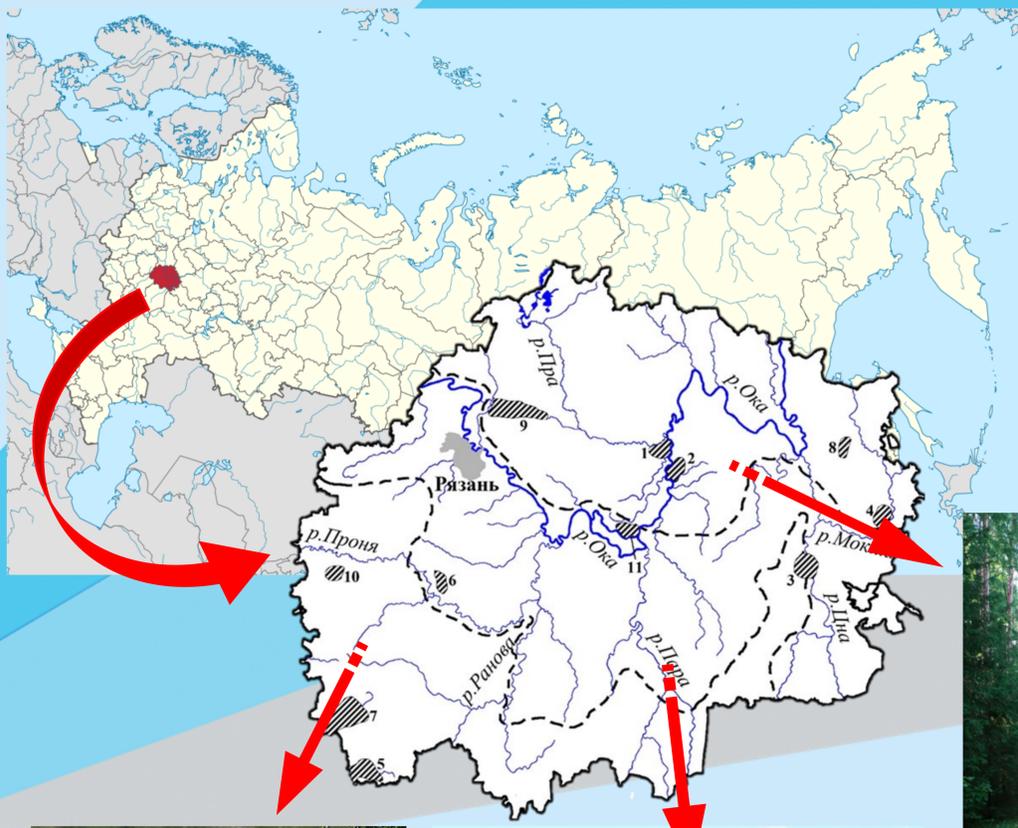




# The Ryazan Region is a model territory for monitoring of changes in the entomocomplexes of Central Russia.

In recent decades, we have been observing climate changes on the planet and this is confirmed by many studies (Houghton, 2004; Rosenzweig et al., 2008). We have already examined the long-term dynamics timing of spring activity of some species of insects in the Ryazan region (Nikolaeva, 2015). One of the responses of insects to such changes is changes in distribution ranges of species. We observe such changes on the territory of the Ryazan region.



The Ryazan region is unique. It is located in three natural zones. There are feather grass steppes and elements of the southern taiga here, that's why the entomofauna of the region is very diverse. Only the list of invertebrates of the Oka Reserve includes about 4000 species. Employees go on expeditions across the Ryazan region to inspect the territory and identify new and rare species. Now we have accumulated material on invertebrates that are rapidly changing the northern boundary of the area. For example: *Argiope bruennichi* (Arachnida, Araneidae), *Mantis religiosa* (Dictyoptera), etc. Such species as *Scolia hirta*, *S. maculata* (Hymenoptera), *Melanargia russiae* (Lepidoptera) and others have become common now. Among the new species, there are potential pests, for example: *Cameraria ohridella* (Lepidoptera).



We used various methods to study insects. We collected material using an entomological net, light from a lamp, traps in the soil, and visual observations.

## Some of the insects which changed of distribution ranges in the Ryazan region.



*Melanargia russiae* has been observed since 2000. It was a rare species. Now it is common species.



*Scolia hirta* has been observed since 2000. Now it is common species.



*Megascolia maculata* has been observed since 2018.



*Mantis religiosa* has been observed since 2011.

Some true bugs are such species: *Gonocerus acuteangulatus*, *Eurigaster austriaca*, *Cydnius atterimus* and other.

Thus, the Ryazan region is a good model for studying the impact of climate changes on the composition of entomocomplexes in Central Russia. We propose to identify key territories in various natural zones of the region and annually monitor changes in the composition of the entomofauna (mark new species, make insect counts and determine change in habitats).

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