

How Has Biology Helped Agriculture

Biology has helped improve many things in agriculture, it has meant that farmers have had bigger yields and this has meant more money available to be made in farming.

Many techniques used in biology have helped agriculture; these have included cloning, limiting factors in photosynthesis, G.M foods, pesticides, fertilisers, genetic engineering, selective breeding and natural pesticides.

Cloning in agriculture has meant that farmers have been able to have an animal or plant that is exactly what they want and then clone it. Which means extra money for the farmer because they could clone a sheep that has loads of wool and lots of meat on it. This would never have been possible if it wasn't for the advancements in biology in developing a technique to get exact copies of what they want. However this also means that one disease that they're not resistant to can wipe them out, cloning also decreases the gene pool. Plant cells are routinely cloned in a process called tissue culture, which grows adult plants from cells taken from rapidly growing parts of the plant. Cloning animals is done by taking a cell from an animal and taking out the chromosomes and putting them into a dormant state by withdrawing the growth factors. An unfertilised egg then has the nucleic acid sucked out of it and then it's put in with the cells

from the animal, a protein was then added causing them to fuse and the DNA to take up in the egg.

The limiting factors of photosynthesis are the amount of light, water and carbon dioxide. Biologists have made it possible to create a perfect environment for plants to grow in by having green houses with the optimum temperature at which the plants photosynthesise most rapidly at. The concentration of carbon dioxide is also kept high as well as the light intensity. Due to biology farmers can grow plants to their maximum at the cheapest cost and this means more output for the farmer resulting in more money. Biology has also meant that they know the exact temperature to keep the plants at without going too high and killing the plants.

G.M foods have meant that farmers can create a fruit to suit their needs and be a certain shape and even a certain taste. This has meant that consumer needs can be dealt with down to the finest detail. This has also meant that vegetarians can have meat without it being from an animal. This would have been impossible for farmers to grow without biologists developing the technique by researching with genes and they can insert a specific gene into any plant or animal, making it into exactly what you want.

Pesticides can be classified as acaricides, avicides, chemosterilants, herbicides, insecticides, molluscicides, plant growth regulators, virucides, algacides, bactericides, fungicides, insect attractants, mammal repellents, nematocides, rodenticides, antifeedants, bird repellents, herbicide safeners, insect repellents, mating disrupters, plant activators, synergists and chemical classes.

Pesticides are, a chemical compound formulated to kill pests. Systemic pesticides are applied to the plant and are absorbed into the sap, killing any insect that tries to feed on the plant. Contact pesticides kill any insect that comes into direct contact with the chemical; either by being sprayed directly or by landing on a treated part of the plant while the spray is still wet.

The development of these by biologists has meant that farmers can keep their crops disease and pest free to give them a healthier yield. This has meant that insects eating them, no longer damage plants. Herbicides are put down to kill unwanted plants (weeds) to prevent competition with the plants that they are growing. This makes those plants being grown a lot stronger and healthier.

Fertilisers have been developed to give plants the three nutrients that they need which are phosphorus, potassium and nitrogen. There are organic fertilisers, which are derived from a once living organism and inorganic fertilisers, which are petroleum-based products. Inorganic fertilisers have been adapted so that they can be used in acidic or flooded conditions, when organic fertilisers can't be used, because the bacteria, which are needed to break it down, can't work in extreme conditions. So the inorganic fertiliser was developed to solve this.

Natural pesticides are used to kill unwanted insects or animals, for example frogs from one country can be introduced into another to try and wipe out an insect problem. However this can go wrong and the frog may not do what it's supposed to do because there is no way to control it, and what it does. However when it does

work it is very successful because it is done in harmony with the environment.

Genetic engineering is done to breed an animal with the features that a farmer wants it to have for whatever it's being used for. Using recombinant DNA and other techniques, which mean that farmers are using what biologists have found out, to help them get the best of what they want out of their agricultural produce, quicker than using selective breeding.

Selective breeding for finding a plant resistant to a, fungi for example, is done by planting a few plants in fungi and whichever ones survive are then bred together and in two or three generations the plant is completely resistant to that fungi. If biologists hadn't found out how to do selective breeding then many plants wouldn't give such good yields or survive certain conditions that they face.