

1: Bumblebee Conservation Trust

The human bumblebee. pg. xiii-xxv in The Botany of Desire. Random House of Canada Limited, Toronto. Well, initially when I was assigned this week's readings and saw that it came from two separate books I immediately thought I would only do one blog post since it would be more work to do two and I tend to be a bit of a minimalist when it comes.

Feeding[edit] The bumblebee tongue the proboscis is a long, hairy structure that extends from a sheath-like modified maxilla. The primary action of the tongue is lapping, that is, repeated dipping of the tongue into liquid. When at rest or flying, the proboscis is kept folded under the head. The longer the tongue, the deeper the bumblebee can probe into a flower and bees probably learn by experience which flower source is best-suited to their tongue length. Wax is secreted from glands on the abdomen and extruded between the sternites where it resembles flakes of dandruff. It is secreted by the queen when she starts a nest and by young workers. It is scraped from the abdomen by the legs, moulded until malleable and used in the construction of honeypots, to cover the eggs, to line empty cocoons for use as storage containers and sometimes to cover the exterior of the nest. Depending on the species and morph , the warning colours range from entirely black, to bright yellow, red, orange, white, and pink. For example, in California a group of bumblebees consists of largely black species including *B. Other bees in California include a group of species all banded black and yellow. The muscle temperature can be raised by shivering. Compared to honey bees and carpenter bees, bumblebees have the lowest chill-coma temperature. However, bumblebees have been seen to fly in colder ambient temperatures. This discrepancy is likely because the chill-coma temperature was determined by tests done in a laboratory setting. However, bumblebees live in insulated shelters and can shiver to warm up before venturing into the cold. However, they are sensitive to the vibrations made by sound travelling through wood or other materials. Instead, when they return from a successful foraging expedition, they run excitedly around in the nest for several minutes before going out to forage once more. These bees may be offering some form of communication based on the buzzing sounds made by their wings, which may stimulate other bees to start foraging. Bees monitor the amount of honey in the honeypots, and when little is left or when high quality food is added, they are more likely to go out to forage. In a study involving *Bombus terrestris* , bees were taught to complete an unnatural task of moving large objects to obtain a reward. Bees that first observed another bee complete the task were significantly more successful in learning the task than bees that observed the same action performed by a magnet, indicating the importance of social information. The bees did not copy each other exactly: Many species nest underground, choosing old rodent burrows or sheltered places, and avoiding places that receive direct sunlight that could result in overheating. Other species make nests above ground, whether in thick grass or in holes in trees. A bumblebee nest is not organised into hexagonal combs like that of a honeybee; the cells are instead clustered together untidily. The workers remove dead bees or larvae from the nest and deposit them outside the nest entrance, helping to prevent disease. Nests in temperate regions last only for a single season and do not survive the winter. Then she builds wax cells in which to lay her eggs which were fertilised the previous year. The eggs that hatch develop into female workers, and in time, the queen populates the colony, with workers feeding the young and performing other duties similar to honeybee workers. In temperate zones , young queens gynes leave the nest in the autumn and mate , often more than once, with males drones that are forcibly driven out of the colony. They survive in a resting state diapause , generally below ground, until the weather warms up in the spring with the early bumblebee being the species that is among the first to emerge. *Bombus pensylvanicus* is a species that follows this type of colony cycle. The queen remains in hibernation until spring of the following year in order to optimize conditions to search for a nest. An egg passes along the oviduct to the vagina where there is a chamber called the spermatheca , in which the sperm from the mating is stored. Depending on need, she may allow her egg to be fertilised. Unfertilised eggs become haploid males; fertilised eggs grow into diploid females and queens. Bumblebees feed nectar to the larvae by chewing a small hole in the brood cell into which they regurgitate nectar. Larvae are fed pollen in one of two ways, depending on the bumblebee species. Pocket-making bumblebees create pockets of pollen at the base of the brood-cell clump from which the larvae feed themselves. Pollen-storing*

bumblebees keep pollen in separate wax pots and feed it to the larvae. The wax canopy or involucre has been removed to show winged workers and pupae in irregularly placed wax cells. After the emergence of the first or second group of offspring, workers take over the task of foraging and the queen spends most of her time laying eggs and caring for larvae. The colony grows progressively larger and eventually begins to produce males and new queens. Only fertilised queens can lay diploid eggs one set of chromosomes from a drone, one from the queen that mature into workers and new queens.

