Recently, we observe that the share of the area affected with high salinity or drought stress is growing each year. According to the data of FAO Land and Plant Nutrition Management Service, soils affected by increased salinity currently constitute more than 6% of the cultivated area (nearly 400 million hectares) and by 2025, up to 2/3 of the Earth's surface will be affected by drought. Therefore, the understanding of mechanisms related to resistance to both mentioned stresses seems more than important. In our study, we will analyse the response of a model semi-halophyte and $C_3$-CAM transient plant - *Mesembryanthemum crystallinum* L. (common ice plant) - to both these stresses, namely drought and high salinity. While osmotic stress presence is responsible for $C_3$→CAM photosynthetic shift, in our earlier studies we confirmed that with its withdrawal *M. crystallinum* performs reversal photosynthetic shift, precisely CAM→$C_3$ which is accompanied by the fastest and broadest photosynthetic apparatus reorganization known in the plants' world. In the present study, we will answer the question, of how such a rapid and broad transformation of the photosynthetic apparatus is possible? Using the NGS RNA sequencing we will check, how both osmotic stresses' presence and further withdrawal affect the genes' expression at the transcriptome level. We will take a closer look at the transcriptome part related to the photosynthetic apparatus and its regulatory mechanisms. We believe that proteases involved in biogenesis and maintenance of chloroplast are key components responsible for the photosynthetic apparatus's high plasticity. For this reason, later in the project, we will look for molecular and biochemical evidence confirming the share of mentioned components of the chloroplast's regulatory mechanism, in the high plasticity of photosynthetic apparatus. We believe, it seems most justified to understand the mechanisms determining, on the one hand, resistance to salinity stress, which can be observed in halophytes and semi-halophytes. On the other hand, it seems equally important to understand the mechanisms related to the behavior of the photosynthetic apparatus during osmotic stress, which probably plays a central role in the resistance of the whole plant. In summarizing, although the hypotheses tested within the project as well as the plant model are not directly related to the applicational problems, molecular and physiological mechanisms the project is going to study may be utilized in resolving at least some future problems of crops and pastures cultivation.