DOWNLOAD PDF FEEDING AND DIGESTION

Chapter 1 : Essay on Earthworm: Feeding and Digestion

After digestion in the stomach, the bolus moves to a long, white organ, caecum for digestion. Lastly the food goes to the liver, for nutrient absorption and solid waste is excreted through the rectum.

Tropical Fish Food Understanding feeding and digestion in fish. When compared to humans, the digestive system in fish is relatively simple. There will of course be variations that are species-dependent. Some species of fish have teeth. The teeth in fish are generally adapted for performing special functions. Predatory Catfish will for instance have small sharp pointed teeth, while the Pacu fish have teeth adapted to crushing fruits and nuts. The stomachs of fish are also generally adapted to the kind of food they eat. Predatory fish generally have sac shaped stomachs that allow them to pack away enormous amounts of food. The Puffer fish has a stomach that can be inflated with air or water in order to scare off enemies. Food that is partially digested moves from the stomach into the intestine. Here it is digested further and the nutrients are absorbed into the body. The herbivores have an elongated intestine and their systems are more complicated than the carnivores. Food that is not completely digested and absorbed leaves the body through the anal opening, together with other waste products produced by the metabolism. Giving your fish the right kind of food at the right time and in the right amounts is crucial to their growth and development. In a closed system, the fish have no choice but to eat what they are provided with. If you want fish that are full of energy, you have to feed them according to their particular needs. Herbivorous fish require lots of fiber in their diet, while carnivores require food that is rich in protein. Some predatory fish eat food only after chasing the live food. Yes, fish also gain unhealthy fat from over eating. Some fish like the catfish will eat just about any amount of food. They become too big and lose health. Remember that fish in your aquarium do not expend energy looking for and chasing food. They only move about within the confines of your tiny little aquarium. So, feed your fish only according to their nutritional needs. Mostly, fish are able to take in the food they need within minutes of their feed. Food left in the aquarium after the first 10 minutes of feeding is not needed by the fish, and will collect in the aquarium as waste; decaying and releasing toxins. Hyperactive fish and fast swimmers will get the first pick in the aquarium. Small fish can be scared away by larger fish and newly introduced fish may be too shy to get to the food. Feeding fish the same kind of food day after day tends to dry up their appetite. Besides, they also need a variety of nutrients, which can be provided only by rotating the feed. Many fish species love worms, insect larvae etcetera and will stay much healthier when provided with live food. Care must however be taken to ensure that these food varieties do not carry infections, such as germs or other parasites, in them. This is very difficult to ascertain, unless you culture your own live food. So beware when you feed live food to your fish. Food for the fish has to encompass a large number of nutrients. All these together make your fish healthy and able to adapt to changing conditions in the aquarium. Remember, the healthier the fish, the more resistance will they have to disease and infections. Protein and fish Protein is the single most important nutrient that the fish needs to grow. On a dry-weight basis, this makes up the maximum weight in their body structure. Amino acids are derived from proteins and the fish uses them to make new body tissues as well as enzymes. Fish are very adept at converting food to body tissues. That is why fish need lesser amounts of food than do most other animals. Carbohydrates are almost non-existent in the food intake for many fish species, since energy is also derived from proteins. The quantity of protein required for the fish to be healthy depends on a number of variables like the species of fish, amount of natural food available, growth rate etc. Fry and larvae require a more protein rich diet to maximize their adaptability and chances of survival. As the fish grow larger, their dependency on protein reduces. The temperature of the water also affects protein requirements. Fatty acids and fish Fatty acids are a storehouse of energy for most fish. Carbohydrates can also do this job. It is also seen that some of the predatory fish species require some source of fish oil in their diet too. Fish that live within the confines of an aquarium are naturally prone to obesity. They do not use up their excess energy in swimming long distances or looking for food. In most cases, excess fat can be damaging to the general health of the fish. Some fish lose their reproductive capabilities if there is too much body fat. Fat-soluble carotenoid and fish Fat-soluble carotenoid is responsible for the bright hues in some fish. Krill and brine fish are some of the foods that are rich in pigments. While they are alternate sources of energy, they are not very necessary for fish growth. Though most fish will handle some amount of carbohydrates, they develop signs of ill health if there is a high concentration of carbs in their diet. For instance, if young fish ingest too much of carbs, other nutrients will not be absorbed appropriately by their bodies. That is why cereal grains, which have very high levels of raw starch, are not ingested fully by fish. Vitamins and minerals and fish Vitamins are vital to fish health. These are organic substances that act as catalysts for many of the biochemical reactions within the fish. The best way to get a rich supply of vitamins to your fish is to buy small quantities of diverse food for them. Storing excess food in the freezer also prolongs the life of the vitamins. Providing frozen or fresh vegetables and live food can also supply the much-required vitamins to your fish. Minerals are also necessary for you fish. Bones, teeth and scale tissues require lots of minerals. The minerals also carry out many supportive functions. Your tropical fish will most likely suffer from a lack of Calcium and Phosphorous, if any. If they are kept in hard water, fish are able to extract some amount of calcium from it, but soft water has absolutely no supplies of calcium. Though mineral supplements will help to compensate this deficiency, excess of some minerals can be poisonous. Therefore, mineral supplements should not be used indiscriminately. Register for free and ask your question in our Aquarium forum! Our knowledgeable staff usually responds to any question within 24 hours. Alternative fish Foods - Information about suitable fish foods you can buy in your grocery store. Brine Shrimp Hatchery - How to make a simple plastic bottle brine shrimp hatchery, in pictures. Choosing food for and Feeding Fry - An introduction to feeding fry. Cultivation of some common live food - A guide about how you can cultivate some common types of live food in your home. Culturing Microworms - An article on this useful live food for fry and small fish. Feeding fish - An article about feeding fish and which factors that stimulate fish to eat. Fish feeding habits - An introduction to the different feeding habits different types of fish have. Growing adult Brine shrimp - how to grow adult Brine shrimp Microworms - Microworms are easy to cultivate and are excellent live food for small fish or growing fry. Raising and Growing Large Brine Shrimp - How to build a brine shrimp hatchery, and how to feed and grow the shrimps. Raising Daphnia - How to culture and use daphnia. Raising mealworms for animal food - Yellow mealworm larvae or adults serve as food for fish, reptiles, birds and other animals Raising Vinegar Eels - How to culture this easy and inexpensive live food. Combined Worm Culture - Grindal worms and red worms can be cultured in one container together, thus providing live food for different sizes fish Tropical fish food - An introduction to fish food for beginners. Types of fish food - A guide to the basic types of fish food available. Feeding your fish vegetables - Fresh cooked high fibre vegetables benefit the digestive systems of many fish.

