The objective of this research was to examine the concentrations of crude protein, P, K, Mg, Fe, Mn and Zn of 5 triticale genotypes and 2 barley cultivars (two-row) at different growth stages. The experiments were carried out at Süleyman Demirel University farm in Isparta during the growing season of 2012-2013. Three hexaploid triticale lines (SDÜ-21, SDÜ-27, SDÜ-43) and 2 cultivars (Karma-2000 and Tatlicak-97), and two-row barley cultivars (Hamidiye and Cumhuriyet) were used in the experiment. The experimental design was a randomized split block design with three replication. The genotypes were used as main plots and growth stage were used as sub-plots. The basic pre-sowing fertilization rates for all plots were 30 kg N·ha⁻¹ and 50 kg P·ha⁻¹, the rest of 30 kg N·ha⁻¹ was applied at the early spring (stem-elongation stage). Plants were harvested at four stages, stem elongation, milk development, dough development and mature stage. Samples taken from each plot were dried to constant weight at 65°C in oven. After cooling, the samples were milled for crude protein and mineral element analyses. According to the results of variance analysis, the nutrient concentrations of triticale and barley genotypes showed variations depending on the genotypes and different growth stages. The crude protein content of barley cultivars were higher than triticale genotypes. The concentration of K, Fe, Mn and Zn in whole plants decreased from stem elongation to maturity, while Mg and P contents increased. Crude protein rate (18.59%) at dough development stage was higher than other growth stages. The nitrogen use efficiency of SDÜ-27 line, which can be used for cultivar registration, was higher than control cultivar (Karma -2000; Tatlicak -1997).