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Chapter 1 : The Ultimate Guide to Studying Insects - Eva Varga

*Incredible Bugs/Ultime Guide to the World of Insects [Rick Imes] on calendrierdelascience.com *FREE* shipping on qualifying offers. The Ultimate Guide to the world of insects.*

Dick Buscher The Great North American desert is a vast, forbidding region that stretches from Oregon and Idaho southward down the west side of the continent into the northern territories of Mexico. It is a rain-starved land situated between the towering barriers of the Rocky Mountains and the fertile, moist ranges along the Pacific Ocean. Best estimates place the land area of the four major deserts Great Basin, Mojave, Chihuahuan and Sonoran that make up the North American desert to be from , to more than , square miles 1. An aphid dinner Credit: NPS Yet, despite the incredible extremes of heat and cold, flooding and drought so typically found across the North American deserts, life is plentiful – especially insect life. Entomologists have identified and described over 10, different species of insects that make these inhospitable lands their homes and estimate that as many insect species are awaiting discovery. Shown here is a common seven-spotted ladybug beetle, *Coccinella septempunctata*, looking for aphids upon which to dine within the beautiful yellow bloom of a Foothill Palo Verde tree, *Parkinsonia microphylla*. NPS Within the Sonoran Desert region alone, there are over 1, species of bees representing 45 genuses in seven families. Over 3, varieties of flowering vascular plants are also found across this sweeping desert landscape. Among this vast floral mixture is an incredible diversity of insects and small, vertebrate pollinators. Most desert plants are suitable for pollination by native bees, with others best adapted for beetles, wasps, flies, butterflies and moths. A few small vertebrates, such as hummingbirds and bats, are also common desert pollinators. Pollinators come to the flowers of the desert for their sugary nectar as well as their protein-rich pollen that is used to feed both themselves and their young. Shown here, a common desert honey bee, *Apis mellifera*, feeds on the spring flowers of a foothill palo verde tree, *Parkinsonia microphylla*. Even though the large bees appear somewhat fearsome, they are usually a very docile insect that rarely stings. Carpenter bees do not form colonies like their honey bee cousins, as each female builds her own nest as a tunnel in soft or decaying wood. She then dutifully divides the tunnel into cells and supplies each cell with nectar and pollen before depositing an egg. With the hatching of the larva, the stored food provides enough nutrition for the larva to pupate and then emerge into an adult carpenter bee. A member of the Diptera order, these defenseless bee flies mimic the stinging bees so as to avoid being eaten by insectivorous birds and lizards. These non-stinging flies are also not attracted to human food. They occupy most of their day flying near the ground and feeding from the many varieties of desert flowers. Their long and specialized flower-feeding mouthparts may look dangerous but are only a natural straw used to dine on the sweetness of nectar. Within the Chihuahuan Desert alone, over species of butterflies make their homes in this shrub-dominated desert. Within the boundary of the Sonoran Desert, over species of butterflies have been identified. The wide topographies found across the North American Deserts result in many varieties of rainfall patterns, microclimates and plant distribution, thus resulting in the great variety of butterflies. Shown here is the monarch butterfly, *Danaus plexippus*, which is found both living in and migrating across all the deserts of North America. NPS The vast majority of desert butterflies are rather sedentary in their life cycle. Adults tend to cluster near the food source of their larvae. When the annual summer rainy season brings a new growth of plant life and flower bloom, an influx of desert butterflies from other nearby regions occurs. Such winged visitors to the deserts tend to depart as soon as the rains disappear and the hot, dry weather returns. The Mormon metalmark butterfly, *Apodemia mormo*, shown here, is a common sight along the desert roadside and washes from Sinola, Mexico to southwestern Canada. NPS There are 37 species of milkweed plants found across the plains and deserts of the American West. Desert milkweed, *Asclepias subulata*, is a common plant along the washes and hillsides in both the Sonoran and Mojave Deserts at elevations up to 2, feet m. The milkweed plants are a crucial food source for not only the milkweed butterflies like the Monarch, *Danaus plexippus*, and Queen butterflies, *Danaus gilippus*, but also for the

