

Supplementary Materials

Table S1. Main species of pest locusts and grasshoppers around the world today (modified from Lecoq & Zhang 2019). Phase polymorphism: indicate the presence of a density-dependent phenotypic plasticity which can concern nymphal colour (C), morphometrics ratios (M), physiology (P) and/or behaviour (B). Question mark denotes the possibility based on inconclusive and anecdotal evidence. A dash indicates the absence of phase polymorphism (modified from Song 2011).

Species	Principal biogeographic range	Phase polyphenism
<i>Acanthacris ruficornis</i> (Garden locust)	Sub-Saharan Africa from the West African forest zone south to South Africa and east to Saudi Arabia and Yemen	-
<i>Ageneotettix deorum</i> (White whiskered grasshopper)	Western and central N America	-
<i>Aiolopus simulatrix</i> (Sudan plague locust)	West Africa to West and South Asia	C? P?
<i>Anacridium melanorhodon</i> (Sahelian tree locust)	<i>A. m. melanorhodon</i> : Cape Verde, West Africa to Red Sea coast. <i>A. m. arabafum</i> : Arabian Peninsula, West Asia, East Africa	C
<i>Aulocara elliotti</i> (Bigheaded grasshopper)	Western N America	-
<i>Austracris guttulosa</i> (Spur throated locust)	Australia, Papua New Guinea, Indonesia, Philippines	-
<i>Boopedon nubilum</i> (Ebony grasshopper)	From West Canada and United States to Mexico	-
<i>Boopedon diabolicum</i> (Black short-winged grasshopper)	Southwestern Mexico	-
<i>Calliptamus italicus</i> (Italian locust)	Europe, North Africa, Central and West Asia	M P B?
<i>Calliptamus turanicus</i> (Turanian locust)	Kazakhstan, Kyrgyzstan, Turkmenistan, Uzbekistan, Tadjikistan, NW China, NE Iran, Afghanistan	-
<i>Camnula pellucida</i> (Clearwinged grasshopper)	North America	-
<i>Ceracris kiangsu</i> (Yellow-spined bamboo locust)	East and South-eastern Asia	?
<i>Chorthippus albomarginatus</i> (Lesser marsh grasshopper)	Temperate and subtemperate Old World including Europe and temperate Asia	-
<i>Chortoicetes terminifera</i> (Australian plague locust)	Australia	M P B
<i>Chondracris rosea</i> (Cotton locust)	China, India, Pakistan, Burma, Philippines, Indonesia, Japan, and other south eastern parts of Asia	-
<i>Diabolocatanops axillaris</i> (Devil grasshopper)	Savannah regions from Cape Verde to Ethiopia, Arabian Peninsula and Iran, and south to Zimbabwe and Mozambique	-
<i>Dichroplus elongatus</i> (Elongated grasshopper)	Chili, Argentina, Uruguay, southern Brazil	-
<i>Dichroplus maculipennis</i> (Spotted-wing grasshopper)	Chili, Argentina, Uruguay, southern Brazil	-
<i>Dociostaurus kraussi</i> (Krauss' cross-backed grasshopper)	South-East Europe, South-West Siberia, Kazakhstan, North-East China, Kyrgyzstan, Turkmenistan, Uzbekistan, Tadjikistan, Afghanistan, North Pakistan	-
<i>Dociostaurus maroccanus</i> (Moroccan locust)	Southern Europe, Canary Islands, Madeira, North Africa, East and Central Asia	C M P B?
<i>Eyprepocnemis plorans</i> (Berseem grasshopper)	Southern Europe, Caucasus, most of Africa (absent from desert, tropical rainforest and SW Africa)	-
<i>Gomphocerus sibiricus</i> (Siberian grasshopper)	North Eurasia, South Siberia, North Kazakhstan, North Mongolia and North-East China - Mountains of South Europe, Caucasus, Central Asia	-
<i>Hieroglyphus banian</i> (Rice grasshopper)	Pakistan, Afghanistan, India, Nepal, Bhutan, Bangladesh, Burma, Thailand, N. Vietnam, China, Sri Lanka	-
<i>Hieroglyphus nigrarepletus</i> (Rice grasshopper)	Pakistan, India, Bangladesh	-
<i>Kraussaria angulifera</i>	Sahel and Sudan zones from Senegal in the West to Eritrea in the East	-
<i>Locusta migratoria</i> (Migratory locust)	Widespread all over the Old World, from sea-level to more than 4,000 m in Central Asian mountains.	C M P B
<i>Locustana pardalina</i> (Brown locust)	South Africa (Nama-Karoo regions), Namibia, Botswana	C M P B?
<i>Melanoplus differentialis</i> (Differential grasshopper)	Widely across North America	-
<i>Melanoplus femurrubrum</i> (Redlegged grasshopper)	Widely across North America	-
<i>Mermiria bivittatus</i> (Two-striped grasshopper)	Widely across North America	-
<i>Melanoplus sanguinipes</i> (Migratory grasshopper)	Widely across North America	C

