis	Peru	−3.9167	−73.7500	26.39	25.80	2,712	4
Caryoborus gracilis	Peru	−3.4000	−72.7500	26.23	25.58	2,873	4
Caryoborus gracilis	Peru	−4.9167	−73.6667	26.83	26.25	2,632	4
Caryoborus gracilis	Venezuela	9.7500	−63.1831	26.95	26.05	1,294	1
Caryoborus serripes	Bolivia	−11.1172	−66.1239	26.52	25.32	1,651	1
Caryoborus serripes	Brazil	−3.1033	−60.0114	27.45	26.98	2,153	1
Caryoborus serripes	Brazil	−14.7864	−39.2728	24.33	22.88	1,445	5
Caryoborus serripes	Brazil	−18.5833	−39.7500	24.07	22.02	1,307	5
Caryoborus serripes	Brazil	−19.3936	−40.0581	24.27	22.08	1,203	1
Caryoborus serripes	Brazil	−4.2614	−55.9719	27.35	26.77	2,137	1
Caryoborus serripes	Brazil	−2.4333	−54.7000	26.07	25.45	2,154	1
Caryoborus serripes	Brazil	−22.8750	−43.2775	23.02	20.52	1,256	1
Caryoborus serripes	Brazil	−5.9833	−35.9333	25.09	23.42	539	1
Caryoborus serripes	French Guiana	4.9389	−52.3206	26.54	25.97	3,021	1
Caryoborus serripes	French Guiana	4.5742	−52.2261	25.19	24.68	3,766	1
Caryoborus serripes	French Guiana	4.8167	−53.2667	25.23	24.63	2,664	1
Caryoborus serripes	Guyana	5.2617	−59.1483	26.45	25.65	2,853	1
Caryoborus serripes	Peru	−4.9081	−73.6667	26.83	26.25	2,632	4
Caryoborus serripes	Peru	−4.0536	−73.1700	26.43	25.87	2,716	1
Caryoborus serripes	Peru	−3.9167	−73.7500	26.39	25.80	2,712	4
Caryoborus serripes	Peru	−3.4000	−72.7500	26.23	25.58	2,873	4
Caryoborus serripes	Peru	−6.0333	−76.9667	22.99	22.33	1,392	4
Caryoborus serripes	Peru	−4.9167	−73.6667	26.83	26.25	2,632	4
Caryoborus serripes	Peru	−12.6333	−69.2000	25.51	23.93	2,245	4
Caryoborus serripes	Suriname	4.7711	−55.0494	26.78	26.03	2,313	1
Caryobruchus curvipes	Guatemala	16.9833	−89.8333	25.55	22.95	1,511	1
Caryobruchus curvipes	Guatemala	17.3936	−89.6336	25.78	22.90	1,240	1
Caryobruchus curvipes	Mexico	17.4489	−91.9614	25.39	22.78	2,563	J. Romero Nápoles collections (this paper)
Caryobruchus curvipes	Mexico	16.7500	−93.1000	23.75	21.60	912	1
Caryobruchus curvipes	Mexico	17.2752	−95.0542	25.14	22.20	2,579	G. E. Morse collections (this paper)
Caryobruchus curvipes	Mexico	18.2372	−96.4047	25.20	21.85	2,732	1
Caryobruchus curvipes	Mexico	23.1028	−106.0203	24.75	20.77	834	1
Caryobruchus gleditsiae	Bermuda	32.3475	−64.6633	21.64	17.28	1,513	1
Caryobruchus gleditsiae	Cuba	21.5497	−77.9717	25.10	22.32	1,403	1
Caryobruchus gleditsiae	Cuba	21.3808	−77.9169	25.19	22.45	1,414	1
Caryobruchus gleditsiae	Cuba	23.1319	−82.3642	25.04	22.22	1,238	1
Caryobruchus gleditsiae	Cuba	23.1239	−82.3003	24.85	22.00	1,289	1
Caryobruchus gleditsiae	Jamaica	17.9183	−76.1844	26.60	25.30	1,715	1
Caryobruchus gleditsiae	Mexico	22.3403	−105.2983	24.66	21.27	1,274	1
Caryobruchus gleditsiae	Mexico	22.6578	−105.6069	24.87	21.10	1,021	1
Caryobruchus gleditsiae	Mexico	27.9333	−111.0500	24.66	18.28	191	1
Caryobruchus gleditsiae	Mexico	29.5500	−110.4250	22.33	15.03	460	ASUT (this paper)
Caryobruchus gleditsiae	Mexico	18.9761	−96.0775	25.91	22.65	1,538	1
Caryobruchus gleditsiae	United States	29.6500	−82.3167	20.43	13.30	1,322	1
Caryobruchus gleditsiae	United States	29.5744	−82.3474	20.60	13.50	1,337	G. E. Morse collections (this paper)
Caryobruchus gleditsiae	United States	27.2928	−81.3631	22.34	16.70	1,216	1
Caryobruchus gleditsiae	United States	26.4328	−81.8156	23.26	18.13	1,336	1

Table S4. Cont.