2: Bee - Wikipedia

INTRODUCTION The Human Bumblebee www.enganchecubano.com 3/8/02 Page xiii. will disappear. I'm in charge here, in other words, and behind me.

The honey bee can gather the raw materials from far and wide and create a society that is effectively a production line of honey. The honey store is built throughout the year but is essential during the winter, when it represents the only real option to sustain the colony through the cold months. How much help should we give our bees? Bees have been doing this for millions of years, without human intervention. That is one reason why many supporters of natural beekeeping prefer a very hands-off approach to beekeeping. Despite this, there are times when the beekeeper may be justified in helping his or her bees, by feeding them. This is an introductory article looking at the reasons the beekeeper may choose to feed his or her bees. It is important to emphasize that feeding bees should not be the norm. New beekeepers have a tendency to overuse their smoker. Many consider it an insurance policy. Well, actually, there could be. Depending on the method of feeding, the use of a feeder could attract pests or robbers. Some types of feeder run the risk of drowning bees, though many have design elements intended to reduce this. Additionally, the consumption of too much feed can adjust the ratios of brood to honey cells in the hive, a series of events that could eventually induce swarming. If you end up leaving a feeder on throughout the year and topping it up many times, you are doing it wrong! The feeding of bees should be considered supplementary and as a way to address very specific scenarios. Dare we say it can also be indicative of a weak beekeeper? A strong hive can stand alone. If the maturity, conditions, and situation for your bees allow them to take care of themselves, then that is exactly what you should let them do. However, there are some situations where a feeder can still be a wise choice. The nutritional needs of bees Bees need a varied and complex diet. They collect pollen and nectar, which provides an incredibly rich set of nutritional components. They receive carbohydrates from the nectar they collect and the honey they subsequently make. They receive protein from pollen. Together these food sources provide the majority of what bees need. Variety is also essential. A focus on a single source of pollen or nectar can rob bees of important minerals. For this reason, the colony will intentionally collect nectar and pollen from a wide range of sources, if available. Keep that in mind as you consider just how much you can "save your bees" with feeding. Nothing you can provide to them will have the diversity and natural elements of the resources available outside of the hive. When to feed Introducing a package of bees This is the most obvious time to feed and probably the most easily justified. A package of bees is around 10, worker and drone bees - and a queen - in a box. Reasonably soon bees will organize themselves and start foraging and building resources, but this takes time. So there is a lot of work to be done. Their pace is insufficient to sustain the colony and, as such, many beekeepers install a feeder at this time. Even a nuc, which comes with a few frames of honey, is likely woefully under-resourced. In both of these cases, installing a feeder is commonplace. In the Spring The scenarios above relate to colonies freshly installed in a new hive. The other end of the spectrum is an established colony that survived the winter months and is about to enjoy the warmer spring weather. Despite that success, these colonies are not necessarily well set. The honey reserves they took into the winter may be almost exhausted by the winter cluster. As the colony enters spring, brood production picks up. This is an expensive process and there are a lot of mouths to feed! As a rough guideline, creating a frame of brood requires a frame of honey and a frame of pollen. If the colony has reduced the honey reserves to the bone, then an accelerated brood production will cause problems. To administer medication The desire to add medications to a colony will vary, depending on the philosophy of the beekeeper. For many beekeepers, adding specific medications or nutritional supplements is justified and is done by adding to regular feeding regimes. Entering the winter Another common time to feed is as winter approaches. Another contributing factor is patience on the part of the beekeeper - patience to wait for the second year before stealing honey from bees in need! There are, though, some important considerations. Once the temperature drops too far around 17 degrees C, the bees cannot reduce the water content to the level at which is usually put in a cell and capped. This means the syrup may remain uncapped, which can in turn result in fermented syrup. This is bad for the bees. All this comes

from feeding when it is too cold, so the exact time available to feed is heavily dependent on the local climate. The bees will take the syrup as they need it. When they stop doing the syrup should be removed, to ensure it cannot mold.

3: Introduction to the Devout Life - Christian Classics Ethereal Library

Reread "Introduction: The Human Bumblebee" in *The Botany of Desire* (read pages xiii - xxv) and create a list of the significant metaphors that Pollan uses. List at least twenty metaphors used by Pollan.