<i>Mermiria bivittata</i> (Mermiria grasshopper)	From south-central Canada, through United States, into Mexico	-
<i>Nomadacris septemfasciata</i> (Red locust)	Africa south of Sahara (mainly south of the equator and Indian Ocean islands)	C M P B
<i>Oedaleus decorus</i> (Handsome cross grasshopper)	Semi-arid areas of Eurasia from the Atlantic coast to the Pacific mountainous area, North Africa, Canary Islands, and Madeira	-
<i>Oedaleus senegalensis</i> (Senegalese grasshopper)	Sahelian region of Africa from Cape Verde to Sudan, extending into Middle East and India.	C?
<i>Oxya chinensis</i> (Chinese rice grasshopper)	Myanmar, China, Taiwan, Korea, Japan, India, Indonesia, Malaysia, Russia and Vietnam	-
<i>Oxya hyla</i> (Smaller rice grasshopper)	Africa, Madagascar, Oriental region west (<i>O. h. hyla</i>) or east (<i>O. h. intricata</i>) of Indo-Myanmar barrier	-
<i>Patanga succincta</i> (Bombay locust)	Widely distributed in Southeast Asia: China, India, Indonesia, Japan, Malaysia, Pakistan, Philippines, Sri Lanka, Taiwan, Thailand, Vietnam, Taiwan.	C M P
<i>Rhammatocerus schistocercoides</i> (Mato Grosso locust)	Brazil (Rondonia, Mato Grosso, Goiás), Colombia (llanos), Peru, Venezuela	C B
<i>Schistocerca cancellata</i> (South American locust)	Chile, Argentina, Paraguay, Uruguay, southern Brazil	C M P B?
<i>Schistocerca gregaria</i> (Desert locust)	Africa north of equator, Middle east, Arabian and Indo-Pakistani Peninsulas	C M P B
<i>Schistocerca interrita</i> (Peruvian locust)	Ecuador, Peru, northern Chile, east of the Andes	C? M?
<i>Schistocerca piceifrons</i> (Central American locust)	<i>S. p. piceifrons</i> : Mexico, Guatemala, Belize, El Salvador, Honduras, Nicaragua, Costa Rica. <i>S. p. peruviana</i> : Peru	C M P B?
<i>Stauroderus scalaris</i> (Dark-winged grasshopper)	Southern part of the boreal zone (steppes); South Europe, Caucasus, Asia Minor, Central Asia, Iran (mountains)	-
<i>Brachystola magna</i> (Plain lubber grasshopper)	United States, Mexico	-
<i>Tropidacris collaris</i> (Quebrachera grasshopper)	Most tropical South America	-
<i>Bufonacris claraziana</i> (Toad grasshopper)	Argentina	-
<i>Phymateus viridipes</i> (Green bush locust)	Tropical East, Central and South Africa	-
<i>Sphenarium purpurascens</i> (Corn grasshopper)	United States, Mexico	-
<i>Zonocerus elegans</i> (Elegant grasshopper)	Southern, east-central and East Africa, Madagascar	-
<i>Zonocerus variegatus</i> (Variegated grasshopper)	Africa south of the Sahara, Ethiopia, Angola, DR Congo, Kenya	-