Species	Country	Latitude	Longitude	MAT	CQMT	MAP	Source
Caryobruchus gleditsiae	United States	29.1667	−81.8000	20.95	14.25	1,287	1
Caryobruchus gleditsiae	United States	25.6769	−80.2719	24.13	20.00	1,295	1
Caryobruchus gleditsiae	United States	25.4475	−80.4794	23.71	19.40	1,506	1
Caryobruchus gleditsiae	United States	25.4683	−80.4778	23.64	19.33	1,537	1
Caryobruchus gleditsiae	United States	25.4045	−80.6925	23.67	19.30	1,394	G. E. Morse collections (this paper)
Caryobruchus gleditsiae	United States	24.7167	−81.0833	24.67	20.67	1,102	1
Caryobruchus gleditsiae	United States	28.5333	−81.3667	22.03	15.87	1,258	1
Caryobruchus gleditsiae	United States	27.7456	−81.5308	22.41	16.60	1,249	1
Caryobruchus gleditsiae	United States	25.9014	−97.4972	23.21	16.57	687	1
Caryobruchus gleditsiae	United States	26.2000	−98.2167	23.27	15.77	558	1
Caryobruchus marieae	Cuba	23.1319	−82.3642	25.04	22.22	1,238	1
Caryobruchus maya	Guatemala	17.2250	−89.6133	25.26	22.45	1,339	1
Caryobruchus maya	Mexico	18.5339	−89.6408	25.08	21.90	1,121	1
Caryobruchus maya	Mexico	18.5169	−89.3958	24.63	21.48	1,137	1
Caryobruchus maya	Mexico	18.2453	−92.8314	26.51	23.75	1,872	1
Caryobruchus maya	Mexico	19.7997	−87.4764	26.06	23.65	1,252	1
Caryobruchus maya	Mexico	19.2153	−88.1011	25.87	23.43	1,275	1
Caryobruchus maya	Mexico	18.4861	−88.8217	25.05	22.50	1,321	1
Caryobruchus maya	Mexico	18.3817	−88.5658	25.08	22.87	1,359	1
Caryobruchus maya	Mexico	20.9947	−89.6086	25.78	22.98	950	1
Caryobruchus rubidus	Mexico	16.7500	−93.1000	23.75	21.60	912	J. Romero Nápoles collections (this paper)
Caryobruchus rubidus	Mexico	17.9824	−96.1100	25.00	21.62	2,777	G. E. Morse collections (this paper)
Caryobruchus rubidus	Mexico	18.3650	−95.7953	26.27	23.00	1,558	1
Caryobruchus rubidus	Mexico	18.4442	−95.2133	24.37	21.27	2,157	1
Caryobruchus veseyi	Mexico	29.7294	−114.7208	18.16	13.05	115	1
Caryobruchus veseyi	Mexico	23.7000	−109.8167	21.57	16.25	378	1
Pachymerus abruptestriatus	Brazil	−15.2333	−39.6167	22.17	20.43	1,067	1
Pachymerus bactris	Brazil	−3.1033	−60.0114	27.45	26.98	2,153	1
Pachymerus bactris	Ecuador	−2.4581	−79.2614	23.87	22.93	1,943	1
Pachymerus bactris	French Guiana	5.1597	−52.6503	26.06	25.62	2,855	1
Pachymerus bactris	Panama	9.1667	−79.8333	26.58	25.80	2,682	1
Pachymerus bactris	Panama	8.9000	−79.5833	26.94	26.43	1,844	1
Pachymerus bactris	Panama	8.8064	−79.5167	26.98	26.50	1,717	1
Pachymerus bactris	Venezuela	10.2469	−67.5961	24.98	24.17	932	1
Pachymerus bactris	Venezuela	10.4000	−66.9000	19.53	18.33	1,084	1
Pachymerus bridwelli	Argentina	−28.5000	−59.0500	20.80	15.52	1,063	1
Pachymerus bridwelli	Argentina	−31.3869	−58.0200	18.63	12.98	1,277	1
