Important postulates of mendels experiment

report: Important Postulates of Mendels Experimentreport The consistent

pattern of results obtained from different monohybrid crosses led Mendel to

propose four postulates which are also called principles of inheritance.

Postulate 1: Mendel proposed that each genetic character is controlled by a

pair of unit factors, now known as alleles or allelomorphic pair. On the

analysis of a monohybrid cross as per this postulate in the true bred parents,

there are two unit factors for tallness and in the similar way two unit factors

for dwarfness.

Thus, three combinations are possible: (i) either these are two factors for tall, or (ii) two factors for dwarf stems, or (iii) one of each factor in an individual. Postulate 2: This postulate is based on the results obtained in F1 generation. Mendel proposed that when two dissimilar unit factors are present in a single individual, only one is able to express and not the other.

The one which expresses itself is the dominant unit factor and the other which does not express is the recessive unit factor, and thus, tall stem is said to be dominant over the recessive dwarf stem. The dominant and recessive terms are used to denote a trait, e. g., tall trait or recessive trait. Now the unit factors of Mendel are called genes. Postulate 3: This postulate is popularly known as the principle of segregation or purity of gametes.

During gamete formation, the unit factors of a pair segregates randomly, so that, each gamete receives one or the other unit factor with equal probability. This ensures the purity of gametes. During the formation of gametes in P generation (tall x dwarf) each gamete from the parent will receive one but the same unit factor either for tallness or for dwarfness. After fertilization, F1 plants will receive one unit factor for tallness and one for dwarfness. With the former (i. e., factor for tallness) being dominant, all F1 plants will be tall.

When F1 tall plants will form gametes, the principle of segregation will demand that each gamete randomly received either the tall or the dwarf unit factor. With subsequent fertilisation, which is a chance event, four combinations of these unit factors will result in equal frequency in F2 generation:(i) tall/tall (ii) tall/dwarf (iii) dwarf/tall (iv) dwar/dwarf. When any

individual produces gametes, the alleles segregate; so each gamete receives only one member of the pair of alleles and the paired condition is restored by random fusion of gametes during fertilisation.

Application of postulate 2: When postulate 2 is applied the combinations (i), (ii) and (iii) will result into tall plants, and only combination (iv) will result into dwarf plants. This means that the F2 generation consists of three-fourths tall and one-fourth dwarf or a phenotypic ratio of 3: 1. This is exactly what Mendel observed, and is found in all the monohybrid crosses. Application of postulate 3: When postulate 3 is applied, the combinations (i) and (iv) will result into homozygous tall and homozygous dwarf respectively and combinations (ii) and (iii) will result in heterozygous tall and homozygous dwarf, respectively in F2 generation.

Postulate 4: This postulate is popularly known as the Principle of Independent Assessment of Factors. As already described, Mendel extended his work by conducting Dihybrid or two factor crosses, in which the parent plants differed in two pairs of contrasting traits. For example, a cross in which plants producing round and yellow seeds were crossed with plants producing wrinkled and green seeds.

The F, s were all yellow and round seeded, which suggests that yellow is dominant over green and round seed is dominant over wrinkled seed. When F1s were Selfed, Mendel postulated that the segregation of one pair of unit factors will occur independently of the other pair or they will assort independently. As per rule, the gametes must carry all possible combinations of the unit factors in equal frequency. In such example, gametes with

random distribution of unit factors will give following combinations: (i) yellow, round (ii) green, wrinkled (iii) green, round and (iv) green, wrinkled. During fertilisation, each zygote will have equal probability of receiving two of these combinations, one from each parent. This will result into progeny as follows: 9/16 yellow round; 3/16 yellow, wrinkled; 3/16 green, round; 1/16 green, wrinkled, i. e.

, 9: 3: 3: 1. Mendels Dihybrid results. On the other hand, if the two pairs of

contrasting traits are inherited independently, the principle of independent

assortment can also be stated as when two independent events occur

simultaneously the combined probability of two outcomes is equal to the

product of their individual probabilities of occurrence. For example, the

segregation of yellow ? green and also of round seed ? wrinkled seed is 3/ 4

yellow: 1/4 green, and 3/4 round seed: 1/4 wrinkled seed. report report -X