



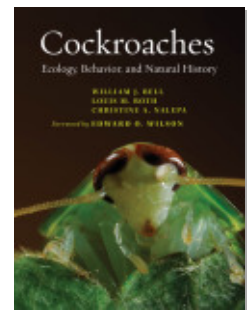
PROJECT MUSE®

---

## Index

### Published by

Wilson, Edward O., et al.  
Cockroaches: Ecology, Behavior, and Natural History.  
Johns Hopkins University Press, 2007.  
Project MUSE. <https://dx.doi.org/10.1353/book.3295>.



➔ For additional information about this book  
<https://muse.jhu.edu/book/3295>

# Index

- accessory glands: female, 44; male, 73, 89, 94, 110. *See also* uric acid, uricose glands
- activity rhythms, 39–41, 49, 54, 61, 62, 140, 141. *See also* seasonality
- aggregation(s), 79, 132–41, 145, 149, 152, 153, 157, 160, 163, 169, 172; cost of, 137, 141; and disease transmission, 87; environmental influences, 136, 137; formation of, 86; as nurseries, 140–41; relatedness in, 133–34; size and composition, 134–35. *See also* pheromones
- aggression, 3, 63, 71, 135, 140, 141, 151, 163, 175; during courtship, 106; male-male, 90, 102, 134; maternal, 127, 132, 142, 145; in termites, 156
- aging, 19, 106, 122
- Aglaopteryx*, 59, 133
- Agmoblatta*, 113
- Allacta*, 20, 37, 102
- Alloblatta*, 50
- allometry, 3, 6, 9, 10, 123
- Alluaudellina*, 14, 52, 54, 157
- Amazonina*, 100
- American cockroaches. *See* *Periplaneta americana*
- amoebae, 76, 77, 87
- Anamesia*, 47, 167
- Anaplecta*, xii, 24, 111, 112
- Anaplectinae, xii, xiii, 25, 53, 97, 124
- Anaplectinae, 5
- Anastatus*, 127
- Ancaudellia*, 31, 32, 49
- Angustonicus*, 30
- Anisogamia*, 8, 40, 44, 167
- antibiotics, 82, 78, 87, 172
- ants, 5, 58, 69, 71, 166; *Acromyrmex*, 50; *Atta*, 29, 50; *Campanotus*, 29, 50; *Crematogaster*, 28, 39, 50; *Dorylus*, 50; *Formica*, 29; as hosts, 20, 28–29, 39, 50–51, 83, 153, 156; *Pogonomyrmex*, 11; as predators, 11, 127, 128, 132, 138, 142, 145; *Pseudomyrmex*, 50; *Solenopsis*, 29, 50
- Apotroglia*, 41, 134
- Aptera*, 142
- aquatic cockroaches, 57–58. *See also* rafting; swimming
- Archaea, 159, 172
- Archiblatta*, xii
- Archiblattinae, xii
- Archimandrita*, 6, 97
- Arenivaga*, 22–23, 32, 38, 50, 51, 54–56, 62, 68, 70, 94, 134, 154; morphology, 5, 12, 20, 23, 36; as prey, 170; spermatheca, 111–13
- Aspiduchus*, 52, 173
- asymmetry, 2, 101
- Attaphila*, 6, 7, 13–14, 35, 50, 51, 126, 153, 156; phoresy, 28–29; size, 7
- Australian burrowing cockroaches. *See* *Geoscapheini Austropolyphaga*, 47
- bacteria, 69, 70, 76–83, 86–88, 158–61, 166–67, 169, 171; in caves, 75; in soil, 172. *See also* bacteroids; hindgut microbiota; methanogens; pathogens
- bacteroids, 73, 74, 83–88, 100, 147, 151, 160–61, 175; phylogeny of, 83–84; transmission of, 83
- Balta*, 4, 27, 68
- Bantua*, 3, 12
- bats, 15, 40, 41, 52, 74, 77, 139, 171. *See also* guano
- beetles, 1, 3, 12, 33, 46, 48, 74, 75, 104, 137, 145, 172; Lampyridae, 5; mimicry of, 4–5, 7, 24, 25, 58, 128; *Monolepta*, 5; *Oides*, 5
- Beybienkoa*, 69
- bioluminescence, 91
- biomass, 54, 59, 166–67, 169, 170, 172
- birds, 133, 139, 163; droppings/guano, 35, 69, 74, 78–79, 85, 86, 99, 101, 118, 149, 158; nest as habitat, 29, 37, 51, 58, 59, 77, 119, 132, 166, 172; as predators, 50, 128, 171
- Blaberidae, xii, xiii, 12, 64, 90, 92, 93, 96, 99, 101, 106, 108, 109, 111–13, 119, 123, 124–26, 130, 140, 142
- Blaberinae, xii, 10, 94
- Blaberus craniifer*, 33, 41, 72, 84, 87, 94, 108, 110, 122, 130, 134; aggregation, 136; aggression, 102; brooding, 142; burrowing, 23; in caves, 52; copulation, 106; flight, 26; pronotum, 3, 4; size, 6, 8; spermathecae, 113
- Blaberus* (genus and other species), xii, 5, 6, 21, 26, 33, 46, 47, 52, 78, 88, 97, 106, 117, 123, 129–30, 134, 136, 146; in caves, 39, 41,