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Chapter 2 : Feeding and Digestion/Movement and Support - Cnidarians

Feeding and digestion - Physical characteristics of Sharks All sharks are carnivorous and many people believe that sharks will eat just about anything; for a few species, such as the tiger shark, this is true.

Reproduction Excretion The excretory systems of many birds are similar to those of some reptiles. Nitrogenous wastes are removed from the blood by the kidneys, converted to uric acid, and depositd in the cloaca. What do they eat? Birds have to eat more food than their proportion size because of their high metabolic rates. Birds have to have a light mass so that they still are able to carry themselves in flight. Some birds will starve for hours in order to maintain this small weight. The digestion system starts with the birds beak or bill. This is where the food enters the body. This also replaces the teeth or a mouth for the bird. The size of the beak depends on the birds diet. The next step of the digestion system would be the esophagus. The esophagus takes the food from the beak and transfers it down to the stomach. This is temporary food storage. A bird has two parts of a stomach. They have Hydrochloric acid in each of their stomachs to help break down food. Next the food would travel through each of the intestines the small and the large. After it is finished in the intestines it would then be held in the cloaca which is where all the waste products is held. Why do birds have to maintain a small mass? Birds have to maintain a small mass because in order to stay in flight. So to keep this small mass their digestion system helps them. Plus the more food birds eat, the more heat energy its metabolism can generate. Why do birds eat stones? Birds eat stones because with birds being toothless. They eat stones to help breakdown their good in their stomachs. Powered by Create your own unique website with customizable templates.

Chapter 3 : Feeding and Digestion - mollusks

Feeding and Digestion Mammals are heterotrophs - they obtain food from other organisms. They are chunk feeders, ingesting large amounts of food at a time.

