**Highlights**

* The presence and frequency of *LEP* and *LEPR* polymorphisms was studied in Ukrainian Large White pigs.
* Association between *LEP*, *LEPR* polymorphisms and backfat thickness and average daily weight gain was investigated.
* No *LEP* SNPs were found to be associated with backfat thickness and daily weight gain.
* *LEPR* SNP c2856C>T was found to be associated with both, backfat thickness and daily weight gain in Ukrainian Large White breed.