Endoreduplication is a modified form of mitotic cycle in which repeated rounds of DNA replication occur without chromosome segregation and cell division, leading to formation of larger and thicker chromosomes called polytenics. In the present study, spontaneous formation of polytene chromosomes in the generative nuclei of pollen grains of Amaryllidaceae, and presumably in angiosperms, was described for the first time**.** For this purpose, microspores and mature pollens of the endangered species *Pancratium maritimum* L. were examined by light and transmission electron microscopy with a special reference to the observation of polytenic nuclei. Polytene chromosomes were detected in most of the generative cells of young bicellular pollen grains and mature pollen grains found in some anther locules, but they were rare or absent in the other anther locules. Polytenization of chromosomes did not follow the same pattern in all of the pollen grains. Polytene structures found in the developing pollen grains of *P. maritimum* exhibited variation from a diffuse to a condensed state and from reticulate to cable-like structures with different degrees of bonding. In addition to cryptic polyteny, cable-like polytene chromosomes with bands resembling classic polytene chromosomes were also detected. However, some nuclei did not exhibit polytenic structure clearly. Morphological changes in polytene chromosomes that are caused by the formation of functional structures such as DNA amplification, puffing and looping were also recognized. Other reasons for morphological differences of polytene chromosomes are discussed in detail.