In this essay we will discuss about: External Features of Earthworm 2. Transverse Section of Earthworm 3. Feeding and Digestion 6. Blood Vascular System 8. External Features of Earthworm: The anterior end is pointed, while the posterior end is more or less blunt. A full grown worm is about mm long and 3 to 5 mm in diameter in the broadest portion of the body Fig. The dorsal surface is brown while the ventral surface is dull grey. A dark median line runs along the dorsal surface throughout the length of the body. The surface bears a series of narrow ring-like grooves, and the body is divided into about to small segments or metameres. A small, fleshy lobe, the prostomium Fig. At a distance of about 20 mm posterior to the anterior end, a prominent band known as clitellum is present. A median round aperture, the female genital pore is present on the ventral surface of the 14 segment Fig. A pair of crescentic apertures on raised papillae, the male genital pores are present on the ventral surface of the 18 segment. In front and behind the male pores, on the 17 and 19 segments, a pair of papillae, the genital papillae are present in each segment. The ventral surface of the 17 to 19 segments is called the genital area. Spermathecal pores or openings of the spermathecae are four pairs, placed ventrolaterally in the inter-segmental grooves between the 5 and 6, 6 and 7, 7 and 8 and 8 and 9 segments. At about the middle of each segment except the first, the last, and the clitellar segments, chitinous needle-like structures called setae are arranged in a circle. The setae help in locomotion. The dorsal pores are minute openings in the mid-dorsal line of inter-segmental grooves. Starting from the groove between the 12 and 13 segments and except the last groove, they are present in all the inter-segmental grooves. The anus is a slit-like opening at the tip of the last segment. The nephridiopores are minute, and scattered irregularly all over the skin except that of the first two segments. Transverse Section of Earthworm: The outermost layer is a thin, porous cuticle secreted by the underlying epidermis Fig. The epidermis is a single cell layer thick and consists of two kinds of cells, the large glandular cells with eccentric nucleus, and columnar cells placed between the glandular cells. A few cells functioning as sense cells are also present. Two layers of muscles are present. The inner longitudinal muscular layer is thick and consists of muscle fibres arranged in narrow bands. A distinct coelom is present. The gut-wall consists of: A visceral layer of coelomic epithelium. Enteric epithelium consists of a single layer of cells, some of which are glandular and others are absorptive. It is thrown into folds. A large median fold known as typhlosole in the region extending from 26 to 95 segments before anus, hangs in the lumen from the dorsal wall. The setae are arranged in the form of a ring in all segments, except the first, last and clitellar segments. A swelling, nodule, may be present in the middle. The setae of the posterior part of the body are fixed to the substratum; contraction of the circular muscles put pressure on the coelomic fluid and forces the longitudinal muscles to stretch and the anterior part of the body elongates. Digestive System of Earthworm: The alimentary canal is a straight tube, starting at the mouth and ending in the anus Fig. The ventral mouth is crescent- shaped, situated in the peristomium. It is followed by a small buccal cavity, opening into the pharynx. The thick-walled, pear-shaped, muscular structure in the segments. A pharyngeal bulb is present on the dorsal wall. The posterior part of the oesophagus is thick-walled, muscular with an inner, cuticular lining, oval in shape and known as gizzard. The food matters are grind to fine particles in it. It is a hard, muscular structure lined internally by a tough cuticle. A thin walled, somewhat wide tube, running up to the anus in the last segment. A pair of small, conical outgrowths, directed anteriorly, project from the sides of the intestine in the 26 segment. A fold of the dorsal intestinal wall in the segments, hangs downward in the lumen of the intestine Fig. Feeding and Digestion in Earthworm: Earthworm obtains organic materials from the soil it swallow, rejecting the rest as cast. It also feeds upon decaying matters, small dead animals, etc. The mouth and pharynx help in feeding. In the pharynx mucin and proteolytic enzymes are secreted. Mucin lubricates the food and digestion of protein starts. The gizzard grinds the food to fine particles and digestion is completed in the stomach with the help of enzymes secreted there. Respiratory Organs of Earthworm: The highly vascularized skin, kept moist by the secretion of epidermal glands and coelomic fluid coming out through dorsal pores, serves the functions of respiratory membrane. Blood Vascular System of Earthworm: The blood of Pheretima is red due to the presence of haemoglobin dissolved in plasma. The corpuscles are colourless and nucleated. An elaborate system of blood vessels is found in earthworm. It runs along the mid-dorsal line between the gut and the body wall. It has a thick wall and contracts rhythmically. A pair of valves are present in the lumen of a vessel in each segment, to prevent backflow of blood. It is a collecting vessel and receives blood from: The dorsal vessel drives the collected blood forward. It runs along the mid-ventral line just below the gut. It sends the following vessels: A pair of ventro-integumentary in each segment, which piercing the septum posteriorly, send blood to the body wall, septal and integumentary nephridia. It runs along the mid-ventral line below the ventral nerve cord. The sub-neural vessel is connected with the dorsal vessel through a pair of commissurals in each septum. The first two pairs are called lateral hearts and the last two pairs latero-oesophageal hearts Fig. In the region of 9 to 13 segments a short longitudinal vessel, the supraoesophageal vessel is present dorsal to the oesophagus. The latero-oesophageals are connected with the supraoesophageal by two pairs of loops in the 10 and 11 segments. These are called anterior loops. Blood from latero-oesophageals pass to the supraoesophageal through these anterior loops. Excretory System of Earthworm: Nephridia are of 3 types. The septal nephridia are about in each segment Fig. The body of the nephridium consists of a short straight lobe and a long, spirally twisted loop Fig. The twisted loop is more than double the length of the straight lobe and is made up of two limbs; a proximal and a distal, the two spirally twisting each other. The straight lobe continues into distal limb of the twisted loop at the base of the nephridium. The proximal limb of the twisted loop receives the ciliated ductule from the funnel and also gives out the terminal nephridial duct. The body consists of a much coiled ciliated tubule richly supplied with blood. The funnel is lodged in the same segment in which the body of the nephridium lies. A narrow ciliated ductule connects the funnel with the body of the nephridium. A pair of supraintestinal excretory ducts are present on the dorsal surface of the gut and these ducts open in the gut by short vertical ducts near each inter-segmental partition. As the nephridia open into the gut, they are called enteronephric nephridia. Smallest nephridia attached to the body wall and occur in large numbers in each segment, excepting the first two. All of them open directly to the exterior and termed ectonephric nephridia. Occur in large numbers in 4 to 6 segments as paired tufts associated with blood glands. Terminal ducts unite to form a common duct and a pair of such ducts are present in each segment. These three pairs of ducts run forward in the fourth, fifth and sixth segments. The ducts of those in the 4 and 5 segments open in the lumen of the pharynx but of those in the 6 segment open in the buccal cavity. Nervous System of Earthworm: Nervous system is well-developed and includes central, peripheral and visceral nerves Fig.

