Introducing Mathematical Models to Estimate Yield and Damages Caused by Selected Detrimental Factors in Walnut Orchards

Dr. D. Hasani∗, R. Dastjerdi, Dr. R. Rezaee
Dr. M. J. Aghaee, Dr. K. Vahdati, A. B. Dehghani,
M. R. Mozafari, S. Eskandari, H. Hadadnejad & A. Soleimani.

Abstract

Walnut trees are subjected to damage of several detrimental factors including frost, hail, drought, pest and diseases such as anthracnose, blight and codling moth. Insurance of walnut tree against these factors is necessary to alleviate damages caused by these disasters. Accurate estimate of yield and damage caused by climatic and biological factors has special importance in major developmental decision-making, crisis management, determining the degree of damage in insurance industry and banks. Currently, insurance fund inaccurately determines insurance cost according to self expression of farmers which may cause over or under estimation resulting to financial loss for both of insured or insurer. Therefore, developing of an efficient model or instruction to estimate yield and crop damage has specific importance. In this research, according to records in organs damage in different phonological stages of walnut and correlated factors with yield, a mathematical model $[TY = tcsa \times (PTY(1 + (db + ci + om))w]$ was defined to estimate the yield of tree and damage caused by the climatic and biological factors in walnut orchards. This model estimates the potential yield at first, and then frost damage related to any of the organs of fruiting and fruiting habit in separation are subtracted from the total yield. For user convenience and to avoid multiple calculations, the coefficients corresponding to attributes were set in specific matrices and a computer program was designed in Visual Basic for Excel that can be used to determine the performance and damages of the product.

Key words:

Walnut, Frost Damages, Fruit Production, Late Spring Frost, Crop Insurance,

∗. Horticultural Research Dept, Seed & Plant Improvement Institute, Karaj – Iran.
E-mail: hassanida@gmail.com

فصلنامه
پژوهشی