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common desert milkweed bug, *Lieges kalmii*, shown here. These true bugs with their modified elongated proboscis mouthparts, often gather in large numbers to feed on the leaves, seeds and stems of milkweed plants. NPS Coleoptera, more commonly known as beetles, are the most numerous species of the animal kingdom with over 250,000 different species identified across the world. Across North America, over 25,000 different species of beetles are known, with thousands making their homes across the deserts of North America. The inflated beetle, *Cysteodemus armatus*, shown here, is a common resident seen walking across the desert soil during the cool weather of spring. Their grossly enlarged elytra and abdomens make for an odd appearance. The yellowish material seen on their elytra is a toxic material that makes these small, lumbering desert critters off limits to predator birds, toads and lizards in their shared desert environment. A flamboyant insect Credit: NPS The thick exoskeleton of desert beetles helps to minimize the loss of moisture, an important benefit for all insects that live in such arid conditions. Many species of beetles burrow into the desert soils that not only provide relief from the extreme heat but also protection from always present predators. Shown above, the master blister beetle, *Lytta magister*, a flamboyant desert beetle which is a common sight feeding on desert flowers and pollen. The larva of these beetles are unwelcome parasites in the nests of ground nesting insects, especially bees. Many differing species find their ecological niche in the vast and differing biomes found across the deserts. Desert grasshoppers tend to spend the winter months buried in the desert soil as eggs. When the springtime sun once again warms the desert lands, new plant growth begins and a new generation of grasshoppers hatch. A second annual generation of grasshoppers again hatch across those deserts which experience a yearly summer rain pattern. Like all grasshoppers, desert grasshoppers forge on the new growth of desert shrubs and wildflowers and are a vital source of food for desert-dwelling birds, reptiles and amphibians. Shown above is the desert granite grasshopper, *Lepus intermedius*, exhibiting a most effective camouflage coloration for living in the North American deserts. NPS Wherever small ponds of water are found across the North American deserts, so too are the desert dragonflies. Some species of dragonflies have been identified across the American deserts, and if you add in their close damselfly relatives, that number jumps to nearly 100 different species. Shown above is the Flame Skimmer, *Libellula saturata*, which can be found near hot springs from Idaho southward into northern Mexico. NPS Some desert insects have truly unique defensive behaviors. Such is the case of the pinacate beetle, *Eleodes obscurus*, shown here. These common darkling beetles are also known as "clown beetles" and "stinkbugs. If approached by a predator, this beetle will quickly take up a defensive position with its head on the sand and its abdomen high into the air. Insects of the North American Deserts Credit: Dick Buscher The insects of the North American deserts have evolved well for not only living but thriving in the harsh conditions of the deserts. They have evolved to survive without a daily source of liquid water, in heat that would shrivel most living things and in soil that is often best described as solid rock. Their many colors, shapes, sizes and behaviors are all testaments to the amazing natural world in which we all live.

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Chapter 2 : Photos: Amazing Insects of the North American Deserts