- Blaberus* (continued)  
51, 74; locomotion, 18, 19; pheromones, 138, 140
- Blaptica*, xii, 10, 35
- Blatta*, 8, 20, 26, 27, 42, 52, 57, 67, 72, 96, 101, 108, 121, 140, 172; aggregation, 133; building behavior, 154; ootheca, 117–18, 121, 129
- Blattabacterium*. See bacteroids
- Blattella germanica*, xi, 2, 7, 18, 19, 20, 38, 57, 70, 72, 84, 121, 153, 156; activity cycle, 40; aggregation, 131–41; autotilly, 156; cannibalism, 71; in caves, 52; coprophagy, 79; courtship/copulation, 90, 99, 101, 106, 107, 110; flight, 26; foraging, 62–65, 76; genitalia, 101–3; gestation, 110; migration, 33; nuptial gifts, 100–101; ootheca, 117–19, 123–28; sanitary behavior, 87; size, 8–10; sperm, 94–95; spermathecae, 113–15; spermatophore, 94, 108; starvation, 67, 122; tergal gland, 98–99; uric acid, 99–101
- Blattella* (genus and other species), 15, 50, 52, 71, 74, 75, 93, 98, 100, 114, 119, 127–29, 132, 139; *asahinai*, 19, 26, 39, 46, 68, 71, 90, 174; *vaga*, 26, 65, 67, 71, 77, 121, 122, 128, 143, 146
- Blattellidae, xii, xiii, 7, 16, 18, 54, 62, 64, 80, 84, 91, 94, 96, 98, 103, 108, 111, 114–15, 123, 124–26, 153, 169, 170, 174
- Blattellinae, xii, 84, 94, 99, 101, 102, 104, 111–12, 114, 119, 124–25
- Blattidae, xii, xiii, 106, 123, 153
- bromeliads. See epiphytes
- brood sac, 65, 91, 108–10, 116, 119–21, 123–26, 128–30, 146–48
- burrowing/building, 9, 20, 45–50, 55, 105, 153–55; ecological impact of, 165–68; head raising, 3, 23; sand swimming, 22–23; scratch digging, 21–22; tooth digging, 22; and wing loss, 34
- Byrsotria*, 2, 96, 97, 102, 104, 106, 108, 109, 119, 120–23, 130, 136, 142, 146, 153
- Caeparia*, 30, 31, 32
- calcium oxalate, 125–26
- calling, 91, 106, 107, 140
- Calolampra*, 46, 68, 70, 125, 172
- cannibalism, 71–73, 83, 87, 117, 126–27, 130, 140–42, 147, 151, 153, 157, 158, 161, 175
- canopy cockroaches, 4, 7, 25, 28, 29, 34, 37, 42, 44, 45, 50, 58–60, 62, 68, 69, 93, 166, 169, 170; dominance of habitat, xii, 58, 169. See also epiphytes; soil, suspended
- Capucina*, 4, 10, 11, 38, 62, 65, 66, 69
- Cardacopsis*, 5, 24
- Cardacus*, 24
- Cariblatia*, 18, 38, 41, 55, 58, 65, 66, 68, 69, 100, 133
- carnivory, 70–73; in caves, 74–75; predation, 71, 151, 171
- Cartoblatta*, 123, 138
- cave cockroaches, 6, 7, 9, 27, 34–36, 41–42, 44–46, 51–54, 71, 127, 131–34, 138, 139, 154, 172–74; diet, 61, 70, 73–75; morphology, 5, 14–16, 20, 28, 29–30; oothecae of, 54; as prey, 171; zonation, 39, 52–53
- Celatoblatta*, 27, 37, 42, 43, 173
- cellulase, 77–78, 151, 159, 165
- cellulose, 77–79, 81, 159
- chitinase, 73, 83
- Chorisia*, 119
- Chorisonaura*, 24, 28, 34, 51, 58, 133
- Chorisoserrata*, 104
- Choristima*, 24
- Chromatonotus*, 43
- Coelophora*, 5
- Colapteroblatta* 2, 7, 12, 48
- cold tolerance, 37, 42–43, 86, 173
- Coleoptera. See beetles
- coloration, 2, 4–6, 16, 36, 58, 91, 118; aposematic, 4, 138, 142; cryptic, 4, 118, 128, 130; lack of, 5; of musculature, 25–26; of oothecae, 125–26; of wings, 24, 31–32
- communication, 3–4, 14, 19, 41; acoustic, 92–93, 137, 152–53. See also pheromones.
- competition, 10, 141, 156, 173; for food, 62–63, 72, 121, 138, 147, 148, 174; for mates, 3, 8, 89, 96, 101–2, 105, 134. See also aggression; sperm, competition
- Compsagis*, 12, 13, 48
- Compsodes*, 29
- Comptolampra*, 20
- conservation, 173–74
- conspecific food, 64, 71–73, 141, 149, 152, 158; evolution of secretions, 129
- coprophagy, 51, 64, 73, 77, 78–80, 85–87, 142, 157, 158, 160, 161, 163, 172. See also feces; guano
- copulation. See mating
- courtship, 27, 73, 91–93, 96, 98–99; copulatory, 103–5; female response to, 106–7
- crevice fauna, 10, 32, 34, 44–46, 132, 134, 137. See also harborage
- Cryptocercidae, xii, xiii, 5, 12, 22, 46, 48, 97, 105, 142, 145, 150–51, 154; as decomposers, 166–67
- Cryptocercus*, xii, 10, 12, 20, 26, 43, 44, 48, 49, 70, 81–82, 84, 86, 105, 169; allogrooming, 73; altricial development, 5, 147; bacteroids, 83; burrowing/building, 3, 22, 154–55; cannibalism, 72, 130; cold hardiness, 43, 86; coprophagy, 80; copulation, 90, 97, 105; dispersal, 33; ecology, 171–74; paedomorphosis, 35–36; oothecae, 72, 118, 123; parental care, 129, 145–48; as prey, 170; pronotum, 3; sanitary behavior, 87, 154; size, 7, 8; spermathecae, 111–12; in relation to termites, 150–63; trophallaxis, 80
- cuticular hydrocarbons, 51, 135, 153
- Cyrtotria*, 2, 3, 12, 32, 49
- defensive behavior, 11, 14; in aggregations, 137–38; chemical defenses, 4, 11, 87, 128, 130, 138, 172; parental, 145, 146, 161
- Dendroblatta*, 100, 133, 138
- Derocalymma*, 43
- Deropeltis*, xii, 46
- desert cockroaches, 28, 54–57; ecological impact, 167–69; as prey, 170; wing loss in, 34. See also Polyphagidae
- Desmozosteria*, 142, 167
- detritus. See plant litter
- development, 10, 44, 81, 86, 88, 139, 141, 155–58, 161–64; altricial, 5, 147, 164; arrested, 155, 156; control of, 155–57; embryonic, 120–21, 129; injury and, 156; nutrition and, 85, 156; precocial, 123. See also group effects; heterochrony; life history
- diapause, 43–44
- diet, 10, 40, 57, 61–75; aquatic cockroaches, 57; cave cockroaches, 73–75; inquilines, 50; mixing, 63; quantity, 66, 167; sexual differences, 64–65; and social behavior, 149, 158, 164. See also guano; microbivory; wood feeding
- digestive tract: crop, 66; hindgut, 66, 77, 86, 166; proventriculus, 70, 82. See also hindgut microbiota
- Diploptera*, 11, 19, 24–26, 71, 91, 94, 113, 140; copulation, 105–8, 110; courtship, 93; development, 8–10, 163; foraging, 62, 64, 65, 68; group size, 134; sperm competition, 95–96; starvation, 67; viviparity, 73, 119–23, 125, 128–30
- Diplopterinae, 25, 94, 125
- disease. See pathogens
- dispersal, 27, 32, 33, 34, 45, 46, 141, 153, 173. See also migration
- distribution, 35, 39, 44, 49, 122, 132, 169, 170; relation to diet, 36, 48, 53, 63; vertical stratification, 41–42, 54–55, 60, 62. See also plant associations
- Dryadoblatta*, 57
- Ectobiinae, 25, 111–12, 124
- Ectobius* 3, 4, 7, 28, 30, 33, 39, 40, 42, 68, 113, 121, 134, 166, 170, 171, 173; life-cycle, 43–44; oothecae, 117–18, 123

