Organophosphorus (OP) compounds have been reported to induce in vitro and in vivo generation of reactive oxygen species (ROS). Paraoxenase, an enzyme that hydrolyzes oxon derivative of organophosphorus pesticides, can directly reduce oxidative stress in macrophages and in serum. The Q allele of paraoxenase 1 (PON1) can be several times less efficient than the R allele in hydrolyzing paraoxen. We performed this study to test hypotheses that organophosphorus insecticides would increase the level of oxidative stress in human body, and that more ROS would be produced in individuals with the PON1 Q/Q genotype than in those with the Q/R or R/R genotype. 8-Hydroxydeoxyguanosine (8-OHdG) levels in DNA extracted from leukocytes in peripheral blood and urine specimens, and urinary OP metabolites of 18 males who mainly used organophosphorus insecticides and 18 men who have not, were measured and compared according to the status of pesticide exposure, sampling season and the PON1 genotype. The effects of pesticide exposure, PON1 genotype, sampling season, and their interaction terms on 8-OHdG levels in leukocytes or urine specimens after controlling the other variables were statistically tested using a general linear model. The mean 8-OHdG level in leukocytes and urine specimens were significantly higher in pesticide users than in controls regardless of sampling season. Blood leukocytes sampled from pesticide users in summer showed a significantly higher mean of 8-OHdG level than those sampled in winter. The means of urinary dimethylphosphate (DMP) and total OP metabolite concentration were significantly higher in pesticide users than in controls in summer. The urinary 8-OHdG significantly correlated with urinary DMP and total OP metabolite concentrations. There was no significantly decreasing or increasing tendency in the level of 8-OHdG as the number of the Q allele decreased. However, the urinary DMP and total OP metabolite concentrations in summer were significant decreasing tendency as the number of the Q allele decreased. We found significant correlations between the 8-OHdG level in leukocytes and urinary DMP and total OP metabolite concentrations in all subjects and pesticide users with the PON1 Q/Q genotype. A significant correlation between urinary 8-OHdG level and urinary total OP metabolite concentration was found in all subjects with the PON1 Q/Q and Q/R genotypes. PON1 polymorphism, exposure status, and interaction term between exposure status and PON1 polymorphism were significant in a general linear model for urinary 8-OHdG level. These results suggest that organophosphorus pesticide would induce oxidative stress in individuals with the PON1 Q allele.