Chapter 4 : Feeding and Digestion - Scorpions

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Feeding Jellyfish Jellyfish are carnivorous and ravenous eaters. The sea anemone captures its prey with its deadly stinging tentacles. Coral Corals usually eat at night. So, when corals eat they consume plankton that are floating around them in the water. Digestion Jellyfish They have a simple digestive system which consists of a gastro vascular cavity attached to the oral opening, which does the function of the stomach. Hydras The gut of a Hydra is simply a hollow cavity within the body and has only one opening, which is the mouth. Enzymes are produced by special cells in the endodermis and released into the gut cavity. The enxymes that are released begin to break down the food into smaller particles. Other lining cells have long hair-like flagella that wave about and keep the contents of the gut well mixed. The tentacles then contract to bring the prey into the stomach. Once digested, the stomach reopens, allowing the elimination of waste products and the beginning of the next hunting cycle. Coral also does photosynthesis with alge. Digestion in Hydra is divided into two phases. The preliminary digestion outside the cells of the endodermis extracellular and the secondary phase inside the cells intracellular. The main digestion is extracellular. The cells of the gut merely absorb the digested remains. In all cnidarians corals, hydroids, jellyfish, sea anemones, etc digestion is partly extracellular and partly intracellular. Those jellyfish which can swim do so using a form of jet propulsion in order to allow them to move throughout the water. Jellyfish move by squeezing their bodies so that jets of water from the bottom of their bodies are pushed out which in turn causes the jellyfish to be propelled forward. If the mouth is open water is expelled. Tentacles move independently of body to allow capturing its prey. Sea Anemones Sea anemones usually spend most of their lives in one place, but some have the ability to move. If they do move, they can only travel three to four inches an hour. Sometimes sea anemones hitch a ride on hermit crabs or decorator crabs. Sea anemones have a hydrostatic skeleton. A hydrostatic skeleton consists fo a layer of circular muscles and a layer of longitudinal muscles that enable the cnidarian to move. Oceanologists have been oberving them and noticed that corals keep shifting oernight. And eunicid worms drag corals with their jaws, then stick them to new rocks. Support Jellyfish Jellyfish are delicate, soft-bodied animals. They are invertebratesâ€”jellyfish have no bones, exoskeleton, or shell to protect or support them. Instead, the water in which they live provides their body with the structural support it requires. If a jellyfish is removed from water or is washed ashore, it collapses and dies. The inner layer the endoderm is the one in which the symbiotic zoochlorellae are found. Hydras double-layered tubular structure is found in both the trunk and tentacles of the polyp. Sea Anemones Sea anemones are solitary animals that live firmly attached by a pedal disk to some object, either a branching coral, submerged rocks, or shells. A few species even bury themselves partly in soft sediments. Then eventually the dead coral and dead organisms compact together and form another hard shell around the inner layer. The coral keeps on secreting calcium and making more and more layers with the calcium with the dead organisms. Powered by Create your own unique website with customizable templates.

Chapter 5 : RoundWorms - Home page/Feeding and Digestion

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In this article we will discuss about the: Introduction to Cockroach 2. Feeding in Cockroach 3. It is a common nocturnal omnivorous household animal which acts as a scavenger. It prefers dark warm corners of kitchens, godowns, underground drains and places where food and humid atmosphere are available. Cannibalism is a common feature among cockroaches. They are very fast moving and escape predators by producing a pungent secretion from the abdominal glands. Cockroaches have adopted themselves to all types and sizes of diet. Out of all appendages only mouth parts are described here as feeding apparatus, followed by the process of feeding. Details description are given in chapter 1. Cockroaches are not habitual predators. They generally take static matter as their food. They possess five types of receptors, viz. Among these, photoreceptors locate food by forming images; chemoreceptors, present in antenna and other appendages, help in detecting chemical stimuli in the form of smell and taste. After detecting the appropriate food, they gradually move over it. Then the food is procured by the maxillae and is cut into pieces by the mandibles. Extracellular digestion is the characteristic like other developed animals. Digestion starts from the buccal cavity containing the mouth parts. The food is then subjected to a variety of biochemical reaction within a specialized digestive system. Digestive System of Cockroach: The tract is about 6. It is divisible into three distinct regions: It is also known as stomodaeum. It is lined internally by cuticle and includes the mouth, pharynx, oesophagus, crop and gizzard Fig. The mouth denotes the beginning of the alimentary canal. This aperture leads to a small chamber called the buccal cavity between the mandibles and maxillae on either side. The labrum serves as upper lip and labium acts as lower lip. A short tongue or hypo-pharynx is present on the floor of the buccal cavity. The buccal cavity opens into a short pharynx which is a small tube. The salivary duct opens within the pharynx near the base of hypo-pharynx. The pharynx leads into the next part of the fore gut, which is called the oesophagus and the opening between the two is thick, muscular and guarded by a sphincter. The oesophagus extends up to the prothorax and is followed by the crop. The dilated sac-like crop constitutes the largest part of the fore gut. The wall of the crop is composed of epithelial layer, circular and longitudinal muscle layers. The crop extends within the abdominal cavity and acts as a temporary reservoir of food, where ingested food may be retained for two months. The crop leads into a short thick-walled gizzard, which forms the last part of the fore gut. It is divided into an anterior and a posterior part. The wall of the gizzard is highly muscular and its anterior part contains in its inner wall six chitinous teeth extending towards the cavity of the gizzard. The posterior part of the gizzard possesses two circular hairy cushions. The teeth are used for crushing the food and the hairy cushions work as sieve to permit only the finer particles of food to go inside the mid gut. It is a slender tube having an internal lining of columnar epithelium. In the inner wall, the epithelial cells throw fine filaments within the lumen of mid gut. The junction of the mid and hind gut is marked externally by the presence of numerous threads called Malpighian tubules which are excretory organs Fig. The ileum is the first part of the hind gut and has small narrow lumen having epithelial lining. The ileum leads to colon, which is broad and slightly coiled. The inner lining of colon is thrown into irregular folds and is formed by slender epithelial cells having a chitinous covering. The inner wall of the rectum is raised in the form of papillae. Special kinds of glands called rectal glands are present in the rectal wall for absorbing water. Thus the rectum not only stores the residual parts of the food but also helps in osmoregulation. The rectum opens to the exterior through an opening called the anus. The anus is provided with a sphincter muscle. A pair of salivary glands lies one on each side of the thoracic cavity. Each gland consists of two leaf-like diffused lobes and a reservoir. The secretory lobes, reservoirs and their ducts together constitute the salivary apparatus Fig. The lobes of the salivary gland open within the reservoir. From each reservoir a salivary duct runs anteriorly. The salivary ducts of two sides unite to form a common duct which runs along the oesophagus to open into the pharynx and near the base of hypo-pharynx. The internal lining of the mid gut and the hepatic caeca also produce digestive juices. Digestion Procedure in Cockroach: Within the buccal cavity, the food comes in contact with saliva and passes through the oesophagus into the crop. Both peristalsis and antiperistalsis take place in the crop. Such activities of the crop are more intense in males than in females. The passage of food from the crop to the gizzard depends upon the ingested fluid. From the crop, the food passes to the gizzard, where the cuticular teeth crushes the food and the hairy cushion permits only finer particles to enter the mid gut. The lining of mid gut and hepatic caeca act both as secretory and absorptive areas. The cellulase obtained in the mid gut is synthesised by the micro-organisms residing there. Most of the digested foods are absorbed only in the mid gut. Glucose is absorbed by the caeca. After the absorption of digested food, the rest passes within the hind gut, where water and salts are absorbed. Residual matter is temporarily stored in the rectum and are periodically rejected through the anus. Food requires nearly 33 hours to travel the entire length of the alimentary canal. These membranous structures are toned up in the anterior region of the hind gut by the internal spines. Electron microscopic studies have revealed that the peritrophic membranes are made up of several layers and resemble the structures present in saliva.