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Share Shares 1K Warning: However, there are around , species of flies in the world many are yet to be discovered and some of them are accomplished predators. Robber flies are among these; they have extremely sharp eyesight and can fly at high speed, catching other insects in mid air. They have stabbing mouthparts proboscis which inject a powerful neurotoxic venom and digestive juices into the victim, liquifying its innards, which the fly sucks afterwards. Robber fly venom is usually harmless to humans, but if captured they can give an extremely painful bite. However, they are the scourge of small aquatic animals, which they capture with their strong, modified forelegs. Water scorpions are sort of the insect equivalent of a crocodile; they are slow moving ambush predators that snatch any small animal that comes close; mostly, they feed on other aquatic insects such as mosquito larvae and diving beetles, but they have been known to dine on small fish and frogs once in a while. Although they have wings, their flight muscles are poorly developed and they fly rarely, usually when the ponds or lakes where they live start to dry up and they must find a new residence. As for the long, tail-like projection at the end of their abdomen, it is actually a breathing tube; the water scorpion uses it to collect oxygen from the surface, and can subsequently remain underwater for up to half an hour before it has to breathe again. They usually live in the ceiling of dark, secluded caves, away from wind currents and sunlight. The larvae spin a nest of silk produced by themselves and hang several silk threads from the cave ceiling, around the nest. Each one of these threads is covered on sticky droplets of mucus, sometimes loaded with venom. The Arachnocampa larva can glow like a firefly, which attracts flying insects such as moths to the sticky threads and to a horrible end. Once the unfortunate insect is caught, the larva tones down its glow, pulls the silk thread up and starts feeding voraciously on the entangled prey, whether it is alive or dead. Compared to this, a Tiger Beetle is a slowpoke; it can only run at a speed of 8 kms 5 mph per hour. But if we take its size into account, it is actually the fastest animal in the world! If we could run as fast as the tiger beetle, proportionally to our size, we could reach speeds of almost kms mph per hour! This speed is so extreme that a running Tiger Beetle must stop constantly to locate prey, since its eyes are unable to process visual information at such high speed. Tiger Beetles feed on whatever small animal they can subdue; they hunt mostly on land, but are also skilled flyers and have been known to catch other insects in the air too. Their sharp mandibles can easily sever the limbs and body parts of other insects, sometimes bigger than the Tiger Beetle itself. There are many species of Tiger Beetle and they are among the most abundant insect predators, being extremely useful to humans as they help control pests. The larvae of these beetles are also fearsome predators, but instead of chasing their prey, they prefer to wait in ambush, hidden underground, and capture any passing insect with their enormous jaws. Antlion larvae, on the other hand, are deadly insect predators, and just like Arachnocampa, they have developed a most amazing trick to capture prey. They live in sandy places, where they dig a funnel-shaped pit, cleverly designed so that no insect can climb its steep walls. The antlion then buries itself in the bottom of the pit. Once the antlion larva has secured its prey, it sucks its body fluid with the tooth-like projections of its jaws, and then throws the dry carcass out of the pit. There are plenty of species, and most of them are harmless to man although some have excruciatingly painful bites. Often, a species of assassin bug will specialize in a certain kind of prey; for example, some of them feed only on spiders, others prefer ants, etc. Like many other insects, assassin bugs are unable to feed on solid matter. Some of them cover their bodies with bark, dust, or even dead insects to disguise their appearance and scent, and sneak up on unsuspecting prey. Spider-hunting assassin bugs often mimic the vibrations produced by insects entangled in a spider web; the spider attacks, thinking that it has caught a tasty meal, only to be killed and devoured itself. Perhaps the most amazing assassin bug is a certain species that feeds on ants. It produces a

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sugary substance through its abdomen, which serves as bait for the sweet-loving ants. But the sugary substance is also loaded with a powerful tranquilizer; soon, the ant collapses, paralyzed, and the assassin bug can suck its innards without any resistance. It is among the fastest flying insects, reaching almost 90 kms 56 miles per hour which is even more amazing if we consider its small size and apparent fragility. It can dive-bomb, hover like a helicopter, and even fly backwards, and its enormous eyes, which cover almost all of its head, give it near degree vision, so that no insect escapes its attention. Dragonflies feed on any flying insects they can catch, and also on spiders, which they capture from their webs. Although they usually hunt and devour prey at high speed in the air, they can also snatch spiders and insects from exposed surfaces. Dragonfly larvae are also formidable predators; they are aquatic, and use their protractile, sharp mouthparts to stab other small animals to death, including small fish, frogs and other dragonfly larvae. Siafu ants have very large, sharp jaws and venomous stings, which they use to subdue small animals such as lizards, worms and other insects. However, there have been reports of cows, goats and other domestic animals that were tied to trees or poles by their owners, and, unable to get out of the way, were killed by the Siafu ants. Wild animals avoid ant armies on the move, and some naturalists have claimed that even lions and elephants flee away from them. Also, one tourist that was reported as missing in Tanzania was later found to have been killed by Siafu ants. It is said that these larger victims may not die of envenomation after being stung, but rather of asphyxia, since the attacking ants will go into any body orifice and crawl into the lungs. There are many species of praying mantis, or mantids, around the world, but they are all perfect ambush hunters, armed with long, modified forelegs armed with sharp hooks to capture prey. These insects usually stand still, camouflaged, until a smaller insect or animal gets close; then they capture with a lightning fast movement, and start feeding whether the victim is alive or dead. They are extremely voracious and any kind of prey is good to them; they have been known to capture and devour spiders including the deadly black widow spider, lizards, small snakes and even birds. They are also infamously prone to cannibalism; females often bite off the head of the male during sex, and feed on the rest of him afterwards. Baby mantids are also known to feed on their siblings when food is scarce. Mantids are skilled flyers but they usually only fly at night, to avoid birds and other larger predators. They are armed with an incredibly potent venom, and inject great amounts of it; like other hornets, they can sting repeatedly. This venom is strong enough to cause serious illness, and even death, to humans; indeed, they are the most dangerous wild animal in Japan, killing around 40 people per year more than venomous snakes and bears combined. But the Japanese hornet uses its sting as a defensive weapon only; to kill prey, it uses its sharp jaws to decapitate the victim, and cut its body in small pieces. It then carries the carcass back to the nest, where it chews the dead insect into a soft paste to feed the larvae. To give you an idea of the destructive power of Japanese hornets, let us only say that a few of them can completely devastate a honey bee colony in a couple of hours, decapitating every single bee in the nest up to 30, one by one. When all the bees are dead, the hornets feed on the honey and then carry the bee larvae, and parts of the adult bee bodies, back to their own nest to feed their larvae. But Japanese honey bees are different; they evolved along with the hornet, and have developed an incredible trick to kill the hornet scouts as soon as they find their hive. Honey bees can survive this temperature, but hornets cannot; they are basically fried alive by the bees. With the scouts dead, the hornet colony never finds out about the location of the honey bee nest. Even the most formidable predatory insect has to meet its match one day!