Anthophila bees Internal This cladogram of the bee families is based on Hedtke et al. Dasypodainae , Meganomiinae at least 50 Mya long-tongued bees Apidae social, inc. They differ from closely related groups such as wasps by having branched or plume-like setae hairs , combs on the forelimbs for cleaning their antennae, small anatomical differences in the limb structure and the venation of the hind wings, and in females, by having the seventh dorsal abdominal plate divided into two half-plates. However, certain wasp species such as pollen wasps have similar behaviours, and a few species of bee scavenge from carcasses to feed their offspring. Between and above these are three small simple eyes ocelli which provide information for the bee on light intensity. The antennae usually have thirteen segments in males and twelve in females and are geniculate , having an elbow joint part way along. They house large numbers of sense organs that can detect touch mechanoreceptors , smell and taste, and small, hairlike mechanoreceptors that can detect air movement so as to "hear" sounds. The mouthparts are adapted for both chewing and sucking by having both a pair of mandibles and a long proboscis for sucking up nectar. The front legs of corbiculate bees bear combs for cleaning the antennae, and in many species the hind legs bear pollen baskets, flattened sections with incurving hairs to secure the collected pollen. The wings are synchronised in flight and the somewhat smaller hind wings connect to the forewings by a row of hooks along their margin which connect to a groove in the forewing. The abdomen has nine segments, the hindermost three being modified into the sting. Haplodiploidy Willing to die for their sisters: Such altruistic behaviour may be favoured by the haplodiploid sex determination system of bees. According to inclusive fitness theory, organisms can gain fitness not just through increasing their own reproductive output, but also that of close relatives. The requirements for eusociality are more easily fulfilled by haplodiploid species such as bees because of their unusual relatedness structure. This mechanism of sex determination gives rise to what W. Hamilton termed "supersisters", more closely related to their sisters than they would be to their own offspring. This unusual situation has been proposed as an explanation of the multiple independent evolutions of eusociality arising at least nine separate times within the Hymenoptera. But, monogamy queens mating singly is the ancestral state for all eusocial species so far investigated, so it is likely that haplodiploidy contributed to the evolution of eusociality in bees. Eusociality Bees may be solitary or may live in various types of communities. Eusociality appears to have originated from at least three independent origins in halictid bees. In some species, groups of cohabiting females may be sisters, and if there is a division of labour within the group, they are considered semisocial. The group is called eusocial if, in addition, the group consists of a mother the queen and her daughters workers. When the castes are purely behavioural alternatives, with no morphological differentiation other than size, the system is considered primitively eusocial, as in many paper wasps ; when the castes are morphologically discrete, the system is considered highly eusocial. Their colonies are established by swarms , consisting of a queen and several hundred workers. There are 29 subspecies of one of these species, *Apis mellifera* , native to Europe, the Middle East, and Africa. Africanized bees are a hybrid strain of *A.* They practise mass provisioning , with complex nest architecture and perennial colonies also established via swarming. Bumblebee colonies typically have from 50 to bees at peak population, which occurs in mid to late summer. Nest architecture is simple, limited by the size of the pre-existing nest cavity, and colonies rarely last more than a year. Most are in the family Halictidae , or "sweat bees". Colonies are typically small, with a dozen or fewer workers, on average. Queens and workers differ only in size, if at all. Most species have a single season colony cycle, even in the tropics, and only mated females hibernate. A few species have long active seasons and attain colony sizes in the hundreds, such as *Halictus hesperus*. Some allodapine bees Apidae form primitively eusocial colonies, with progressive provisioning: There is no division of labor so these nests lack queens and worker bees for these species. Solitary bees typically produce neither honey nor beeswax. Often it is mixed with nectar to form a paste-like consistency. Some solitary bees have advanced types of pollen-carrying structures on their bodies.