- Ellipsoidion*, 4, 41, 68, 83, 90, 102, 118
- Elliptorhina*, 3, 12, 93
- endangered species, 49, 171, 173
- Epilampra*, 24, 39–42, 51, 57, 58, 65, 66, 69, 70, 92, 166
- Epilamprinae, xii, 57, 96, 99, 143
- epiphylls, 40, 62, 65, 69, 71
- epiphytes, 18, 28, 29, 37, 45, 50, 52, 57–60, 166; bromeliads, 29, 38, 57, 58, 60, 91, 166
- Eremoblatta*, 22
- Ergaula*, xii, 46, 50
- Escala*, 2, 32, 39
- Eubacteria, 159
- Eublaberus*, 33, 39, 41, 46, 51–53, 66, 72, 74, 87–88, 90, 108, 121, 122, 127; aggregation, 133–34, 136, 141; building behavior, 154; copulation, 105, 106; courtship, 93
- Eucarya, 159
- Eucorydia*, 4
- Eumethana*, 52
- Euphyllodromia*, xii, 40, 84
- Eupolyphaga*, 37
- Eurycotis*, xii, 8, 26, 38, 60, 66, 67, 98, 106, 133, 138, 140; ootheca, 117–18, 127
- eusociality: evolution of, 148, 151–64; trophic shift model, 161–63
- Euthlastoblatta*, 51, 54
- Euzosteria*, 153
- exocrine glands, 87–88; defensive tergal glands, 72–73, 138; male tergal glands, 2, 16, 27, 73, 92, 96–99, 106, 107, 115, 129
- external rumen, 81
- exuvia, as food, 69, 72–73, 83, 139, 158
- fat body endosymbionts. *See* bacteroids
- feces/fecal pellets, 76; attractants in, 135–36, 139, 141, 153; as building material, 3, 22, 153–55, 157; ecological impact of, 166–67, 169–72; size, 7. *See also* coprophagy
- fecundity, 8, 31, 35, 122, 126, 128–29, 175
- fire ecology, 173–74
- flight. *See* wings and flight
- foraging behavior, 61–65, 138–39, 145; in burrowers, 62–63; cyclical, 64–66, 128; on leaves, 68–69; ontogeny of, 63–64
- fossils, xii, 2, 4, 6, 7, 33, 150, 151
- fungi, 42, 48, 61, 69, 70, 75–77, 79, 81–83, 87, 88, 165, 166, 167, 169; cultured by social insects, 28, 50, 83; mycorrhizae, 82, 168; nitrogen content, 81; as pathogens, 87, 88, 155, 172
- genitalia, male, 16, 89, 101–5, 110; male-female coevolution, 114–15
- Geoscapheini, 3, 7, 9, 21–22, 30, 31, 33, 46, 49, 70, 126, 173; courtship, 93; distribution, 49, 54; ecological impact, 167–68; evolution of, 49; foraging, 62; genitalia, 105; life history, 49; migration, 33; morphology, 2; parental care, 145
- Geoscapheus*, 22, 31, 32, 49, 70, 78, 117, 120, 167
- German cockroach. *See* *Blattella germanica*
- gestation, 40, 109–10, 116, 119–21, 123, 124, 126, 129, 130, 147; length of, 110, 128, 148
- global warming, 173
- Griffiniella*, 51
- Gromphadorhina*, 2, 3, 19, 21, 46, 49, 57, 72, 88, 92, 96, 109, 129, 137; copulation, 102; courtship, 93; parental feeding, 119–20, 130, 131, 142–43, 146, 147; size, 7–9
- grooming, 73, 81–82, 87, 152, 157, 158, 163
- group effects, 9, 132, 137, 140, 141, 145; and reproduction, 96, 123, 140; in relation to termites, 155, 156–57, 158, 163
- guano, 15, 21, 23, 35, 39, 45–46, 53, 54, 64, 71, 73–75, 134, 138, 153–54, 166, 171, 173
- Gyna*, 38, 41, 50, 53, 58, 74, 123, 134
- gynandromorphs, 2
- Haanina*, 27
- habitat(s), 20, 33, 37–60, 76; conservation of, 173–74; impact in, 166–70; stratification, 134; and wing loss, 27–29, 34–35
- harborage, 38–40, 42, 43, 62, 63, 131–41, 153
- hatch, 43, 44, 47, 48, 116–17, 119, 121, 122, 124, 128, 134, 140, 142; asynchrony of, 72, 147, 161
- Hebardina*, 28, 33, 74
- Hemithyrocera*, 102
- herbivory, 66–69; in caves, 74; cryptic, 69, 170; leaf foraging, 68–69; nectar, 62, 68, 170; pollen, 68–69, 82, 170
- heterochrony, 150, 152, 157–58, 163–64; paedomorphosis, 35–36, 105, 150, 157, 163–64
- Heterogamia*, 167
- Heterogamisca*, 56, 70
- Heterogamodes*, 46
- hindgut microbiota, 66, 68, 77–78, 149, 151, 158–60, 168–69, 171–72; transmission to juveniles, 78–80, 87, 141, 160. *See also* protozoa
- Holocampsa*, 28
- Homalopteryx*, 10, 142
- Homoeogamia*, 33
- Homopteroidea*, 102
- hygiene. *See* sanitary behavior
- Hymenoptera, 5, 51, 58, 152, 155; bees, 170; *Melipona*, 51; *Polybia*, 51; *Vespula*, 51, 172. *See also* ants; parasites, wasp
- Hypercompsa*, 113
- hypopharyngeal bladders. *See* water balance
- Hyporichnoda*, 41
- Imblattella*, 18, 41, 58, 66, 69, 84
- immunology, 86, 88, 141
- investment: in immune system, 88, 141; male, 98–101, 145; nitrogenous, 72, 157; parental, 85, 115, 122, 123, 129–30, 147–48, 163
- Ischnoptera*, 4, 14, 24, 28, 38, 41, 42, 84, 98
- Isoptera. *See* termites
- Jagrehnia*, 92, 106
- juveniles, 38–40, 45, 75, 81, 140, 143, 149, 153, 155–58, 163; aggregation of, 132, 134, 157; color, 4; difficulty in identifying, 1–2, 58; foraging, 62, 80, 141, 158; mortality factors, 43, 140–42, 147–48; nutritional requirements, 63–64, 78, 139, 146
- kin recognition, 135, 142, 152, 153, 157, 163
- laboratory selection, 26, 35, 141, 175
- Lamproblatta*, xii, xiii, 40, 47, 82, 111–12, 132
- Lanxoblatta*, 10, 133
- Latiblattella*, 27, 39, 60, 64, 66, 68, 100, 102, 170
- Lauraesilpha*, xii, 30, 47
- Laxta*, 2, 4, 7, 10, 28, 32, 36, 47
- learning, 63, 139–41, 172
- Leiopterooblatta*, 13
- Leptozosteria*, 10
- Leucophaea*. *See* *Rhyparobia*
- life history, 85, 175; and eusociality, 164; and seasonality, 43–44; of soil burrowers, 49; tradeoffs, 35, 88; of wood feeders, 48, 161
- Litopeltis*, 47, 57, 70
- Loboptera*, 52, 54, 104, 113–15, 118
- Lobopterella*, 28
- locomotion (terrestrial): adhesion to substrate, 19–21, 28, 68, 143, 145; bipedal, 18; climbing, 19–21; during gestation, 126, 128; hindrance by offspring, 148; during mating, 102; speed, 17–18; stability, 18–19, 27
- Lophoblatta*, 100, 104, 117, 119, 124–26, 129–30
- Lucihormetica*, 91
- Macropanesthia rhinoceros*, 19, 21–22, 32, 36, 49, 70; burrows, 21, 168; ecological impact, 167–68, 172; foraging, 40; genitalia, 105; mating, 92; pronotum, 3, 6; size, 6–7, 9
- Macropanesthi* (genus and other species), 6, 7, 12, 25, 31, 49, 72, 105, 117, 120, 129, 145, 147, 167
- Macrophyllodromia*, 58, 71
- mantids, 14, 84, 150–52
- Margattea*, 44, 46, 170
- Mastotermes*, 83, 84, 86, 105, 126, 151, 161–62