Pachymerus bridwelli	Argentina	−32.2667	−68.4167	17.69	9.70	150	1
Pachymerus bridwelli	Argentina	−25.2833	−57.7167	23.24	18.58	1,375	6
Pachymerus bridwelli	Argentina	−25.1600	−58.1464	22.66	18.10	1,124	1
Pachymerus bridwelli	Argentina	−25.7050	−54.2483	20.13	15.63	1,767	1
Pachymerus cardo	Bolivia	−14.2333	−63.5167	25.50	23.72	1,458	1
Pachymerus cardo	Brazil	−2.0500	−59.9000	26.84	26.45	2,802	7
Pachymerus cardo	Brazil	−22.9675	−43.2239	22.53	20.08	1,401	1
Pachymerus cardo	Brazil	3.4167	−61.6667	26.69	25.95	1,760	8
Pachymerus cardo	Colombia	3.5394	−76.3036	23.93	23.58	1,026	1
Pachymerus cardo	Colombia	4.1267	−76.3706	21.36	20.98	1,463	1
Pachymerus cardo	Colombia	4.6647	−76.0486	23.28	22.82	1,332	1
Pachymerus cardo	Colombia	3.3753	−76.5336	23.98	23.48	1,307	G. E. Morse collections (this paper)
Pachymerus cardo	Costa Rica	11.2178	−85.6125	26.31	25.38	2,149	1
Pachymerus cardo	French Guiana	4.8167	−53.2667	25.23	24.63	2,664	1
Pachymerus cardo	Guyana	6.2800	−57.5753	27.16	26.77	1,156	1
Pachymerus cardo	Guyana	6.8064	−58.1453	26.85	26.42	2,335	1
Pachymerus cardo	Honduras	15.7000	−86.8500	24.35	22.23	2,121	2
Pachymerus cardo	Honduras	15.7667	−87.0000	26.46	24.45	2,569	2
Pachymerus cardo	Panama	9.1667	−79.8333	26.58	25.80	2,682	1
Pachymerus cardo	Panama	9.0000	−79.7500	26.39	25.70	2,363	1
Pachymerus cardo	Panama	8.8792	−79.7822	26.77	26.23	2,003	1

Table S4. Cont.

Species	Country	Latitude	Longitude	MAT	CQMT	MAP	Source
Pachymerus cardo	Panama	9.0483	−79.6606	26.36	25.65	2,183	1
Pachymerus cardo	Panama	9.0833	−79.6167	26.35	25.65	2,099	1
Pachymerus cardo	Panama	9.0333	−79.6333	26.35	25.70	2,190	1
Pachymerus cardo	Panama	9.0933	−79.6516	25.99	25.23	2,292	G. E. Morse collections (this paper)
Pachymerus cardo	Panama	9.0618	−79.6437	26.36	25.65	2,183	G. E. Morse collections (this paper)
Pachymerus cardo	Peru	−4.9081	−73.6667	26.83	26.25	2,632	4
Pachymerus cardo	Peru	−3.9167	−73.7500	26.39	25.80	2,712	4
Pachymerus cardo	Peru	−4.9167	−73.6667	26.83	26.25	2,632	4
Pachymerus cardo	Peru	−12.6333	−69.2000	25.51	23.93	2,245	4
Pachymerus cardo	Trinidad and Tobago	10.6667	−61.5167	25.72	24.83	1,861	1
Pachymerus cardo	Trinidad and Tobago	10.6636	−61.5267	26.57	25.72	1,618	1
Pachymerus cardo	Venezuela	10.2469	−67.5961	24.98	24.17	932	1
Pachymerus cardo	Venezuela	8.4258	−70.6281	26.83	26.47	1,772	1
Pachymerus cardo	Venezuela	10.1117	−68.0653	24.56	24.08	1,233	1
Pachymerus cardo	Venezuela	10.4000	−66.9000	19.53	18.33	1,084	1
Pachymerus cardo	Venezuela	8.8041	−65.2019	26.92	26.42	1,221	G. E. Morse collections (this paper)
Pachymerus cardo	Venezuela	8.9333	−67.4167	27.38	26.43	1,196	1