A very few species of solitary bees are being cultured for commercial pollination. Most of these species belong to a distinct set of genera which are commonly known by their nesting behavior or preferences, namely: Bee "hotels" are often sold for this purpose. Most solitary bees nest in the ground in a variety of soil textures and conditions while others create nests in hollow reeds or twigs, holes in wood. The female typically creates a compartment a "cell" with an egg and some provisions for the resulting larva, then seals it off. A nest may consist of numerous cells. When the nest is in wood, usually the last those closer to the entrance contain eggs that will become males. The adult does not provide care for the brood once the egg is laid, and usually dies after making one or more nests. The males typically emerge first and are ready for mating when the females emerge. Solitary bees are either stingless or very unlikely to sting only in self-defense, if ever. Large groups of solitary bee nests are called aggregations, to distinguish them from colonies. In some species, multiple females share a common nest, but each makes and provisions her own cells independently. This type of group is called "communal" and is not uncommon. The primary advantage appears to be that a nest entrance is easier to defend from predators and parasites when there are multiple females using that same entrance on a regular basis. The wax canopy has been removed to show winged workers and pupae in irregularly placed wax cells. Life cycle Further information: Honey bee life cycle Carpenter bee nests in a cedar wood beam sawn open The life cycle of a bee, be it a solitary or social species, involves the laying of an egg, the development through several moults of a legless larva , a pupation stage during which the insect undergoes complete metamorphosis , followed by the emergence of a winged adult. Most solitary bees and bumble bees in temperate climates overwinter as adults or pupae and emerge in spring when increasing numbers of flowering plants come into bloom. The males usually emerge first and search for females with which to mate. The sex of a bee is determined by whether or not the egg is fertilised; after mating, a female stores the sperm, and determines which sex is required at the time each individual egg is laid, fertilised eggs producing female offspring and unfertilised eggs, males. Tropical bees may have several generations in a year and no diapause stage. In the case of solitary bees, each one is laid in a cell with a supply of mixed pollen and nectar next to it. This may be rolled into a pellet or placed in a pile and is known as mass provisioning. In social species of bee there is progressive provisioning with the larva being fed regularly while it grows. The nest varies from a hole in the ground or in wood, in solitary bees, to a substantial structure with wax combs in bumblebees and honey bees. They have fifteen segments and spiracles in each segment for breathing. They have no legs but are able to move within the confines of the cell, helped by tubercles on their sides. They have short horns on the head, jaws for chewing their food and an appendage on either side of the mouth tipped with a bristle. There is a gland under the mouth that secretes a viscous liquid which solidifies into the silk they use to produce their cocoons. The pupa can be seen through the semi-transparent cocoon and over the course of a few days, the insect undergoes metamorphosis into the form of the adult bee. When ready to emerge, it splits its skin dorsally and climbs out of the exuviae as a winged adult and breaks out of the cell. Animal navigation and Waggle dance The ethologist Karl von Frisch studied navigation in the honey bee. He showed that honey bees communicate by the waggle dance , in which a worker indicates the location of a food source to other workers in the hive. He demonstrated that bees can recognize a desired compass direction in three different ways: He showed that the sun is the preferred or main compass; the other mechanisms are used under cloudy skies or inside a dark beehive. Bees are able to sense the presence of desirable flowers through ultraviolet patterning on flowers, floral odors, [62] and even electromagnetic fields. In rare cases, a plant species may only be effectively pollinated by a single bee species, and some plants are endangered at least in part because their pollinator is also threatened. There is, however, a pronounced tendency for oligolectic bees to be associated with common, widespread plants which are visited by multiple pollinators. There are some forty oligoleges associated with the creosote bush in the arid parts of the United States southwest, for example. Many bees are aposematically coloured, typically orange and black, warning of their ability to defend themselves with a powerful sting. As such they are models for Batesian mimicry by non-stinging insects such as bee-flies , robber flies and hoverflies , [66] all of which gain a measure of protection by superficially looking and behaving like bees. Brood parasite and Nest usurpation Brood parasites occur in several bee families including the apid subfamily Nomadinae. They typically enter the nests of pollen collecting species, and lay their eggs in

cells provisioned by the host bee. However, unlike many other bee brood parasites, they have pollen baskets and often collect pollen. Others parasitize bees in different families, like *Townsendiella*, a nomadine apid, two species of which are cleptoparasites of the dasypodaid genus *Hesperapis*, [73] while the other species in the same genus attacks halictid bees. Most are tropical or subtropical, but there are some which live in arid regions at higher latitudes. These bees have greatly enlarged ocelli, which are extremely sensitive to light and dark, though incapable of forming images. Some have refracting superposition compound eyes: Their ability to fly by night enables them to avoid many predators, and to exploit flowers that produce nectar only or also at night.

4: "The Human Bumblebee" | brynsplantsandpeopleblog

4 foreign connotations. INTRODUCTION The Human Bumblebee The seeds of this book were first planted in my garden "while I was planting seeds, as a matter of fact.