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Chapter 3 : Backyard Monsters: The World of Insects

Incredible bugs: the ultimate guide to the world of insects Incredible bugs: the ultimate guide to the world of insects. by Imes, Rick. Publication date

August 29, A wildly diverse bunch, the class Insecta includes ants, bees, flies, beetles and much more. These creatures all possess a body composed of three segments – head, thorax and abdomen – encased in a hard exoskeleton. All insects also sport a pair of antenna, compound eyes and three pairs of jointed legs. From that basic body plan, emerge all sorts of amazing behaviors and abilities, as Live Science reveals here in 20 startling facts about insects. The most successful creatures. To date, scientists have catalogued about 1. But scientists have only begun to scratch the surface: Studies estimate the total number of species on Earth is probably closer to 9 million. A rhinoceros beetle shows off its antler-like horn. Beetles, of the insect order Coleoptera, are the most biodiverse group of creatures known, with more than , species described to date, making up 40 percent of all insect species on the books. When asked what a study of nature tells you about a creator, the British scientist J. Haldane once reportedly quipped that you can assume such a creator has "an inordinate fondness for beetles. This ensures that their species do not go extinct as readily as, say, mammal or amphibian species. A California harvester ant worker stands guard at the nest entrance. Planet of the ants. Outside in warm temperatures? Wilson estimated in their Pulitzer Prize-winning book, "The Ants" Belknap Press , that on the order of 10 quadrillion ants live on the planet at any given moment. In fact, only one true species of insect, a wingless midge called *Belgica antarctica* , calls the southernmost continent home, according to the Laboratory for Ecophysical Cryobiology at Miami University Ohio. The tiny fly is only 0. Why have insects failed to set up shop in the biggest biosphere on the planet? No one really knows why, but suggested explanations are that the oceans lack the plants for food and sheltering habitat that are found on land. Another possible explanation is that a cousin of insects, the crustaceans, have largely made the ocean their home, potentially muscling out their jointed-leg competitors. Breathing through their sides. Insects do not breathe through their mouths. They inhale oxygen and exhale carbon dioxide via holes called spiracles in their exoskeletons. Rather than closed vessels such as arteries and veins shuttling blood around, insects have an open circulatory system, in which their blood, called "hemolymph," bathes the organs. This vessel contracts to send hemolymph forward toward the head; from there, it sloshes around back into the rest of the body. Hemolymph is typically clear but can be greenish or yellowish, as anyone knows who has seen certain bugs splatter on their windshield or underfoot. The oldest insect fossil – a set of jaws, actually – goes back million years, suggesting insects were among the first animals to transition from sea to land. Insects, in other words, were around a good million years before dinosaurs came onto the scene. The largest insect ever known to have terrorized the skies is *Meganeuropsis*, or the griffinfly , which was an ancient dragonfly with a wingspan of up to 2. These ancient dragonflies preyed on other insects and small amphibianlike creatures during their reign from about million to million years ago. *Tinkerbella nana*, a new species of fairyfly from Costa Rica. The smallest insect, you ask? The evocatively named fairyflies from Costa Rica. In one of these wasp species, *Dicopomorpha echmepterygis* , the male is a mere 0. A prominent feature on insects is the compound eye, consisting of many individual visual units called ommatidia. A popular misconception promulgated tongue-in-cheek in this section title is that each unit acts as its own eye, each perceiving a total field of view. But in fact ommatidia act more like pixels, building up into a mosaic of imagery. The dragonfly is widely considered to have the most impressively ommatidia-studded compound eyes, with about 30, units per half-spheroid eye, according to researchers reporting in a issue of the online journal PLOS ONE. These ommatidia permit a nearly degree field of view, handy for snatching flying insect prey out of the sky. In addition to the two large compound eyes on either side of their heads, a number of insects have so-called simple eyes, or ocelli, in between, smack dab on their "foreheads. Recent studies have reported, however, that the ocelli, at least in dragonflies, seem specialized for detecting light, particularly when distinguishing the