Pachymerus cardo	Venezuela	8.4822	−72.3317	28.10	27.30	2,285	1
Pachymerus cardo	Venezuela	9.8753	−70.9619	27.73	27.23	1,402	1
Pachymerus nucleorum	Bolivia	−17.4500	−63.6667	24.13	20.97	1,572	CAS (this paper)
Pachymerus nucleorum	Brazil	−12.9742	−38.5133	25.12	23.55	1,834	1
Pachymerus nucleorum	Brazil	−21.7000	−57.8667	25.08	21.12	1,284	1
Pachymerus nucleorum	Brazil	−10.8125	−50.6189	27.39	26.43	1,812	CAS (this paper)
Pachymerus nucleorum	Paraguay	−23.4308	−56.4989	22.91	19.07	1,427	G. E. Morse collections (this paper)
Pachymerus sveni	Brazil	−3.1033	−60.0114	27.45	26.98	2,153	1
Pachymerus sveni	Brazil	−3.9164	−38.6075	25.77	25.00	1,406	1
Pachymerus sveni	Brazil	−1.4372	−48.4706	26.88	26.45	2,438	1
Pachymerus sveni	Brazil	−22.8750	−43.2775	23.02	20.52	1,256	1
Pachymerus sveni	Brazil	−28.4000	−54.9667	20.68	15.72	1,901	1
Pachymerus sveni	Venezuela	10.4000	−66.9000	19.53	18.33	1,084	1
Pachymerus thoracicus	Paraguay	−25.2833	−57.6333	23.30	18.67	1,403	6
Pachymerus undetermined species	Paraguay	−25.5100	−57.5600	22.87	18.23	1,388	G. E. Morse collections (this paper)
Pachymerus undetermined species	Paraguay	−23.3442	−57.0442	23.46	19.30	1,348	G. E. Morse collections (this paper)
Speciomerus giganteus	Brazil	−17.8872	−51.7181	23.52	21.70	1,535	1
Speciomerus giganteus	Brazil	−2.9381	−51.8617	26.65	26.20	2,067	1
Speciomerus giganteus	Colombia	8.9833	−73.9667	28.43	27.87	2,086	1
Speciomerus giganteus	Costa Rica	10.0631	−84.7700	26.81	25.92	1,872	1
Speciomerus giganteus	Panama	9.1667	−79.8333	26.58	25.80	2,682	1
Speciomerus giganteus	Panama	9.3728	−79.8811	26.74	26.10	3,256	CAS (this paper)
Speciomerus giganteus	Panama	9.1317	−79.7769	26.41	25.57	2,497	1
Speciomerus giganteus	Paraguay	−25.5333	−57.0500	21.48	17.17	1,453	G. E. Morse collections (this paper)
Speciomerus giganteus	Paraguay	−23.4308	−56.4989	22.91	19.07	1,427	G. E. Morse collections (this paper)
Speciomerus giganteus	Peru	−3.9167	−73.7500	26.39	25.80	2,712	4
Speciomerus giganteus	Peru	−4.9167	−73.6667	26.83	26.25	2,632	4
Speciomerus revoili	Paraguay	−24.1500	−55.7000	22.57	18.47	1,550	G. E. Morse collections (this paper)
Speciomerus revoili	Paraguay	−25.5333	−57.0500	21.48	17.17	1,453	G. E. Morse collections (this paper)
Speciomerus rubrofemoralis	Brazil	−17.8872	−51.7181	23.52	21.70	1,535	1
Speciomerus rubrofemoralis	Brazil	−15.4333	−55.7500	22.87	20.88	1,548	1
Speciomerus rubrofemoralis	Brazil	−16.4681	−54.6414	24.93	22.35	1,523	1
Speciomerus ruficornis	Brazil	−2.8333	−55.1333	26.15	25.68	1,957	1
Speciomerus ruficornis	Brazil	−15.4333	−55.7500	22.87	20.88	1,548	1
Speciomerus ruficornis	Brazil	−12.7667	−55.6000	24.95	23.63	1,852	1

Table S4. Cont.