Predation occurs when one animal eats other animals and kills them. The animal that is killed is called the prey and the animal that does the killing is called the predator. Bumblebee Symbionts means living together, and there are three kinds of symbiotic relationships between species: Where the parasite receives some benefit from the host and by doing so harms the host. Where one partner receives some benefit from the other without harming or benefiting the other partner. Where both partners benefit from the relationship. Bumblebee Parasites Cuckoo bumblebees, Psithyrus spp. The cuckoo female enters the bumblebee nest and lays her eggs, the bumblebee workers then rear these eggs as if they were their own sisters and brothers. The cuckoo bumblebee has no pollen baskets on her rearmost legs, and does not secrete wax for nest construction. There is no worker caste, and all cuckoo bumblebee eggs hatch as reproductive males or females. Wax moth, *Aphomia sociella* see above. In northern Europe the wax moth is regarded as the most serious enemy of the bumblebee, and is found only in bumblebee nests. It is more commonly found in the above ground nests. The adult moth flies from June - August at night. At first the caterpillars feed on nest debris, but as they grow they switch to feeding on the wax food cells, food stores and even larvae. Normally this destroys the nest. The fully grown caterpillar leaves the nest to overwinter as a pupa in a sheltered spot, It spins a strong, brown cocoon in autumn. In the UK bumblebee boxes have become popular in recent years. All you can do is clear out the nest contents and get it ready for the next year. Invasion of the nest by the north American wax moth *Vitula edmandsii* does not always lead to the destruction of the nest as it does not feed on the larvae. *Brachicoma* *Brachycoma devia* in Europe and *Brachycoma sarcophagina* in north America are flies that look a little like the common house fly. The female fly enters the bumblebee nest and lays larvae this fly does not lay eggs among the bumblebee larvae. The fly larvae attach themselves to a bumblebee larva and wait. Once the bumblebee larva has spun its cocoon the fly larvae start feeding on it and suck it dry. When they are fully grown they one bumblebee cocoon can support 4 parasitic larvae leave the bumblebee cocoon and pupate in the bumblebee nest. A heavy infestation will lead to the death of a colony. *Ephestia kuehniella*, a flour moth see above, the a world wide distribution has been reported in North America as invading bumblebee nests. On the parasites of wild bees in California. The egg hatches inside the bee and feeds off its abdominal contents till it more or less fills the entire abdomen. The bumblebee dies after about 10 days and the fly larva pupates inside the husk of the dead bumblebee body emerging as an adult fly next summer. This parasite can change the behaviour of the bumblebee. Infected workers tend to stay outside the nest more than other workers, often remaining out all night, and they tend to favour colder microclimates, also before the bumblebee dies it attempts to bury itself. In Europe bumblebee queens are not usually parasitised as they emerge before the adult fly emerges. Conopids are usually active from June - August. *Locustacarus buchneri* lives in the air sacs of the bee where it feeds on the haemolymph. It will not kill a colony, but it will weaken one. The mites hibernate inside new queens. However there are some species of mites that live in bumblebee trachea and air sacs and others that live off their blood. These small wasps lay numbers of eggs inside the adult bumblebee and the wasp larvae eat the bumblebee from the inside. *Sphaerularia bombi* above, a nematode tiny worm. This parasite is only found in queens and affects their behaviour. The bumblebee queen is infected by an adult female worm while she hibernates. It is believed that the nematode enters through her mouthparts. In the spring when the queen emerges from hibernation the worm begins to grow, then it turns its whole reproductive system inside out. The uterus grows and grows till it is between centimetres long, while the rest of the worm is only a thin thing of a few millimetres. In a normal queen a hormone would be released and her ovaries would start to develop stimulating her to start building a nest, but somehow this does not happen in an infected queen. Meanwhile the worm releases up to eggs into the blood of the queen, these eggs hatch and develop, moving into the gut and reproductive system. During this time the queen feeds only for herself, she makes no attempt to find a nest site, and her ovaries do not develop. Often she returns to her hibernation site, here the