- Mastotermitidae, xii, 151, 161  
 mate choice, 86, 91, 98–99;  
 cryptic, 101, 104–5, 114  
 mate finding, 64, 91, 139–40  
 mating, 101–5; behavioral  
 sequence, 92–93; female  
 control of, 106–7; fre-  
 quency, 90–91; length of,  
 90, 93; secondary effects  
 of, 110–11, 122–23; type I,  
 92, 101; type II, 92; type  
 III, 92, 105  
 mating system, 89–91;  
 monandry, 90, 96, 105;  
 monogamy, 90, 105, 108,  
 164; polyandry, 90, 96  
*Mediastinia*, 46  
 medicine, cockroach as, 172  
*Megaloblatta*, 6, 58, 62  
*Metanocticola*, 53, 96  
*Methana*, 30, 47, 118  
 methanogens, 77, 158;  
 methane production, 78,  
 171–72  
 microbivory, 64, 70, 75–83, 86  
*Microdina*, 3, 31  
 migration, 9, 33, 34, 42, 54,  
 62, 127, 133, 134, 137, 175.  
 See also dispersal  
 mimicry, 4, 27, 51, 88, 98,  
 110. See also beetles, mim-  
 icry of  
*Miopanesthia*, 30–32  
*Miriamrothschildia*, 59, 100,  
 113, 170  
*Miroblatta*, 6  
*Molytria*, 46  
*Monastria*, 4, 10  
 montane cockroaches, 28, 36,  
 37, 43, 48, 169–71  
 morphology, 1–4, 17, 20–21,  
 81; of borers, 12; of bur-  
 rowers, 5–6, 12, 22–23; of  
 cave cockroaches, 13–14,  
 52; of conglobulators, 11–  
 12; of desert cockroaches,  
 12–13; flattened, 10–11;  
 of juveniles, 1–2, 25; of  
 myrmecophiles and termi-  
 tophiles, 13–14. See also  
 pronotum; sexual dimor-  
 phism; wings and flight  
 myrmecophiles, 7, 13–14, 28–  
 29, 35, 50, 51, 153, 156. See  
 also nests  
*Myrmecoblatta*, 7, 13–14, 28,  
 50  
*Nahublattella*, xii, 58, 66, 84,  
 104  
*Nauphoeta cinerea*, xii, 51, 71,  
 122; activity cycle, 40; ag-  
 gregation, 133, 140; brood-  
 ing, 142; copulation, 94,  
 102, 104; courtship, 91, 93,  
 106–7; fighting 3; flight,  
 26; ovoviviparity, 117,  
 119–21, 128; partheno-  
 genesis, 121; pheromones,  
 91, 140; receptivity, 106–  
 10; sperm, 94, 96; starva-  
 tion, 66–67; stridulation/  
 vibration, 3–4, 93  
*Nelipophygus*, 14  
*Neoblattella*, 113  
*Neogeoscapheus*, 31, 32, 49, 120  
*Neolaxta*, 2, 27  
*Neoloboptera*, 104  
*Neopolyphaga*, 90  
*Neostylopyga*, 20, 26, 28, 52,  
 66, 67, 106  
*Neotemnopteryx*, 20, 33, 52, 96  
*Neotrogloblattella*, 14, 52, 75  
*Nesomylacris*, 29, 39, 40, 41, 66  
 nests, 37, 45, 58, 77, 153–55,  
 172; parental care in, 145,  
 146, 148; of social insects,  
 7, 11, 27, 28–29, 34, 35, 38,  
 39, 50–51, 83, 126; of ver-  
 tebrates, 54–55, 134. See  
 also birds, nest as habitat;  
 myrmecophiles; termito-  
 philes  
 nitrogen, 65, 68, 72, 73, 80,  
 81, 122, 139, 147–49, 157–  
 58, 163, 164, 166–67; fixa-  
 tion, 159, 171; from urates,  
 63, 83–86, 99–101, 161  
*Nocticola*, 42, 50, 52–54, 75,  
 126, 173; morphology, 7,  
 13, 14–16, 24, 28, 35, 157  
 Nocticolidae, xii, 14, 16, 52,  
 126  
*Nondewittea*, 104  
 nuptial gifts, 8, 73, 86, 95,  
 99–101, 115  
 nurseries, 21, 38, 40, 87, 140–  
 41, 155  
 nutrient limitation, 15, 35,  
 85. See also starvation  
*Nyctibora*, xii, 20, 50, 58,  
 111–12, 114, 118, 127, 133  
 Nyctiborinae, xii, 111, 124  
*Nyctotherus*, 77–78; phy-  
 logeny of, 80  
 omnivory, 61, 63, 78, 81, 139  
*Onychostylus*. See *Miri-  
 amrothschildia*  
 oogenesis, 64, 110, 125, 163;  
 dependence on nutrients,  
 122  
 oothecae, 116–30, 161, 162,  
 172; cannibalism of, 71–  
 73; casing, 105, 125–26,  