Chapter 6 : Nutrition in Marine Aquaculture. Training Session, Lisbon, October

The digestive system, which is responsible for digestion and absorption of food materials, includes digestive canal or tract and digesÂ-tive glands. (a) Digestive Tract: The tract is about cm in length.

Etymology[edit] The taxonomic term Bivalvia was first used by Linnaeus in the 10th edition of his Systema Naturae in to refer to animals having shells composed of two valves. The name "bivalve" is derived from the Latin bis, meaning "two", and valvae, meaning "leaves of a door". Some, such as the cockles , have shells that are nearly globular; cockles can jump by bending and straightening their foot. Others, such as the razor clams , are burrowing specialists with elongated shells and a powerful foot adapted for rapid digging. The shipworms , in the family Teredinidae have greatly elongated bodies, but their shell valves are much reduced and restricted to the anterior end of the body, where they function as scraping organs that permit the animal to dig tunnels through wood. Bivalve shell Near the hinge of the shell is the umbo , often a rounded, knob-like protuberance usually surrounding the beak. The umbo generally and the beak specifically represent the oldest portion of the shell, with extra material gradually being laid down along the margins on the opposite sides. The hinge point or line is the dorsal region of the shell, and the lower, curved margin is the ventral region. The anterior or front of the shell is where the byssus when present and foot are located, and the posterior of the shell is where the siphons are located. In bivalves, the mantle lobes secrete the valves, and the mantle crest secretes the whole hinge mechanism consisting of ligament , byssus threads where present , and teeth. In many bivalves, the mantle edges fuse at the posterior end of the shell to form two siphons , through one of which water is inhaled, and the other expelled, for respiration and suspension feeding. This is visible on the inside of the valve as an indentation on the pallial line which is known as the pallial sinus. The valves are made of either calcite , as is the case in oysters, or both calcite and aragonite. Sometimes, the aragonite forms an inner, nacreous layer, as is the case in the order Pterioida. In other taxa , alternate layers of calcite and aragonite are laid down. The periostracum is secreted in the groove between the outer and middle layers of the mantle, and is usually olive or brown in colour and easily abraded. Although the sometimes faint concentric rings on the exterior of a valve are commonly described as "growth rings" or "growth lines", a more accurate method for determining the age of a shell is by cutting a cross section through it and examining the incremental growth bands. Use of this technique has changed views on the longevity of many bivalves. For example, the soft-shell clam Mya arenaria was thought to be short-lived, but has now been shown to have a lifespan of at least 28 years. In different groups of bivalves, the ligament may be internal or external in position. The main function of the ligament as well as joining the valves together is to passively cause the shell to open. The shell is actively closed using the adductor muscle or muscles which are attached to the inner surface of both valves. The position of the muscles is often clearly visible on the inside of empty valves as circular or oval muscle scars. Along the hinge line of the shell are, in most cases, a number of hinge teeth which prevent the valves from moving laterally relative to one another. The arrangement of these teeth is often important in identifying bivalves. The animals have no brain ; the nervous system consists of a nerve network and a series of paired ganglia. In all but the most primitive bivalves, two cerebropleural ganglia are on either side of the oesophagus. The cerebral ganglia control the sensory organs, while the pleural ganglia supply nerves to the mantle cavity. The pedal ganglia, which control the foot, are at its base, and the visceral ganglia, which can be quite large in swimming bivalves, are under the posterior adductor muscle. Bivalves with long siphons may also have siphonal ganglia to control them. The organs are usually mechanoreceptors or chemoreceptors , in some cases located on short tentacles. The chemoreceptor cells taste the water and are sensitive to touch. They are typically found near the siphons, but in some species, they fringe the entire mantle cavity. Each statocyst consists of a small sac lined with sensory cilia that detect the movement of a mineral mass, a statolith, under gravity. These consist of a pit of photosensory cells and a lens. These strong muscles connect the two valves and contract to close the shell. They work in opposition to the ligament which tends to pull the valves apart. In file shells that can swim by flapping their valves, a single, central adductor muscle occurs. Some bivalves, such as oysters and most scallops, are unable to extend their foot and in them, these muscles are absent. Other paired muscles control the siphons and the byssus. The heart has three chambers: The ventricle is muscular and pumps hemolymph into the aorta , and then to the rest of the body. Some bivalves have a single aorta, but most also have a second, usually smaller, aorta serving the hind parts of the animal. The gills hang down into the mantle cavity , the wall of which provides a secondary respiratory surface being well supplied with capillaries. In species with no gills, such as the subclass Anomalodesmata, the wall of the mantle cavity is the only organ involved in respiration. Bivalves adapted to tidal environments can survive for several hours out of water by closing their shells tightly. Some freshwater species, when exposed to the air, can gape the shell slightly and gas exchange can take place. The protobranchs feed in a different way, scraping detritus from the seabed, and this may be the original mode of feeding used by all bivalves before the gills became adapted for filter feeding. These primitive bivalves hold on to the substratum with a pair of tentacles at the edge of the mouth, each of which has