

Potato breeding via Ploidy manipulation

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The Common goal in Potato breeding programs is to collect valuable characteristics from highly heterozygous lines of divergent backgrounds into a new clone. promising clones are selected from a bulk of F_1 hybrid seedlings. These selections are the vegetatively propagated and evaluated at least for seven to ten years in large plots in different locations. Although this method is simple but their effectiveness is low and they are time consuming, because cross pollination between tetraploid potato clones, which are usually heterozygous, produces offsprings that display complex segregation of agronomic, quality characteristics, pest and disease resistance. However potato is the suitable crop that in which the complete genome can be manipulated by the use of unreduced gametes and dihaploid extraction, This cytological facilities lead to emerge the new breeding method called aneuploid breeding which includes the following basic steps: reduction of ploidy level through dihaploid extraction, breeding and selection in diploid level, at this stage high \times valuable and diverse diploid related species germplasm are also used, and finally resynthesis of tetraploids forms by the $2n$ gametes from the $2X \times 2X$ or $4X$ crosses, in this paper each of these steps were demonstrated.