 128; of cave cockroaches,  
 54; concealment, 117–18,  
 126–27, 153–54; egg  
 number, 123; flight while  
 carrying, 26, 128; forma-  
 tion of, 110; frequency of  
 laying, 128; permeability,  
 118–19; rotation, 124–25.  
 See also hatch  
*Opisthoptera*, 20, 24, 44, 57,  
 70, 172  
 orientation, 19, 50, 135, 142,  
 152, 153; in caves, 14; in  
 deserts, 23; to sun, 33;  
 visual, 91  
 Orthoptera, 35, 66–67, 84,  
 151  
*Oulopteryx*, 51  
 oviparity, 110, 116–19, 123–  
 29; and social behavior,  
 141–42, 149  
 ovoviviparity, 110, 116–17,  
 119–21, 123–130; cost of,  
 128–29; and social behav-  
 ior, 141–42, 146, 149  
 oxygen, 21, 45, 128; hypoxia,  
 54–55  
 Oxyhaloinae, xii, 93, 94, 96,  
 133  
 paedomorphosis. See hete-  
 rochrony  
*Pallidionicus*, 30  
*Panchlora*, 4, 47, 62, 92, 123,  
 130  
 Panchlorinae, 93, 94, 105  
*Panesthia*, 44, 48–49, 70, 73,  
 78, 81, 92, 106, 107, 135,  
 158, 167; endangered,  
 173; genitalia, 102, 105;  
 ootheca, 120; sociality, 105,  
 145; wings, 30–33  
 Panesthiinae, xiii, 2, 5, 12, 20,  
 34, 46, 48, 81, 105, 146; as  
 decomposers, 166–67;  
 evolution of, 31–32, 49;  
 wing development, 30–32  
*Paramuzoa*, 47  
*Parapanesthia*, 31, 32, 49, 120  
*Parasigmoidella*, 102  
 parasites, 45, 46, 81, 87, 117,  
 127, 137, 158, 171, 172;  
 as selection pressure, 126;  
 wasp, 50, 71, 126–27, 174  
*Parasphaeria*, 47  
*Paratemnopteryx*, 15, 20, 24,  
 33, 50–53, 74, 75, 85, 127,  
 132; kin recognition, 153;  
 morphological variation,  
 14, 29, 30, 36  
*Paratropes*, 58, 68, 111, 170  
*Parcoblatta*, xii, 4, 8, 26, 38,  
 41–43, 51, 59, 63–66, 68,  
 70, 71, 82, 91, 96, 102, 105,  
 106, 113, 122, 133, 136,  
 172; oothecae, 111, 117–  
 18, 135; as prey, 171; urate  
 excretion, 85–86  
*Parellipsoidion*, 43  
 parental care, 5, 11, 48, 123,  
 134, 141–49; biparental,  
 90, 143, 145, 148, 149;  
 brooding, 80, 132, 142,  
 148; in burrows 145–46,  
 148; cost of, 127–29, 148–  
 49, 161–64; feeding, 64,  
 73, 80, 120, 129–30, 131,  
 142–48, 158, 161; parent-  
 offspring conflict, 147–48.  
 See also trophallaxis  
 parthenogenesis, 121–22  
 pathogens, 45, 46, 76, 80, 82,  
 87–88, 117, 127, 172, 174;  
 sexually transmitted, 88;  
 and social behavior, 87,  
 137, 141, 147. See also sani-  
 tary behavior  
*Pellucidoniscus*, 30  
*Pelmatosilpha*, 51, 118  
 perching, 20, 29, 39, 40, 41,  
 42, 58, 69, 93, 142, 153  
*Periplaneta americana*, xi, 2,  
 7, 27, 38, 40, 41, 72–73, 78,  
 80, 83, 86, 93, 108, 111,  
 115, 121, 123, 153, 174–75;  
 aggregation, 132–37, 140–  
 41, 171; in caves, 52; co-  
 prophagy, 79; copulation,  
 90, 102, 107, 110; develop-  
 ment, 155, 157; digging,  
 48–49, 154; flight, 25–26,  
 35; foraging, 64, 65; geni-  
 talia, 103; as herbivore, 68;  
 immunology, 88; learning,  
 63; locomotion 17–21;  
 ootheca, 117–19, 125–27;  
 as predator, 63, 71; as prey,  
 171; in sewers, 53; size, 8;  
 sperm, 94, 96; starvation,  
 65–67, 130, 156; swim-  
 ming, 23–24; uric acid, 84;  
 water balance, 57  
*Periplaneta* (genus and other  
 species), xii, 8, 20, 26, 38,  
 39, 43–44, 50, 57, 63, 66,  
 67, 71, 72, 74, 78–79, 84,  
 98, 105, 118, 121, 122, 126,  
 127, 129, 132–33, 135,  
 140, 145, 146, 155, 170,  
 172  
*Perisphaeria*, 11, 33, 43  
 Perisphaeriinae, 2, 11, 12, 49,  
 144, 146