a single palp , or flap. The tentacles are covered in mucus , which traps the food, and cilia, which transport the particles back to the palps. These then sort the particles, rejecting those that are unsuitable or too large to digest, and conveying others to the mouth. In burrowing species, there may be two elongated, retractable siphons reaching up to the seabed, one each for the inhalant and exhalant streams of water. The gills of filter-feeding bivalves are known as ctenidia and have become highly modified to increase their ability to capture food. For example, the cilia on the gills, which originally served to remove unwanted sediment, have become adapted to capture food particles, and transport them in a steady stream of mucus to the mouth. The filaments of the gills are also much longer than those in more primitive bivalves, and are folded over to create a groove through which food can be transported. The structure of the gills varies considerably, and can serve as a useful means for classifying bivalves into groups. In these animals, the gills are relatively small, and form a perforated barrier separating the main mantle cavity from a smaller chamber through which the water is exhaled. Muscles draw water in through the inhalant siphon which is modified into a cowl-shaped organ, sucking in small crustaceans and worms at the same time. The siphon can be retracted quickly and inverted, bringing the prey within reach of the mouth. The gut is modified so that large food particles can be digested. It has mantle folds that completely surround its small valves. When the sea cucumber sucks in sediment, the bivalve allows the water to pass over its gills and extracts fine organic particles. The sea cucumber is unharmed. A number of digestive glands open into the stomach, often via a pair of diverticula ; these secrete enzymes to digest food in the stomach, but also include cells that phagocytose food particles, and digest them intracellularly. In filter-feeding bivalves, an elongated rod of solidified mucus referred to as the " crystalline style " projects into the stomach from an associated sac. Cilia in the sac cause the style to rotate, winding in a stream of food-containing mucus from the mouth, and churning the stomach contents. This constant motion propels food particles into a sorting region at the rear of the stomach, which distributes smaller particles into the digestive glands, and heavier particles into the intestine. Feeding and digestion are synchronized with diurnal and tidal cycles. In other ways, their gut is similar to that of filter-feeding bivalves. Each of these consists of a long, looped, glandular tube, which opens into the body cavity just beneath the heart, and a bladder to store urine. The pericardial glands either line the auricles of the heart or attach to the pericardium, and serve as extra filtration organs. Metabolic waste is voided from the bladders through a pair of openings near the front of the upper part of the mantle cavity, from where it joins the stream of exhalant water. The gonads are located close to the intestines, and either open into the nephridia, or through a separate pore into the mantle cavity. Spawning may take place continually or be triggered by environmental factors such as day length, water temperature, or the presence of sperm in the water. Some species are "dribble spawners", but others release their gametes in batches or all at once. Mass spawning events sometimes take place when all the bivalves in an area synchronise their release of spawn. Typically, a short stage lasts a few hours or days before the eggs hatch into trochophore larvae. These later develop into veliger larvae which settle on the seabed and undergo metamorphosis into juveniles that are sometimes for example in the case of oysters known as "spat". These species then brood the young inside their mantle cavity, eventually releasing them into the water column as veliger larvae or as crawl-away juveniles. The longer the period is before the larva first feeds, the larger the egg and yolk need to be. The reproductive cost of producing these energy-rich eggs is high and they are usually smaller in number. For example, the Baltic tellin Macoma balthica produces few, high-energy eggs. The larvae hatching out of these rely on the energy reserves and do not feed. After about four days, they become D-stage larvae, when they first develop hinged, D-shaped valves. These larvae have a relatively small dispersal potential before settling out. The common mussel Mytilus edulis produces 10 times as many eggs that hatch into larvae and soon need to feed to survive and grow. They can disperse more widely as they remain planktonic for a much longer time. Later they are released and attach themselves parasitically to the gills or fins of a fish host. After several weeks they drop off their host, undergo metamorphosis and develop into juveniles on the substrate. An advantage of this to the molluscs is that they can disperse upstream along with their temporary hosts, rather than being constantly swept downstream by the water flow. This decoy moves in the current and attracts the attention of real fish. Some fish see the decoy as prey, while others see a conspecific. They approach for a closer look and the mussel releases huge numbers of larvae from its gills, dousing the inquisitive fish with its tiny, parasitic young. The larvae then feed by breaking down and digesting the tissue of the fish within the cysts. After a few weeks they release themselves from the cysts and fall to the stream bed as juvenile molluscs. The fish are relatively unharmed. However, brachiopods evolved from a very different ancestral line, and the resemblance to bivalves only arose because of a similar lifestyle. The differences between the two groups are due to their separate ancestral origins. Different initial structures have been adapted to solve the same problems, a case of convergent evolution.

Chapter 7 : Bivalvia - Wikipedia

Feeding and Digestion If you want to breast-feed but your baby is unable to, you can express milk which can be fed to your baby by bottle or tube. If you are bottle feeding your baby keep her head up in good body alignment.