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horizon, according to scientists writing in a issue of the journal *Vision Research*. As such, dragonflies can quickly differentiate up from down, as it were, and keep their bearings during acrobatic flight maneuvers, a feat of attitude-sensing that could work nicely for both piloted and unpiloted aircraft. Jerry Butler, now an emeritus professor of entomology at the University of Florida, once shot a pellet out of an air rifle to see if a male horsefly of the species *Hybomitra hinei wrighti* could catch it. Most insects live for only a few days or weeks as reproducing adults, having spent much longer periods as larvae and pupae, the first two stages of the three-part insect life cycle. There are exceptions, however. Amongst the Hymenoptera order ants, bees and wasps, the egg-laying queens of colonies can live for decades. In the case of the red harvester ant, *Pogonomyrmex barbatus*, queens can live perhaps as long as 30 years, according to research published in in the *Journal of Animal Ecology*. Taking the top prize are termite queens, which may reign for a half century, according to the USDA. Running out of baby names. Talk about creating a dynasty. Termite queens can produce 6, to 7, eggs in a single day. An entomologist once recorded a queen of the termite species *Macrotermes hellicosus*, found in Africa and Southeast Asia, cranking out an egg at a rate of one every 2 seconds, which would add up to 43, a day, assuming she never took a break, according to the USDA. The records for standing vertical jump for a human are in the inch cm range, from NFL and NBA players though there are claims of 64 inches for an amateur athlete, Kevin Bania. Either way, a human cannot jump higher than his or her own height. An insect called a meadow froghopper, species name *Philaenus spumarius*, on the other hand, can jump more than times its height, up to about 28 inches – the insect world record, a scientist reported in in the journal *Nature*. Scientists reported in in the *Proceedings of the Royal Society B* that the strongest insect on the planet is *Onthophagus taurus*, known variously as a horned dung beetle, bull-headed dung beetle and taurus scarab. The powerhouse beetle can pull 1, times its own body weight. Admittedly, humans can pull an amazing amount as well. Fast dragged the behemoth 28 feet 9 m. Assuming he weighs lbs. To prevent competitors from also inseminating female mates, some male insects stay latched to the female for days on end. The male Indian stick insect, *Necroscia sparaxes*, has the record in the scientific literature at 79 days. Scientists studying a comparatively short mating session of five-and-half-days in different stick insect species found genital contact occurring for only 40 percent of the hookup. Otherwise, a "male clasping organ," specifically a modified set of back legs, kept the female from straying. To scare off batty predators, this night flier rubs its genitals together to create ultrasound bursts. Can you hear me now? Insects have ears all over the place, yet rarely on their actual heads. Lacewings in the order Neuroptera have ears at the base of their wings. Crickets, including katydids, have thin sound-sensitive membranes on their legs. The ears of tachinids, a parasitic type of fly, peek out from their necks. Some hawkmoths, meanwhile, apparently can detect ultrasonic vibrations with their mouthparts, all the better for avoiding bats, which use sound to locate prey at night. To create their own ultrasonic bursts, to drive away bats, hawkmoths rub their genitals together. All bugs are insects, but not all insects are bugs. Not every insect is a bug. Strictly speaking, "bugs" are an order of insects called Hemiptera. These "true bugs," as entomologists also call them, are distinguished for having hypodermic-needle-like mouthparts. These beaks are perfect for piercing into tissue to slurp up fluids, whether from other insects, plants or – in the case of appropriately named bedbugs – blood from sleeping humans. Original article on Live Science.