- Perisphaerus*, 11, 12, 129, 142, 144, 146–47
- pest cockroaches, 33, 37, 61, 63, 70–71, 81, 133, 134, 172, 174; control of, 87, 141, 171; of plants, 67–68, 170
- pheromones, 89, 172; aggregation, 86, 87, 132, 134–36, 139–41; alarm, 138; dispersal, 141; kairomones, 126; oviposition, 135; sex, 35, 42, 91, 93, 97, 106, 107, 140; trail, 50, 139, 153
- Phlebotomus*, 143, 146
- Phoetalia*, xii, 51, 125
- Phoraspis*, 143
- phoresy, 28–29
- Phortioeca*, 10
- Phyllodromica*, 57, 97–98, 122, 132
- phylogeny, 36, 132, 175; bacteroids, 84; Blattellidae, 124; *Celatoblatta*, 27; cockroaches, xii, 84; Dictyoptera, 150–52; *Nyctotherus*, 80; Panesthiinae, 31–32, 49
- Pilema*, 3, 12, 24, 49
- plant associations, 10, 48, 49, 54, 68, 167, 169; *Acacia*, 4, 20, 32, 49, 50, 68, 167
- plant litter, as food, 49–50, 62, 64, 65, 69–70, 74, 77, 80–81, 144, 165–70, 173–75. *See also* wood feeding
- Platyzosteria*, 4, 7, 10, 41, 59, 138
- Plecoptera*, 7, 24, 113
- Plecopterinae, xii
- Poeciloblatta*, 142
- Poeciloderrhis*, 24, 57, 70
- pollination, 170, 174
- Polyphaga*, xii, 52, 54, 84, 111–12, 121, 134
- Polyphagidae xii, xiii, 13, 22–23, 24, 32, 36, 54, 92, 96, 111, 124
- Polyphaginae, xii
- Polyphagoides*, 47
- Polyzosteria*, 2, 13, 51, 52, 81, 93, 118
- Polyzosteriinae, xii, 4, 28, 41, 47, 91, 112
- population(s): gene flow in, 16, 36, 133; levels, 9, 14, 33, 48, 53, 71, 131, 134, 141, 146, 166, 167, 169, 171, 173–74; microbial, 77, 79; variation in, 20, 44
- predation on cockroaches, 4, 9, 11, 14, 45, 46, 50, 54, 71, 127, 137–38, 141, 158, 170–71; evasion of, 25, 126, 128, 130, 138. *See also* defensive behavior
- Princisia*, 3
- pronotum, 2–4, 6, 11, 12, 14, 22, 23, 91, 93, 157
- Prosoplecta*, 4, 5, 24
- protandry, 8
- protein, 63–66, 72–73, 79, 81–83, 100, 111, 126–28, 130, 138–39, 146, 156; in maternal secretions, 116, 120, 129; microbial, 64, 81, 82, 158; in tergal secretions, 98, 129
- protozoa, 70, 76, 79, 87, 166, 172; ciliates, 77, 168; flagellates, 77, 82, 151, 158–60, 163. *See also* hindgut microbiota; *Nyctotherus*
- Pseudoanaplectinia*, 7, 28, 50, 51, 119, 125
- Pseudobalta*, 119, 125, 130
- Pseudoderopeltis*, 46
- Pseudoglomeris*, 11, 33, 145
- Pseudomops*, 111–13
- Pseudophoraspis*, 146, 148
- Pseudophyllodromiinae, xii, 84, 99, 101, 103, 111–12, 119, 124–25
- Punctulonicus*, 30
- Pycnoscelinae, 94
- Pycnoscelus*, 8, 26, 38, 46, 49, 67, 94, 110, 123, 128, 130, 140; in caves, 52–53, 74–75; copulation, 92; digging, 49; parthenogenesis, 121–22; as prey, 171
- rafting, 27, 28
- refugia, 42, 46, 55
- reproductive mode, 116–17; evolution of, 123–29. *See also* oviparity; ovoviviparity; viviparity
- respiration, 13, 54, 55, 137, 142, 157, 172; in gut bacteria, 159; of methane, 171; while running, 21; under water, 57–58. *See also* oxygen
- Rhabdoblatta*, 57, 169
- Rhyparobia maderae*, 51, 57, 72, 110, 119, 121, 140, 146; activity cycles, 40, 41; aggregation, 133, 153; courtship, 93, 106; flight, 26; foraging, 64, 65; spermathecae, 113–14; spermatophore, 108–9; starvation, 67, 122; tergal gland, 98, 129