worm larvae are discharged with faeces into the soil. The mature worms mate, and wait for another queen to use the site to hibernate. Various species will invade bumblebee nests if they find them and eat stores, eggs and grubs, this often destroys the colony. Bumblebee Commensals Certain hoverflies , e. The adult female fly enters the bumblebee nest and lays her eggs. The fly eggs hatch and the larvae feed on nest debris, doing no apparent harm. The fly overwinters as a pupa in the empty bumblebee nest. This hoverfly is also a bumblebee mimic, and it even buzzes if handled. These mites are often seen attached to the thorax of bumblebees, whom they use as transport between nests. This can be seen below in the photograph sent in by AsB. They scavenge on nest debris, then attach themselves to young queens and hibernate with them. These mites often have even smaller mites living on them! It is believed that many species of flower co-evolved with insects and became so specialised that they need each other to survive. A good example of this is the monkshood flower which, in the UK, can be successfully pollinated only by a bumblebee. So we get our flowers pollinated, the bumblebees get food in a safe environment. And those who raise crops in glasshouses would be unable to do so commercially without commercially reared bumblebees. For more about what bumblebees do for humans see the economic importance page.

5: An introduction to feeding bees - PerfectBee

View Notes - Pollan Study Questions 1 from ECON at Temple University. Botany of Desire Study Questions Introduction: The Human Bumblebee and Chapter 3: Desire: Intoxication/Plant: Find Study Resources.

The Bumble Bees of Florida, *Bombus* spp. Stange 2 Introduction Most bumble bees are large, social bees that produce annual colonies. Mated queens overwinter in the soil and emerge from hibernation in early spring when they feed on spring flowers and search for a suitable location, such as a former rodent burrow in the soil, to begin their colonies. These are beneficial insects that pollinate many native and ornamental plants. They can sting severely, so problem nests near human dwellings should be removed by experienced pest control operators. Adult bumble bee, *Bombus* sp. Bumble bees are less common in southern Florida. None are known from the Florida Keys. Two species, *Bombus griseocollis* and *B.* Description Bumble bees are easily recognized by the corbicula pollen basket on the hind tibiae in the females. Honey bees are the only other bees in Florida with this structure, but are easily recognized by their smaller size, hairy eyes, and lack of hind tibial spurs. Large carpenter bees are often misidentified as bumble bees, but these are readily distinguished from bumble bees primarily due to the absence of pubescence on the dorsum of the carpenter bee abdomen, which is somewhat shiny. A bumble bee, *Bombus* sp. A number of non-social *Bombus* species lost their social behavior and the ability to collect pollen, and are now cleptoparasites on colonies of pollen-collecting *Bombus* species. These cleptoparasitic species were previously listed as being in the genus *Psithyrus* ITIS , and are now sometimes listed as a sub-genus. The parasitic species are easily distinguished by the lack of the corbicula. The most common of this group found in Florida is *B.* Biology and Life Cycle Once a nest site is found, the social bumble bee queen collects pollen and lays her first brood of worker eggs. Workers emerge about 21 days after the eggs are laid and take over the duties of pollen and nectar collection as well as colony defense. The size of the workers increases with each new brood. A third caste of bumble bees, the males, is usually produced in midsummer. A bumble bee emerging backwards from her nest. Adult female twospotted bumble bee, *Bombus bimaculatus* Cresson. Adult female southern plains bumble bee, *Bombus fraternus* Smith. Adult female brownbelted bumble bee, *Bombus griseocollis* DeGeer. Charles Schurch Lewallen [Click thumbnail to enlarge. Florida county records include Alachua: Adult female common eastern bumble bee, *Bombus impatiens* Cresson. David Cappaert, Michigan State University; www. Adult female American bumble bee, *Bombus pennsylvanicus* DeGeer. While once common, it has declined dramatically since Anonymous No specimens seen from Florida, but recorded from Florida by Mitchell Adult female yellow-banded bumble bee, *Bombus terricola* Kirby.

6: The Brief Busy Life of the Arctic Bumblebee, Alaska Department of Fish and Game

Introduction - Y-ME Since May , Bumble Bee Seafoods has been a proud partner with Y-ME National Breast Cancer Organization, through our BeeWell for Life program - an online community of health-minded members who take simple steps towards a healthy lifestyle while doing good for others.

