

1. Please give definitions of the following terms : (a) missense mutation (b) nonsense mutation (c) transposable element (d) euchromatin (e) C value. (50 points)
2. A diploid organism has $2n=36$ chromosomes. How many chromosomes will be found in a monosomic member of this species (10 points)
3. Species I has $2n=14$ and species II has $2n=20$. Give all possible chromosome numbers that may be found in the following individuals.
 - a. An autotriploid of species I. (10 points)
 - b. An allotetraploid formed from species I and species II. (10 points)
4. A corn plant is obtained that is heterozygous for a reciprocal translocation and therefore is semi-sterile. This plant is crossed to a corn plant which had no translocation and carried homozygous recessive *brachytic* (*br*) genotypes on chromosome 2. A semi-sterile F1 plant is then backcrossed to the homozygous brachytic corn. The BC1 progeny showed the following phenotypes: 150 nonbrachytic, semi-sterile; 150 nonbrachytic, fertile; 150 brachytic semi-sterile; 150 brachytic fertile. Please reason whether chromosome 2 is involved in the translocation. (20 points)