- Rhyparobia* (genus and other species), 6, 128, 130
- Riatia*, 58, 84
- robots, 19, 137
- Robshelfordia*, 2, 47
- Rothisilpha*, 30
- Salganea*, 5, 7, 31–32, 36, 48, 90, 153; parental care, 145–48, 158
- sampling, 74, 169, 175; in canopy, 58–59; light traps, 27, 37, 42, 43, 46, 59, 174; in pitcher plants, 68; pitfall traps, 15, 169, 173; windowpane traps, 42
- sanitary behavior, 49, 87, 148, 152, 154–55, 161, 172. *See also* grooming
- Scabina*, 28
- Schizopilia*, 133
- Schultesia*, 5, 32, 51, 132, 133
- seasonality, 9, 33, 34, 35, 39, 42–44, 46, 54, 59, 62, 63, 68, 69, 70, 74, 77, 137, 166, 169
- self organization, 137, 163–64
- semelparity, 148, 162, 164
- sensory trap, 98
- sewers, 26, 33, 42, 45, 52–53, 76, 78
- sexual dimorphism, 2–3, 7–9, 25, 30, 32, 33, 35; and starvation resistance, 66
- sexual receptivity, 106–10; cyclic, 90; female loss of, 107–10; male control of, 100, 105, 108–9; and reproductive mode, 110
- Shelfordina*, 68, 82
- Simandoa*, 46, 75
- size, 6–10, 25, 35, 128, 141, 167, 172; of eggs, 123; of neonates, 120–21; and reproduction, 123
- Sliferia*, 119, 124–26, 129–30
- soil burrowing cockroaches. *See* Geoscapheini
- soil, 165–66; geophagy, 75; suspended, 60, 165, 169; type, 49
- solitary cockroaches, 132
- Spelaoblatta*, 14, 16, 52
- sperm, 89, 90–91, 98, 100, 110; choice by females, 86, 101, 104–5, 111–14; competition, 90, 95–96, 101; influence on reproduction, 121–22; male-female conflict over use, 114–15; manipulation by males, 103, 104, 114–15; morphology, 94–95; and receptivity, 107–8; transfer from spermatophore, 94
- spermathecae, 91, 94–96, 103–5, 107–8, 110–15; multiple, 114; shape, 113–14
- spermathecal glands, 94, 108, 111–13
- spermatophores, 89, 91, 93–94, 97, 99–101, 103, 104, 107–12, 114, 140; ejection, 108; nutritional value of, 110–11
- Sphecochyla*, 51
- spirochetes, 77, 158, 171
- starvation, 8, 15, 64, 65–67, 74, 78, 82, 85, 86, 99, 120, 122, 130, 140, 147, 156, 175
- Stayella*, 119, 124–25
- stridulation, 3, 93
- subgenital organ, 93, 153
- subsociality. *See* parental care
- Sundablatta*, 47
- Supella*, xii, 7, 9, 26, 38, 51, 63, 87, 103, 121, 128, 139, 140; copulation, 90; courtship, 106; feeding/foraging, 64–65, 152; oothecae, 117–18, 135; receptivity, 107; size, 8; sperm, 94; spermathecae, 111–12; spermatophore, 94, 110
- swimming, 23–24, 57, 58
- symbionts. *See* bacteroids; hindgut microbiota
- Symploce*, 24, 28, 44, 52, 74, 85, 128
- taxonomy: characters used in, 20, 30, 70, 97, 101, 117, 124; difficulties in, 4, 32, 35, 36
- tergal glands. *See* exocrine glands
- termites, xii–xiii, 70, 77, 82, 88, 105, 126, 148, 175; *Archotermopsis*, 156; *Cubitermes*, 156; ecological impact, 169, 171–72; evolution/phylogeny, 84, 150–64; Kalotermitidae, xii, 151; *Macrotermes*, 50; mating, 92; *Nasutitermes*, 50; *Odontotermes*, 28, 50; *Porotermes*, 156; as prey, 63, 71; *Reticulitermes*, 86, 159, 163, 169, 172; Termitidae, xii, 151, 154; wings, 31, 157; *Zootermopsis*, 155, 156. *See also* *Mastotermes*; Mastotermitidae

