

THE ADAPTATION OF PLANTS TO GROWTH ON A CALAMINE WASTE HEAP IN BOLESŁAW NEAR OLKUSZ

S u m m a r y

The natural vegetation of areas characterized by high concentrations of heavy metals may be a valuable source of genetic material (forms-ecotypes) ideally adapted to growth under the harsh and pioneering conditions of calamine waste heaps. In this paper we describe the particular traits distinguishing the calamine forms of species dominating a calamine waste heap in Bolesław near Olkusz. The waste-heap populations of *Silene vulgaris*, *Dianthus carthusianorum* and *Biscutella laevigata* have acquired additional adaptations to drought conditions, nutrient deficits and excessive levels of heavy metals in the soil. The morphological traits of these plant populations distinguishing them from the natural populations of these species stemmed in all three cases from adaptations to water deficit. These traits were established genetically and occurred at the same level of significance in three successive generations despite the plants being cultivated under optimal conditions on a substrate devoid

of heavy metals and with an adequate water supply. Two species, *Silene vulgaris* and *Dianthus carthusianorum*, were found to have a type „r” life strategy (a short life cycle, fast growth, large reproductive effort) in which the reduction of biomass was compensated for by increased fertility. In the waste-heap populations of the three studied plant species, microevolutionary processes and strong selection of ecotypes best adapted to local conditions led to the development of distinct calamine resistant forms of these plants. The presented studies also show that the calamine resistant forms of the three species studied can be used in the reclamation of land polluted by heavy metals. The waste-heap populations of these species are particularly valuable since they have genetically established traits that allow them to grow under the harsh and pioneering conditions prevailing on waste heaps rich in zinc and lead.