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Chapter 4 : Incredible Bugs: An Eye-Opening Guide to the Amazing World of Insects by Rick Imes

incredible insects calendrierdelascience.comudyincredible bugs ultimate guide to the world of insectsincredible ladybugs,, , 24 pages, susan ashley bugs explore the amazing world of insects with this great ucce master.

Wherever you live in North America, your insects are included here. The more than 1, color pictures of insects and their damage are truly impressive and will be invaluable in helping readers track down the culprits of their plant injury. This wonderful reference will certainly become a classic. Whether you are a professional or a home gardening enthusiast, this is an indispensable reference. Understanding the way gardeners think, Cranshaw has logically organized the information according to the type of damage inflicted. Methods of controlling insect populations, in-depth discussions of beneficial insects, a comprehensive at-a-glance appendix of common plant-insect associations, and more than 1, color photos make this a marvel among insect identification manuals. Identification is the very first step in the process of opening the door of appreciation, and this book is the key. I know that sometime this summer I will carry a bug of some sort into the house to identify it in this volume. Gardens, and the diverse gardeners that tend them, are similarly widely distributed. Succinctly capturing this diversity, Cranshaw has constructed a lucid and well-illustrated text to allow gardeners to identify insects they encounter. Breadth of synthesis, high quality, and effective formatting justify this work as a valuable addition to the popular literature. An exceptionally well organized and complete text on garden insects. Almost every insect is illustrated, with well over 1, full-color photographs showing them in various life cycle stages. Its very simple but complete explanations, diagrams and photographs make this the best reference I have read for diagnosing virtually all insect problems. It will make you the neighborhood entomologist. Lerner, The Washington Post Garden Insects is destined to become the new bible for horticulturalists and home gardeners alike. Luckily, Garden Insects is also an exceptionally well-made paperback with water-resistant cover and pages that fall open without cracking the spine and stay open without having to balance a rock on top. Acquiring such knowledge has just become easier with the release of Garden Insects of North America. The overwhelming emphasis is on recognizing and categorizing the insects themselves, using appearance, type of destructive damage encountered and target food hosts as clues. With detailed, high-quality photographic plates conveniently adjacent to the standardized insect descriptions, identification of suspected insect enemies is straightforward.

Chapter 5 : [PDF] Amazing Crazy And Weird Bugs And Insects Download Full " PDF Book Download

Incredible Bugs/Ultime Guide to the World of Insects (1st Edition) by Rick Imes, Steve Parker, Jane Parker Hardcover, Pages, Published

Chapter 6 : 20 Startling Facts About Insects

The diverse range of insect life -- the largest animal group on our planet -- offers some of the most fascinating clues to the evolution & preservation of our most dynamic natural structure: the earth's ecosystem.

Chapter 7 : Bug City's Amazing Insect Warriors Movie Review

This book introduces you to the science of bugs without the scientific jargon getting too ridiculous. I learned a lot about insects and I must say they really are incredible.

Chapter 8 : 10 Formidable Predatory Insects - Listverse

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Get this from a library! Incredible bugs: an eye-opening guide to the amazing world of insects. [Rick Imes] -- An illustrated guide to insects, providing information on their evolution, taxonomy, anatomy and sensory characteristics, behavior, reproduction, metamorphosis, and more.