Abstract

Sclerotinia stem rot caused by *Sclerotinia sclerotiorum* is one of the important diseases of rapeseed world wide. The disease damages in the humid regions of north Iran including Mazandaran province. Developing the effective strategies for integrated disease management and inhibition of its economic loss has high importance. In the research, to study the epidemiological aspects of the disease, the data of years 2010, 2011, 2015 and 2016 related to rapeseed fields from different regions of Mazandaran province (Sari, Babolsar, Dashte Naz, Behshahr and Galogah) was used. During the rapeseed growth stages from March to May, the farms were weekly surveys to record the time of disease symptoms appearance, and amount of disease incidence and severity during the infection period in all fields. The disease symptoms were observed in the all regions of the province where the range of final disease incidence in total four years was 2.8-92.4 percent and the range of final disease severity was 0.8-63.4 percent. Based on the final disease incidence, the final disease severity and the area under disease progress curves, there were significant differences ($P<0.01$) between the regions and the research years. The highest amount of them was in year 2016 and lowest in 2015. Between regions, the rapeseed fields of Galogah and Sari had the highest and lowest disease infection rates, respectively. Weather conditions had significant effects on the rate of disease infection in different years. Simple linear model had good fitness with the data of relationship between disease incidence (I) and disease severity (S). The equation of this model for years 2010 and 2016 was S=0.72(I)-0.99 and for years 2011 and 2015 was S=0.55(I)–0.61. Disease progress curves were fitted with different growth models that in total four years, exponential and linear models had good fitness respectively in 116 (48.4%) and 94 (39%) fields, were the best models to describe disease severity progress curves. Testing the rapeseed petals infestation with pathogen ascospores, was performed in year 2016 that the range of petals infestation with spores was 0-88 (mean 33) percent. The results of study on the relationship between the petals infestation percentage and final disease incidence, showed that the linear model with coefficient of determination (R^2) equal to 53%, had partly good fitness with the data, and developing of this method would greatly help to forecast the disease and determine the appropriate time for spraying against the disease. Various models were developed for disease prediction based on environmental and agronomic variables. The most important variables used in these models included apothecia populations in the field, type of rotation, weeds population, amount of urea fertilizer used, rainfall and rainy days in March and April, and the mean temperature of these two months. Effect of different fungicides was investigated on pathogen that the most effective ones were Rovral TS® and Tilt® in the laboratory conditions and Nativo® in the field conditions. Yield loss assessment of the disease was performed by utilizing the models. According to the results of single-point model, each percent increasing of disease incidence in different regions and years, causes 0.25-0.58 (mean 0.37) percent reduction of the rapeseed yield. Thus the equation of relationship between loss (L) and disease incidence (I) is L=0.37(I). Based on this relationship and considering the current price of rapeseed and spraying costs, the economic loss threshold of the disease in canola fields with a potential yield of two ton/ha will be approximately equal to 15 percent of the final disease incidence.

Keywords: *Sclerotinia* rot, *Sclerotinia sclerotiorum*, Epidemiology, Forecasting.

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