The work of gregor mendel

Gregor Johann Mendel was born on July 22, 1822 to peasant parents in a small agrarian town in Czechoslovakia. During his childhood he worked as a gardener, and as a young man attended the Olmutz Philosophical Institute. In 1843 he entered an Augustinian monastery in Brunn, Czechoslovakia. Soon afterwards, his natural interest in science and specifically hereditary science led him to start experiments with the pea plant. Mendel's attraction to research was based on his love of nature. He was not only interested in plants, but also in meteorology and theories of evolution.

Mendel often wondered how plants obtained atypical characteristics. On one of his frequent walks around the monastery, he found an atypical variety of an ornamental plant. He took it and planted it next to the typical variety. He grew their progeny side by side to see if there would be any approximation of the traits passed on to the next generation. This experiment was " designed to support or to illustrate Lamarck's views concerning the influence of environment upon plants. " He found that the plants' respective offspring retained the essential traits of the parents, and therefore were not influenced by the environment.

This simple test gave birth to the idea of heredity. Overshadowing the creative brilliance of Mendel's work is the fact that it was virtually ignored for 34 years. Only after the dramatic rediscovery of Mendel's work in 1900 (16 years after Mendel's death) was he rightfully recognized as the founder of genetics. The reasons for Gregor Mendel to use pea plants in his experiment was, he needed plants that produced flowers that would be easy to protect against foreign pollen.

The special shape of the flower of the Leguminosae family, with their enclosed styles, drew his attention. On trying several from this family, he finally selected the garden pea plant (Pisum sativum) as being most ideal for his needs. Mendel also picked the common garden pea plant because it can be grown in large numbers and its reproduction can be manipulated. As with many other flowering plants, pea plants have both male and female reproductive organs. As a result, they can either self-pollinate themselves or cross-pollinate with other plants.

In his experiments, Mendel was able to selectively cross-pollinate purebred plants with particular traits and observe the outcome over many generations. The pea flowers are either purple or white intermediate colours do not appear in the offspring of cross-pollinated pea plants. This was the basis for his conclusions about the nature of genetic inheritance. Mendel observed seven pea plant traits that are easily recognized in one of two forms:

1. Flower color: purple or white 2. Flower position: axial or terminal 3. Stem length: long or short 4. Seed shape: round or wrinkled 5. Seen color: yellow or green 6. Pod shape: inflated or constricted 7. Pod color: yellow or green This observation that these traits do not show up in offspring plants with intermediate forms was critically important because the leading theory in biology at the time was that inherited traits blend from generation to generation. Mendel's theory proved otherwise. Mendel's Law of Segregation consisted of four parts or laws. The first law stated, Alternative versions of genes account for variations in inherited characters.

This is the concept of alleles. Alleles are different versions of genes that impart the same characteristic. For example, each pea plant has two genes that control pea texture. The second law stated, for each character trait an organism inherits two genes, one from each parent. This statement indicates to the fact that when somatic cells are produced from two gametes, one allele comes from the mother, one from the father. These alleles may be the same true-breeding organisms, or different hybrids.

The third law stated, in relation to the second, declares that, if the two alleles differ, then one which is the dominant allele, is fully expressed in the organism's appearance; the other which is the recessive allele, has no noticeable effect on the organism's appearance. The fourth and final law of segregation stated, the two genes for each character segregate during gamete production. This references meiosis when the chromosome count is changed from the diploid number to the haploid number. The genes are sorted into separate gametes, ensuring variation. This sorting process depends on genetic " recombination.

During this time, genes mix and match in a random and yet very specific way. Genes for each trait only trade with genes of the same trait on the opposing strand of DNA so that all the traits are covered in the resulting offspring. The Mendel Pea Experiment and the discovery of the Law of Segregation has shaped the way that genetic research has developed and it has been shown that this law applies to all sexually reproducing organisms. The most important principle of Mendel's Law of Independent Assortment is that the emergence of one trait will not affect the emergence of another.

For example, a pea plant's inheritance of the ability to produce purple flowers instead of white ones does not make it more likely that it would also inherit the ability to produce yellow peas in contrast to green ones. Mendel's findings allowed other scientists to simplify the emergence of traits to mathematical probability. Mendel was so successful largely thanks to his careful and non passionate use of the scientific method. Also, his choice of peas as a subject for his experiments was quite fortunate.

Peas have a relatively simple genetic structure and Mendel could always be in control of the plants' breeding. His data for his experiment were expressed numerically and subjected to statistical analysis. This method of data reporting and the large sampling size he used gave credibility to his data. He also had the foresight to look through several successive generations of his pea plants and record their variations. Without his careful attention to procedure and detail, Mendel's work could not have had the same impact that is has made on the world of genetics. Mendel and Darwin's Rivalry.

Mendel's ideas on heredity and evolution were diametrically opposed to those of Darwin and his followers. Darwin believed in the inheritance of acquired characters. This led him to his famous theory of continuous evolution. Mendel, in contrast, rejected both the idea of inheritance of acquired characters which was known as mutation, as well as the concept of continuous evolution. The laws discovered by him were understood to be the laws of constant elements for a great but finite variation, not only for cultured varieties but also for species in the wild.

In his short reatise, Experiments in Plant Hybridization, Mendel incessantly speaks of “ constant characters”, “ constant offspring”, “ constant combinations”, “ constant forms”, “ constant law” and “ a constant species”. He was convinced that the laws of heredity he had discovered corroborated Gartner’s conclusion “ that species are fixed with limits beyond which they cannot change”. As the Darwinians won the battle for the minds in the 19th century, no space was left in the next decades for the acceptance of the true scientific laws of heredity discovered by Mendel. Further work in genetics was continued mainly by Darwin’s critics.