Difference Between Autopolyploidy and Allopolyploidy

www.differencebetween.com

Key Difference - Autopolyploidy vs Allopolyploidy

Polyploidy refers to a type of a chromosomal aberration which results in an organism with three or more sets of chromosomes, instead of the normal diploid condition. In most cases, polyploidy is used in plant breeding and it has shown positive outcomes in developing hybrid varieties. Therefore, polyploid varieties are mainly explained in plant biology. Polyploids are mainly formed as a result of non - disjunction between sister chromatids during mitosis. There are two main types of polyploidy; Autopolyploidy and Allopolyploidy. Autopolyploidy is the condition in which an organism is composed of three or more sets of chromosomes received from the same species with similar genomes. Alloploidy is the condition in which an organism is composed of three or more sets of chromosomes received from a different species with different genomes. The **key difference** between Autopolyploidy and Allopolyploidy is the type of organisms which contribute to the respective polyploidy condition**. In Autopolyploidy, the sets of chromosomes received are of the same type of genome, whereas in Allopolyploidy, the organisms are composed of three or more sets of chromosomes received by organisms of different genome types.**

What is Autopolyploidy?

Autopolyploidy is the condition in which an organism receives multiple sets of chromosomes from the same genome type or the same species. Autopolyploidy most often results in an even number of chromosomes. Due to the similarity of the chromosomes, they undergo multivariant pairing during the process of meiosis.

Autopolyploids can be divided into two categories based on the similarity of the genome used in the development of the hybrid polyploid variety. Therefore, autopolyploids are further divided into strict autopolyploids and interracial autopolyploids. Strict autopolyploidy refers to the phenomenon in which a hybrid is formed as a result of the doubling of chromosomes of the same organism. Interracial autopolyploidy is the phenomenon in which the hybrid is formed due to the crossing that takes place between different organisms having the same genotype.

Figure 01: alfalfa

Under artificial conditions, autopolyploidy can be induced via colchicine. Colchicine has the ability to hamper the development of the nuclear spindle. The mitosis, that follows in this way is referred to as C - mitosis. C – mitosis results in forming bivalents. Many cultivated plants are autopolyploids. Examples include tetraploid Potato and alfalfa.

What is Allopolyploidy?

Allopolyploidy is the phenomenon in which a hybrid variety is formed as a result of receiving three or more sets of chromosomes from genetically nonidentical varieties. Therefore, they do not have similar genomes and they belong to different types of species. Allopolyploids can have either an even or an odd number of chromosomes. Multivalents are formed instead of bivalents in allopolyploidy.

Allopolyploids can be also categorized into different types;

1. Segmental allopolyploidy
2. Complete allopolyploidy
3. True or Genomic polyploidy
4. Auto – allopolyploidy
5. Aneuploidy

Figure 02: Allopolyploid - Cotton

Examples of allopolyploids are cotton – 13 pairs and 53 chromosomes, wheat – 7 pairs and 42 chromosomes.

What are the Similarities Between Autopolyploidy and Allopolyploidy?

- Both types belong to the polyploidy condition where the number of chromosomes is increased compared to the normal count.
- Both types are used in developing hybrid varieties.
- Both types are most commonly seen in crop cultivation.

What is the Difference Between Autopolyploidy and Allopolyploidy?

Autopolyploidy vs Allopolyploidy	
Autopolyploidy is the condition in which an organism is composed of three or more sets of chromosomes received from the same species with similar genomes.	Alloploidy is the condition in which an organism is composed of three or more sets of chromosomes received from a different species with different genomes.
Number of Chromosomes	

Even number of chromosomes can be seen in autopolyploidy condition.	Allopolyploidy condition can have an even number or an odd number of chromosomes.
Formation of Sister Chromatids	
Bivalents are formed in autopolyploidy.	Multivalents are formed in allopolyploidy.

Summary - Autopolyploidy vs Allopolyploidy

Polyploids are formed as a result of non – disjunction taking place in the mitosis phase which will either result in bivalents or multivalents. Autopolyploidy is the phenomenon in which an organism receives three or more sets of chromosomes from organisms which have similar genomes, whereas allopolyploidy is the phenomenon in which the hybrid organism receives three or more sets of chromosomes from organisms which do not have similar genomes. Producing these two types of polyploids have shown to be beneficial in plant breeding and crop cultivation. This is the difference between autopolyploidy and allopolyploidy.

Reference:

1.Baron, Adrianne. “Allopolyploid: Definition, Speciation & Example.” Study.com, Study.com. Available here
2.Sengbusch, Peter v. “Autopolyploidy and Somatic Polyploidy.” LON-CAPA Botany online: Classic Genetics - Chromosomal Numbers - Autopolyploidy - Somatic Polyploidy. Available here
3.Anand, Sandhya. “Polyploidy - Causes and Types .” Biotech Articles. Available here

Image Courtesy:

1.'Alfalfa (Medicago sativa) : sprouts Interesting ... :' by Miran Rijavec (CC BY 2.0) via Flickr
2.'Paxta11'By S Aziz123 - Own work, (CC BY-SA 4.0) via Commons Wikimedia

How to Cite this Article?

APA: Difference Between Autopolyploidy and Allopolyploidy. (2018 January 05). Retrieved (date), from http://differencebetween.com/difference-between-autopolyploidy-and-vs-allopolyploidy/

MLA: "Difference Between Autopolyploidy and Allopolyploidy" Difference Between.Com. 05 January 2018. Web.

Chicago: “Difference Between Autopolyploidy and Allopolyploidy”. Difference Between.Com. http://differencebetween.com/difference-between-autopolyploidy-and-vs-allopolyploidy/accessed (accessed [date]).