Tobacco rattle virus (TRV) is a member of the genus Tobraviruses and has the widest host range of any plant virus. Over 100 plant species are infected in nature, and under laboratory conditions more than 400 species have been infected. TRV is transmitted by parasitic plants, nematodes and partially through seed. TRV not only infects vegetative organs and causes decrease of crop production plant such as tobacco, potato and pepper, but also it has enormous impact on seeds and pollen development. Abnormalities in generative processes have immense influence on infected plants seed production. We demonstrated the structural model of TRV PSG replicase prepared in bioinformatic programs such as: Jmol and Scratch Protein Predictor to present three-dimensional structure of the RNA dependent RNA polymerase of Tobacco rattle virus, and to indicate the localization one of the most antigenic epitope in TRV replicase. The significant epitope was used to production specific antibodies against chosen PTKSGDADTYNANSDR-Cys amino-acids sequence of large subunit RdRp of TRV PSG. The aim of this work was an indicating the potential regions of TRV replicase deposition in the context of crucial meaning of viral replication process, using immunofluorescence detection and immunogold labelling localization. The epitope of large subunit TRV PSG RdRp detection was demonstrated during viral infection in diagnostic host plants, but not only in vegetative organs, but also in ovaries and anthers of tobacco and pepper flowers. The large subunit TRV polymerase was detected in primary cortex parenchyma and phloem in roots of both host as well as in and around vascular bundles of infected leaf blades. The strong fluorescence signal indicated the presence of RdRp of TRV-PSG was shown in ovaries tissues (especially in ovary wall, vascular bundle and placenta) and inside ovules cells. The replicase of TRV PSG was detected in young and mature anther tissues. The strong TRV polymerase fluorescence signal was observed also in tobacco pollen tubes. This results shows new and interesting view on the role of TRV replicase in plant-virus interactions in different parts of host plant connected with pathogenic changes in vegetative and generative organs.