The lousewort starts out tentatively, its leaves clutched in tight clusters the size of ping-pong balls, but soon enough it shoots up a wooly stalk, unfurls rows of pink blossoms, and welcomes its first visitor. The sight of that first visitor can be startling. She is the queen of beasts among the tundra flowers. Big and hairy and social by nature, the Arctic bumblebee *Bombus polaris* is exquisitely adapted to life in the northern latitudes where life in turn is often exquisitely adapted to this bushy brightly-colored bee. She has been hibernating for the past nine months at least, suspended in an almost lifeless state in a mouse nest or some other subterranean burrow, waiting for the ground to warm. Already mated, the queen is the sole survivor of her colony and she has no time to lose. Some insects take years to complete their life cycle in the Arctic. A moth caterpillar, clocked at 12 years to pupation, grows a bit each year, freezes, then grows a bit more. A bumblebee in the Arctic, however, must get busy right away, said biologist Bernd Heinrich. Heinrich, a retired entomology professor from the University of Vermont, is probably best known for his popular books on ravens. As a youth, he wanted to study them but said he was advised never to study an animal smarter than himself. Still, he has found that insects are pretty smart too. About fifty species are found in all kinds of habitats across the U. These are important features for B. She has eggs to lay and the eggs must hatch out their larvae, which in turn must grow, pupate, and develop into adults. With time for only a couple of broods, she must also lay very large egg clutches. All this takes prodigious amounts of energy so she visits the early flowers, like the louseworts, the avens, and the willow catkins, pollinating as she goes. Heinrich said she gravitates towards flowers with multiple blooms where she can walk around and cool down a bit. She also seeks out nectar-heavy flowers. His studies show she burns a little hotter for them. As she sips nectar and feeds on protein-rich pollen, the queen has already started incubating her eggs internally. Other members of the B. Temperate bumblebee colonies generally produce hundreds of successful queens. In the Arctic, only one queen per colony on average will survive the winter to renew the life cycle. And the old queen? She will die with her progeny. Anne Sutton is the coordinator of the Wildlife Viewing program at the Alaska Department of Fish and Game [Subscribe to be notified about new issues](#) [Receive a monthly notice about new issues and articles.](#)

7: Introduction to The Liberal Arts

Introduction. Of all the world's creatures, the honey bee is one of the most resourceful. The honey bee can gather the raw materials from far and wide and create a society that is effectively a production line of honey.

Ratchet to the Rescue! Shows the box art with accompanying introductory text of the main Decepticon cast; Megatron , Starscream , Ravage , Skywarp , Soundwave , Rumble , and Laserbeak. Autobot Introduction Two page Autobot roll-call as printed in issue 1 of the comic, introducing all of the Autobots. Plague of the Insecticons! Left to go off-line, Tracks converts to vehicle mode and is found by a young hooligan named J. Meanwhile, Prime hears of Tracks being used as a getaway car and sends Inferno , Grapple and Hoist to retrieve him. Inferno, Grapple and Hoist arrive on the scene, and the sight of three giant robots causes J. The Autobots are thrown to the ground as the front of the bank is blown outwards. Upon hearing of the hostages inside, they begin to evacuate the building and get everyone but Danny clear. Inferno ignores the fact he is 30 foot tall and enters the burning building, shielding Danny with his heat-resistant body. Danny is taken to the hospital, J. And There Shall Come The Decepticons are staging a final assault on Iacon. Bumblebee is stuck on-base with Prowl monitoring news channels for Decepticon activity, complaining about being excluded from combat missions. What a clever chap Prowl is. Bumblebee and the Jumpstarters convince Prowl to go to South America , where the report originated, and investigate. After wrecking a military roadblock and wrestling with a boa constrictor, they discover Megatron has a secret crystal mine, mining for ultra-rare crystals which can be imbued with artificial intelligence, creating Megatron an army of soldiers! He also has a human expedition team held hostage. The Jumpstarters manage to shoot down Starscream causing him to crash into the mine, destroying it instantly. Bumblebee saves them in the nick of time. Items of Note The softcover version of the annual, lacking the word "annual" on the cover, as well as the "The" before "Transformers". A softcover edition of the annual was reprinted in which has 4 extra blank pages due to the binding. The internal contents are identical save for correcting the mislabeling of Page 47 as page The front cover lacks the word "annual". The Annual contains 8 one-page puzzles and a two-page game. President Ronald Reagan refers to Optimus as a "lorry", a primarily British term for a semi-truck. Page 47 is erroneously mis-labelled as page "46". In the puzzle answers page, the answer for the "Transformers Name and Face Match!

8: The Economic Importance of Bee\$, BeeSpotter, University of Illinois

Introduction to Bumblebees: There are anything between 20, and 30, bee species in the world. Britain has species, 24 of them are bumblebees.