Species	Country	Latitude	Longitude	MAT	CQMT	MAP	Source
Speciomerus ruficornis	Paraguay	−23.4308	−56.4989	22.91	19.07	1,427	G. E. Morse collections (this paper)
Speciomerus undetermined species	Paraguay	−25.3500	−57.5167	22.63	18.10	1,408	G. E. Morse collections (this paper)
Speciomerus undetermined species	Paraguay	−23.3442	−57.0442	23.46	19.30	1,348	G. E. Morse collections (this paper)
Caryobruchus gleditsiae	Dominican Republic	18.8300	−69.8000	25.89	24.10	1,946	1
Caryobruchus gleditsiae	Mexico	21.9100	−99.3000	22.40	17.48	1,339	GBIF
Caryobruchus gleditsiae	Mexico	22.3600	−105.0000	23.62	20.22	1,304	GBIF
Caryobruchus gleditsiae	United States	25.8500	−97.4000	23.19	16.60	687	GBIF
Caryobruchus gleditsiae	United States	26.3300	−98.2000	23.08	15.48	584	GBIF
Caryobruchus gleditsiae	United States	28.4300	−99.7000	21.93	13.00	555	GBIF
Caryobruchus gleditsiae	United States	28.8800	−97.9000	20.97	12.30	739	GBIF
Caryobruchus gleditsiae	United States	29.4200	−98.4000	20.65	12.02	697	GBIF
Caryobruchus gleditsiae	United States	29.4500	−98.5000	20.70	12.03	688	GBIF
Caryobruchus gleditsiae	United States	27.2900	−81.3000	22.37	16.72	1,220	GBIF
Caryobruchus gleditsiae	United States	28.1200	−80.6000	22.33	16.77	1,246	GBIF
Caryobruchus marieae	Colombia	4.7400	−76.1000	19.07	18.65	1,880	GBIF
Pachymerus sp.	Brazil	−3.1100	−60.0000	27.45	26.98	2,153	GBIF
Pachymerus cardo	Brazil	−19.5000	−40.6000	24.32	22.20	1,170	GBIF
Pachymerus cardo	Colombia	3.5390	−76.3000	23.93	23.58	1,026	GBIF
Pachymerus cardo	Colombia	4.1260	−76.3000	22.88	22.45	1,236	GBIF
Pachymerus cardo	Colombia	4.7400	−76.1000	19.07	18.65	1,880	GBIF
Pachymerus cardo	Venezuela	8.1590	−70.2000	27.69	27.37	1,535	GBIF
Speciomerus giganteus	Costa Rica	10.8364	−85.6155	24.92	24.08	1,725	GBIF
Speciomerus giganteus	Costa Rica	10.8563	−85.6119	24.92	24.08	1,725	GBIF
Speciomerus giganteus	Costa Rica	10.9625	−85.4953	21.73	20.88	2,723	GBIF
Speciomerus giganteus	Costa Rica	10.5848	−83.5292	26.33	25.42	5,033	GBIF
Speciomerus giganteus	Costa Rica	10.5396	−83.5065	26.25	25.35	4,701	GBIF
Speciomerus giganteus	Costa Rica	8.7594	−83.2831	26.21	25.38	4,840	GBIF
Speciomerus giganteus	Costa Rica	9.3877	−84.1328	26.36	25.50	3,758	GBIF
Speciomerus giganteus	Costa Rica	9.7675	−84.6081	26.31	25.47	2,587	GBIF
Speciomerus giganteus	Costa Rica	9.7742	−84.6081	26.31	25.47	2,587	GBIF
Speciomerus giganteus	Costa Rica	8.6791	−83.5667	25.25	24.40	3,826	GBIF

Decimal latitude and longitudes used. Climate analysis performed using DIVA-GIS software with the WorldClim dataset (9, 10).

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