Feeding and Digestion All mollusks are heterotrophs, some are carnivorous while some are herbivorous. Cephalopods, octopuses and squids, are active predators. They capture their prey with their tentacles and holds a firm grasp with their suckers. They have a two part mouth, a radula, to rasp on their food, and a beak to cut their prey into pieces before being swallowed. With their radula and chitinous beak to kill and eat their prey. Their diet mainly consist of fish, crustaceans, and other mollusks. The Bivalvia mollusks are filter feeders, extracting the nutritious matter from the sea where they live. They draw water from their gills through the beating of the cilia. Suspended food are trapped in the mucus of the gill. Food they eat are phytoplankton, zooplankton, algae and other nutrients and particles in water. The trapped food and then transported to the mouth, where they are eaten, digested and expelled as feces. They filter about 5L of water per hour. Bivalves that are buried under the ground extend a siphon to the surface for feeding. Most gastropods are herbivores and scavengers. They diet consists of fungi, dead animal material, leaves, stems, bulbs and algae. A few are carnivorous, and usually the larger gastropods. They prey on other snails and other smaller organisms. They use their radula for feeding, a tongue like structure that is covered by rows of rasping teeth for scraping or cutting food before it enters the esophagus. After digestion in the stomach, the bolus moves to a long, white organ, caecum for digestion. Lastly the food goes to the liver, for nutrient absorption and solid waste is excreted through the rectum. Octopuses are said to have external digestion. When food particles enter the mouth of the bivalves, they travel down the esophagus to the stomach. In the stomach mechanical and chemical digestion is taken place to break down into smaller particles with the churning motion created by the muscles and enzymes to help in breaking down food. With ciliary tracts, the bolus in the stomach is carried to the digestive diverticulum for intracellular digestion. There are digestive cells that collect the nutrients and store into food vacuoles within the cell. The intestine transfer the wastes into the rectum where it is later discharged from the anus. For gastropods, after the food have been swallowed, the food is moved to the digestive tract through the currents of the ciliary movements. Enzymes are secreted by various salivary glands and digestive glands and led into the buccal cavity or the stomach, sometimes to both area. Digestion then occurs in the stomach and food is broken down. If they are inactive, digested food can be stored in the apical digestive gland, or what is known as the "liver". Powered by Create your own unique website with customizable templates.

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Chapter 8 : Understanding feeding and digestion in fish.

The complete process of feeding and digestion in amoeba. An Amoeba is a shapeless, single celled organism. It feeds on plankton and diatoms present in water. Watch this video to learn about the.

Feeding and Digestion Feeding and Digestion If you want to breast-feed but your baby is unable to, you can express milk which can be fed to your baby by bottle or tube. If you are bottle feeding your baby keep her head up in good body alignment. If your baby is unable to breast-feed or bottle feed she may be tube fed by passing a tube through the mouth Oral-Gastric or nose Nasal-Gastric Into the stomach. Tube feeding provides baby with all the necessary fluid and nutrients. Many babies will go on to bottle feeding or spoon feeding but tube feeding may be continued for as long as necessary. Parents with no special medical experience can learn the correct procedure to tube feed their baby. Trisomy babies may need small and frequent feeds. Some babies may not tolerate certain formulae and you should consider changing to a different brand or a soya-based formula. If your baby is not gaining weight the dietician at your hospital may be able to assist you. A high-calorie infant food may be recommended. Reflux Vomiting Reflux vomiting is when food is regurgitated through the mouth and sometimes down the nose. Many babies have a problem with this. Reflux vomiting may be helped by: This can occur due to poor muscle co-ordination and can be the cause of chest infections. Colic Many babies have colic which is a severe pain in the tummy causing baby to scream and draw up her knees. Some parents find that a change of infant milk formula, a soya formula or a different type of bottle or teat helps. If your baby is uncomfortable with colic your doctor may prescribe medication. Constipation Your baby may be uncomfortable with constipation. Relief of this discomfort can be helped by: Diet to encourage the formation of a soft stool Extra fluids Medication such as laxatives, suppositories, or a stool softener Exercises to encourage your baby to have a bowel motion and to improve the tone of the muscles involved.

Chapter 9 : Feeding and Digestion

Feeding fish - An article about feeding fish and which factors that stimulate fish to eat. Fish feeding habits - An introduction to the different feeding habits different types of fish have. Fish food - an introduction - A comprehensive discussion of fish foods.