- termitophiles, 7, 13–14, 28, 52. *See also* nests  
*Thanatophyllum*, 132, 140, 142  
*Therea*, 45, 84, 90, 92, 117, 123, 138, 140  
 thigmotaxis, 19, 45, 135, 152  
*Thorax*, 26, 56, 60, 70, 129, 143, 146, 148  
*Tivia*, 20, 50  
 traps. *See* sampling  
*Trichoblatta*, 4, 32, 68, 128, 145, 146  
*Trogloblattella*, 7, 16, 52, 53, 74, 75  
 troglomorphy, 14–16, 29, 52, 53–54  
 trophallaxis, 80, 82, 151, 158, 160, 161, 163, 164  
  
 Tryonicinae, xii, 30  
*Tryonicus*, xii, 20, 47, 113–14  
*Typhloblatta*, 52  
  
 urates. *See* uric acid  
 uric acid, 63, 66, 71, 80, 83–86, 99–101, 161; uricose glands, 99–101  
  
 vibration. *See* communication, acoustic; stridulation  
 vibrocrypticity, 21  
 vitellogenesis. *See* oogenesis  
 viviparity, 64, 116–17, 120–21, 123, 125–26, 128–30, 141, 146; “milk” composition, 120  
  
 water balance, 9, 11, 12–13, 28, 43, 54–57, 117–19, 126, 127, 137, 141; cyclical drinking, 65–66; of microorganisms, 166, 168–69  
 wings and flight, 2, 4, 24–36, 128, 157; in caves, 29; cost of, 28; dealation, 30–31; ecological correlates, 27–29; evolution, 31–34; flight-oogenesis syndrome, 35; folding, 24; nectar as fuel, 68; physiology, 25–26, 35; reduction, 25–27, 33–36; variation within taxa, 30–33  
*Wolbachia*, 88  
 wood feeding, 46–48, 62, 70, 166–67; and sociality, 145, 152. *See also* cellulase; hindgut microbiota; plant litter  
  
*Xestoblatta*, 40, 41, 51, 52, 65, 66, 93, 130; spermathecae, 111–13; uricose glands, 73, 100  
  
 yeasts, 63, 77, 81  
*Ylangella*, 47  
  
 Zetoborinae, 94  
*Zonioploca*, 52