The Bumblebee is a widely distributed social insect known for its ability to collect nectar from flowers and pollinate plants. Bumblebees are large yellow and black flying insects with a distinct buzz. There is variation in coloration among bumblebees and some species have bands of red, yellow and black. They have stocky bodies that are covered with many hairs to which pollen adheres. Bumblebees have four wings, the two rear wings are small and usually attached to the fore wings by a row of hooks called hamuli. The wings move rapidly, at beats per second. See photo of a bumblebee collecting nectar. There are over known species, existing primarily in the Northern Hemisphere. Hedgerows near orchards provide food and shelter for pollinators like bumblebees. Bumblebees harvest nectar carbohydrates and pollen protein from flowering plants. Bumblebees are social insects that live in colonies. The queen bee, drones and worker bees all have specific tasks to help support the colony. The queen bee lays hundreds of eggs. Worker bees do all the different tasks needed to operate and maintain the hive. Scent marking flowers Foraging bumblebees tend to avoid flowers recently visited by other bumblebees, although they will visit the same patch of flowers. Bumblebees will scent mark the flowers - leaving behind a message to others that the nectar is gone. Scent marking reduces the time spent probing flowers without nectar. Nectar robbing Some bumblebees cheat by collecting nectar from a plant without entering and pollinating the flower. This is known as nectar robbing. Then she inserts her tongue sheath, extends her tongue and mops and sucks up the nectar. Later other bumblebees may use the hole. Bumblebee workers and the queens can sting, and their stinger is smooth - not barbed like that of the honeybee - so they can sting more than once. Male bumblebees cannot sting as they do not have a sting. The queen bee lays all of the eggs in a colony. The queen fertilizes each egg as it is being laid using stored sperm from the spermatheca. The queen occasionally will not fertilize an egg. These non-fertilized eggs, having only half as many genes as the queen or the workers, develop into male drones. Pollen stimulates the ovaries to produce eggs, which the queen lays in batches of 4 on the ball of pollen which is then covered with wax. The queen keeps the eggs warm at about 30 oC. A *Bombus terrestris* queen may have to visit as many as 6, flowers per day in order to get enough nectar to maintain the heat needed to brood her eggs! Bumblebees harvest nectar and pollen from flowering plants. They live in smaller groups than honey bees and do not tend to swarm. They scent mark flowers they have visited. Bumblebees will not die if they use their sting, whereas honey bees will.

9: Bumblebee Facts for Kids - NatureMapping

He also has a human expedition team held hostage. Bumblebee attacks the mine-fortress alone, somehow avoiding Starscream, Thrust, and Dirge 's fire power. The Jumpstarters manage to shoot down Starscream causing him to crash into the mine, destroying it instantly.

Back To Top Problem Trends Without a way to curtail this decline in honey bee numbers, fewer domestic bee colonies will be available for production of goods and pollination and there will be an increase in reliance on foreign supplements i. Sadly, the number of beekeepers and colonies has been decreasing since the middle of the century. Early causes were industry and land loss and, more recently, additional land loss suburban sprawl , price competition from imports and population crashes from mites, disease, and colony collapse. Yield per colony averaged Colonies which produced honey in more than one State were counted in each State where the honey was produced. Therefore, yields per colony may be understated, but total production would not be impacted. Colonies were not included if honey was not harvested. Producer honey stocks were Unfortunately, there are increasingly more crops to pollinate. Profitability is taking a beating from these factors and the problem appears to be compounding. Bumble bees are also on the decline in many countries. Though the reason is wholly unclear, it may be due to habitat destruction and pesticide use. Continued and long-lasting decline in honey bees and bumble bees will cause widespread decrease in pollination of many plants and, thus, lead to a decrease in plant diversity in areas where bee pollination is vital. Thus, not only is the economy taking a hit from the problem of bee decline, but we are losing a major ally in the continued efforts of resource management and may also lose favorable plants. Click here for more on population decline. Carpenter bees Carpenter bees, though usually seen as a nuisance to humans, are capable of major structural damage from repeated colonization. They bore into wood to make their homes. Males are territorial and can be quite aggressive but lack the danger of a stinger. Females do have stingers but rarely use them and, in fact, are rarely even seen flying. Although carpenter bees are well known pests, they are also prolific pollinators of many wild plants.

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