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.01.2021

B.Sc Zool (H) 2nd Part II

GENETICS (contd.)

1.) Law of unit characters - Characters of a plant or animal are unit characters which are independent of one another so far as their inheritance is concerned. These are governed by some factors or determiners called genes which are responsible for the expression for the character. For example tall character appears when the gene or factor for this character is present in the gamete and the gamete carries the character to the zygote which develops into the individual.

2.) Law of Dominance - When two homozygous individuals (TT x tt) are crossed, the characters which appear in the hybrids of F_1 generation are called dominant characters (Tall in this case) hybrid will resemble with that parent which carries the dominant trait (T). The other (t) which is present in the hybrid (Tt) cannot express itself and is called recessive character. This is concluded from the result obtained in F_1 generation of a monohybrid cross.

3.) Law of Segregation - When an allelomorphic pair of factors is brought together in a hybrid (in F_1) the factors or genes remain together in it and are able to keep their identity and they separate when the hybrid forms gamete. This is found from the fact of gamete formation of F_2 individuals of monohybrid cross.

4.) Law of Independent Assortment - When two pairs of independent alleles are brought together in the hybrid (F_1) they at the time of gamete-formation assort independently at random and freely. This shows that one gene is independent of the other and has no influence on the other. This shown during gamete formation of F_2 individuals of dihybrid cross.

* Explanation of Mendel's laws

for the expression of characters the factors or genes are present in the chromosome of the cell nucleus. Generally, one gene is responsible for the expression of one character. The chromosomes remain in pairs. So, for the allelomorphic characters the two genes are also present in pairs one on each chromosome. During gamete formation the chromosomes are separated and so the genes. Thus in gamete for each one character one gene is present. When the gametes unite during fertilization both the chromosomes and along with both, the genes again come together. In this way the characters of the parent pass on to the offspring as hereditary characters.

*) Genetics and Human welfare

The knoledge of heredity has its practical applications for the welfare of mankind. This has helped us in plant and animal breedings. In breeding desirable characters present in two parent plants or animals of same or allied species are combined by artifical crossing to produce high-yielding and disease resistance varieties. This has wide application in agriculture and it has been possible to produce different varieties of wheat, paddy, cotton, potato, sugar-cane and vegetables. The methods of production of high-yielding crops developed by scientists and biotechnologists have helped a lot to solve the food shortage in India. Some of the new varieties developed by our scientists are given below

Paddy

The following superior varieties of paddy have been produced by the Indian Agricultural Research Institute (IARI), New Delhi

(i) Taichung Native 1 (T.N.1); (ii) IR-8

Both these varieties are dwarf, high-yielding and are suitable for India.

) A new variety called Jaya has been released from Bangalore Research Centre.

(iii) Some other varieties released recently are Pusa Sawani, Pusa A-4, Pusa [illegible].

B. Hillock

It is also another important kind of Indian. The following varieties have been produced by Indian workers.

(i) IARI has introduced a very good variety called New Pusa.

(ii) Shankar Sweet :- The grains are hard and amber. Coloured. Matures quickly in about 120 days.

(iii) Multi-Purpose maturity and are medium-sized grain.

(iv) Kalyan Sona :- These mature in 110-115 days and are suscep to brown and yellow rusts.

(v) Sonalika 308 (I-308) - These mature in 125-130 days and are tolerant. These were released by U.P. Agriculture University, The grains are white and soft.

Thus the experience gained by the study of genetics have applied not only to improve the varieties of plants but these have been applied to improve different economically important animals Cattle and poultry birds.

Good breeds of cattle is found in the Punjab, Haryana, Gu Rajasthan and Maharashtra. The names of some of these breeds Sahiwal and Montgomery of Gujarat, Deoni of Bihar, Hissar of Andh and Khillari of Maharashtra. In India, cattle breeding is done increase milk production.

Our knowledge of genetics has been applied in poultry- The poultry-farming has now become very popular in India. Keeping there are many varieties of fowls of which the very important. Near and Chittagong, the Aseel and the poultry-breeding our aim is to produce good progeny with and [illegible] to produce good quality eggs and meat. suitable for these characteristics. The combination of genes produce improved variety is done by breeders by the methods Selection and Crossing