The digestive transit The mechanical aspect of digestion is similar in larvae and adults. It is a trituration, caused by the combined action of the cristalline style of the gastric shield, of the food which is separated and mixed with the enzymes LUBET, Only the Fluids and the macromolecules, which result from the extracellular digestion exist in the gastric cavity, are capable of entering into the diverticule OWEN, They are then absorbed by the pinocytose and digested by the intercellular passage. The intracellular wastes are rejected by the desintegration of the digestive cell. The part played by the cristalline style has not yet been clearly described, it seems to act as a never ending screw which carries the fine particles to the epithelium level of the cristalline style sack, for absorption purposes. At intestine level, digestion and absorption exist in addition to the role of mucilaginous secretion which is used to form and transport faeces. The time for digestion varies however according to the algal species employed. Digestion is also 2. The infilling of the digestive tube Fig. This infilling takes place rather quickly, and one can remark intact algae in the stomach, in the principal channels of the digestive gland and in the intestine. Then, they are excreted along with a lot of mucus through the anus Fig. The temperature has a great influence on this stage Table 8. The start of the digestion Fig. As soon as the alqae enter into the channels of the digestive gland, they are affected within an hour ; while live algae can be observed rather a long time in the stomach 6 hours and especially in the intestine 8 to 16 hours after feeding. Three to six hours after the commencement of the experiments, the first residues of the digestion appear in the faeces, mixed with numerous live algae Fig. Progressively, the percentage of residues will rise, while the faeces solidify and mould themselves into the shape of the rectum. The residues accomulate into a pleated ribbon and are clearly separated from the straight ribbon formed by the intact algae Fig. Both ribbons are probably moulded together in the rectal bag so at the start of the digestion at least there are supposedly separate transit tubes for the algae and residues. The end of the digestion Fig. The residues will dominate the intact algae, invading all the lumen of the rectum,. They will no longer be excreted continuously, but intermittently, mixed with a lot of mucus. Indeed, the more food available, the less the need to complete the digestion so to ensure the energy gain necessary for Mytilus edulis. However, as the quantity of food influences the efficiency of digestion so does its composition. Thus, as numerous authors have remarked with different bivalves, the efficiency of absorption varies with the seasons. These variations are probably due to the environmental conditions on one hand and to the requirement of the molluscs on the other. The digestion of the different energetic substrates of the food is thus undouptably induced by the implementation of enzymatic organs adapted to the food requirements. These nutritional requirements are probably linked with the physiological seasonal state of the bivalves. The feeding will take place during the high tide cycle, and the matter ingested will not pass through the digestive diverticular before the next high tide, when it will be submitted to intercellular digestion. It is thus during the low tide period that the extracellular digestion is produced in the gastric cavity. The intracellular digestion during out flowing waters and low tide periods will be followed by the fragmentation of the digestive cells and the preparation of the tubules, for the new flow in, of matter during the following high tide cycle. This does not differ from the results showing that the rhythm of digestion were under the control of the environmental varients, such as tides or day and night alternance. Indeed, the food levels fluctuate in unnatural environment, especially in relation with the tides for intertidal species. With larvae MASSON states that from the ovocyte stage, numerous enzymatic activities commence, apart from some lypolitic enzyms which will not develop until after the metamorphosis has taken place, and with the exception of the amylasis which will only commence activity during the pelagic life. These glucanasic activities are found in all the epithelium of the digestive system and more so in the digestive tubules. It appears, when digestion commences, that there is a amylase secretion in the stomach, and the glucanases can be found on the surface of the cristallinestyle. Lipases and proteases in feeble quantities are found present in the lumen of the digestive tubules and of the stomach. Normally proteases are found in the intestine. An intracellular digestion continues in the bordering brushy cells and in the digestive cells by the action of the lysosomale enzymes like the D. There also exists, at the brushy border level of the digestion canals and in the stomach epithelium, membranar enzymes peptidases, alkaline phosphatases which must have a relation with absorption. Thus, a plan of the digestion of Crassostrea gigas Fig. A flow of particulates enter simultaneously into the stomach and into the canals of the digestive gland. All the substances ring brushy cells. The algal walls are attached as soon as they enter into the digestive canal, due to the action of the glucanases which are particularly active at this level, then progressively in the stomach due to the mechanical and then chemical action of the cristalline style, with the help of the enzymes secreted by the stomach wall and the digestive gland. The absorption and the intracellular digestion continues in the intestine. Dissolved absorption While the experimental work carried out by PEQUIGNAT points out the nutritional role of the amino-acids and the dissolved sugars, the energetic supply that they represent has, up to present, not been quantified in the energetic balance of molluscs. Indeed, the branchial epiderm of the lamellibranches is where a strong absorption of the dissolved organic molecules, such as amino-acids, sugars and fatty acids, takes place. Mytilus edulis can thus absorb half of the amino-acids contained in the sea-water which passes through the branchial cavity at concentrations of 1 umole per liter JORGENSEN, JORGENSEN also shows that the absorption of amino-acids from natural water can suffice and supply more than twice the amount of energy necessary for the filtration activity of the gills. On the contrary, according to NELL et al. Indeed, if bivalves are classed as suspensivores and deposivores, this classification is no longer applicable when dealing with animals living in an intertidal environment. The re-suspension of the water-sediment interface leads to an as important participation of the phytoplankton in the food rations of suspensivore animals, such as oysters and mussels for example. In addition, in a hatchery, a nursery or experimentally, the variability of a same phytoplanktonic species, depending on the factors of the culture environment, or the age of the populations make it difficult to comprehend of the cause-effect relations. On the other hand, the existing controversy between OWEN and MORTAN , concerning the rhythms of nutrition, are due more probably to the study of the secondary factors tides, nycthemerals rather than the primary ones food. Indeed, those animals whose feeding rhythm is cyclic in intertidal environments, adapt to continuous feeding when they are fed constantly. Indeed these two authors agree that the digestion depends depends on the availability of food. However there exist some points where particular efforts are required, if one wishes to fully understand the feeding mechanisms of bivalves. The first is the quantitative and qualitative estimation of the ration really ingested. Up to present,most of the studies have been carried out in conditions which do not bring about the apparition of pseudo-faeces. This means that the totality of the matter filtered was ingested. This is not what normally happens in natural intertidal environments, where the particulate loads are often relatively high. Also the level of digestion is probably linked with the quantity and quality of the food ingested. Indeed, without a doubt a connection is produced between the time of transit of the food in the digestive tract and the level of the different enzymatic activities, which gives an optimization of the energy acquired, depending on the energetic requirements of the animals. Therefore, the nutrition of bivalves is the result of successive adaptation of the filtration functions, ingestion and digestion, to the amount and the quality of the food available permitting a animal of given physiology to satisfy its requirements in the best way possible.