

The study was conducted in the Taj Al-Nahrain cattle station in Al-Diwaniyah Governorate (it is 200 km away from the center of Thi Qar Governorate), as well as the laboratories of the Department of Life Sciences at the College of Science, University of Thi-Qar for the period from 10/15/2020 to 10/4/2021 on a sample consisting of 84 Holstein Friesian cows imported from Germany were selected during the third parity (it is a breed of black and white spotted cows and was divided according to the percentage of spotting to 90% white , 50% white -50% black and 90% black). The aim of study was to determining the genotypes of the POU1F1 gene and their relationship to a number of production and growth traits, after conducting molecular analyzes that included DNA extraction, electrophoresis, polymerase chain reaction (PCR) and the use of RFLP technology (Restriction Fragment Length Polymorphism) based on the Hinf1 enzyme for the purpose of determining the genotypes and the ratios of distribution of the studied gene. The results of the study showed the following: 1- The studied genetic segment of the POU1F1 gene showed in three genotypes (AA, AB, BB) with percentages of 55.3, 42.6, 2.1%, respectively, and there were highly significant differences ($P \leq 0.01$) between the distribution of these percentages and the superiority of the A allele (0.766) over The B allele (0.234). 2- The results of the study showed that the relationship of the genotypes of the POU1F1 gene with the characteristics of milk production (daily milk production, total milk production, peak production) was not significant except in the characteristic of peak milk production in favor of the BB genotype at a rate of 538.50 kg on each of the genotypes AA and AB, while the results did not show a significant relationship between the b genotypes (AA, AB, BB) in each of daily milk production rate and total milk production. 3- It was founded that the effect of POU1F1 gene on the characteristics of body dimensions (body length, frontal body height, posterior body height) was significant ($P \leq 0.05$) in body length in favor of the BB genotype (164 cm) on each of the AA and AB genotypes (157,780 and 156,347 cm, respectively), while there were no significant differences between the genotypes in the frontal height and the back height of body. 4- The results showed that no significant effect between the spotted cows (90% black, 50% white - 50% black and 90% white) in the characteristics of milk production. 5- There was a significant effect ($P \leq 0.05$) for the spotting percentage with the characteristics of the body dimensions, as the percentage of spotting 90% white (150.909) outperformed the percentage of spots 90% black (148.540 cm) in the frontal height of the body and there was no significant effect of the percentage of spots in each body length and back elevation of the body. 6- The simple correlation between the characteristics of the body dimensions as well as between the characteristics of milk production was highly significant ($P \leq 0.01$). 7- It was found that the regression was significant ($P \leq 0.05$) for the daily milk production on the posterior height of the body and also for the total milk production on both the frontal height of body and the posterior height of body, and it was not for other studied traits. It can be concluded from the study of the genetic structures of the POU1F1 gene that it is possible to rely on its resulting patterns in the development of genetic improvement programs in cows to increase and maximize the economic returns from breeding projects