SWEDISH UNIVERSITY OF AGRICULTURAL SCIENCES
ST. PETERSBURG STATE AGRARIAN UNIVERSITY
ALL-RUSSIAN INSTITUTE OF PLANT PROTECTION RAAS

CROP PROTECTION CONFERENCE

MANAGEMENT ASPECTS OF CROP PROTECTION AND SUSTAINABLE AGRICULTURE:

Research, development and information systems

Abstracts

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ШВЕДСКИЙ УНИВЕРСИТЕТ АГРАРНЫХ НАУК
САНКТ-ПЕТЕРБУРГСКИЙ АГРАРНЫЙ УНИВЕРСИТЕТ
ВСЕРОССИЙСКИЙ НИИ ЗАЩИТЫ РАСТЕНИЙ РАСХН

КОНФЕРЕНЦИЯ ПО ЗАЩИТЕ РАСТЕНИЙ

Вопросы менеджмента в защите растений и устойчивом земледелии:

Исследования, развитие и информационные системы

Тезисы докладов

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A GIS-based interactive agricultural atlas of the Former Soviet Union with special reference to ranges of agricultural pest organisms

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Интерактивный сельскохозяйственный ГИС-атлас стран б.СССР, включая ареалы вредных для растений видов организмов

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Today's geographic information system (GIS) tools allow spatially explicit data to be assembled, digitized, georeferenced and placed into a framework that can be accessed by a wide audience. In 2003, collaborators from St. Petersburg State University, the All Russian Institute for Plant Protection, and the N.I. Vavilov All-Russian Institute for Plant Industry, in close cooperation with the USDA, ARS started an ambitious project to compile an Agricultural Atlas of Russia and the newly independent states (NIS) which comprised the former Soviet Union (FSU). This project is supported by the U.S.-FSU Scientific Cooperative Program, which is managed by the ARS Office of International Research Programs, U.S. State Department of Proliferation Threat Reduction and the International Scientific and Technical Center (ISTC #2625p).

The Atlas consists of maps and associated metadata, biological descriptions, including photographs, and GIS exploratory software. It represents the distribution of major and minor crops cultivated in the FSU and the incidence of diseases, pests, and weeds. The Atlas also contains maps representing the distribution of wild crop relatives that are indigenous to the FSU, as well as agroecological maps of major climatic parameters that influence agricultural production. The data are based on an extensive review of historic literature and herbarium specimens compiled by scientific specialists of the relevant disciplines. The GIS exploratory software, which is included on the CD-ROM, allows users to carry out simple GIS functions such as map algebra and reclassifcation. This work is the most comprehensive, interactive Atlas ever developed for Russia and the NIS, and represents an important reference for agricultural workers in Russia and the NIS. Because the Atlas is written in both Russian and English, it provides valuable information to an international audience.

Compilation of the Agricultural Atlas is now in it's third year. Prepared materials can be reviewed on the web page http://www.agroatlas.spb.ru/. When completed, the Atlas will be published on a CD ROM or DVD-ROM, as well as web site. In this report we restrict our attention to the activities being carried out by the All-Russian Institute of Plant Protection. By the 1st of April 2005 we have

prepared 393 maps and descriptions of plant protection objects, namely 111 vertebrate and invertebrate pests, 111 diseases, and 126 weeds (fig. 1). Each object (either pest, disease or weed) consists of a map composed of 2-5 layers reflecting geographical spread of the species, and zones representing different levels of harm. The narrative description includes *Taxonomic Position*, *Morphlogy and Biology*, *Distribution*, *Ecology*, *Use and Economic Value*, a photo and *Reference List*. The metadata description includes *Scale*, *Accuracy*, *Projection*, *Content*, *Accuracy of Qualifier*, *Method of Map Construction* and *Sources of Data*.

A wide group of experts from the All Russian Institute for Plant Protection has been involved with the project, namely Frolov A.N. (sub manager of the Project), Saulich M.I., Budrevskaya I.A. (vector mapping); Levitin M.M., Mikhailova K.A., Dmitriev A.P., Yakutkin V.I., Afanasenko O.S., Gul'tyaeva E.I., Gagkaeva T.Yu., Kungurtseva O.V., Khlopunova L.B., Gasich E.L., Ishkova T.I., Bilder I.V. (phytopatology); Grichanov I.Ya., Gus'kova L.A., Fasulati S.R., Berim M.N., Chumakov M.A., Ovsyannikova E.I., Davidyan G.E. (pests); Luneva N.N., Larina S.Yu., Kravchenko O.E., Sokolova T.D., Nadtochii I.N., and Doronina A.Yu. (weeds) under the helpful administrative support by the director of the Institute, Acad. RASKHN V.A.Pavluyshin. The group of mentioned scientists has collaborated closely with specialists at the St. Petersburg State University, especially Afonin A.N. (manager of the project), the N.I. Vavilov Institute, especially Dzyubenko N.I. (sub manager of the Project), and Greene S.L., the USDA, ARS collaborator.

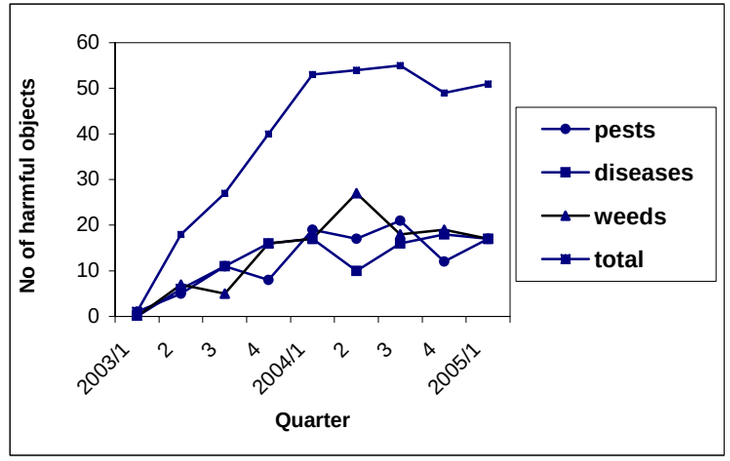

Fig. 1. The rate of preparation of the papers devoted to agricultural pests, diseases, and weeds during execution of the project

To illustrate our project, we present the map and description of Bird Cherry Oat Aphid (*Rhopalosiphum padi* L.) compiled by M.N. Berim and M.I. Saulich which can be found at:
http://www.agroatlas.spb.ru/pests/Rhopalosiphum_padi_en.htm and
http://www.agroatlas.spb.ru/pests/Metadata/Meta_Rhopalosiphum_padi_en.htm
(Fig.2).

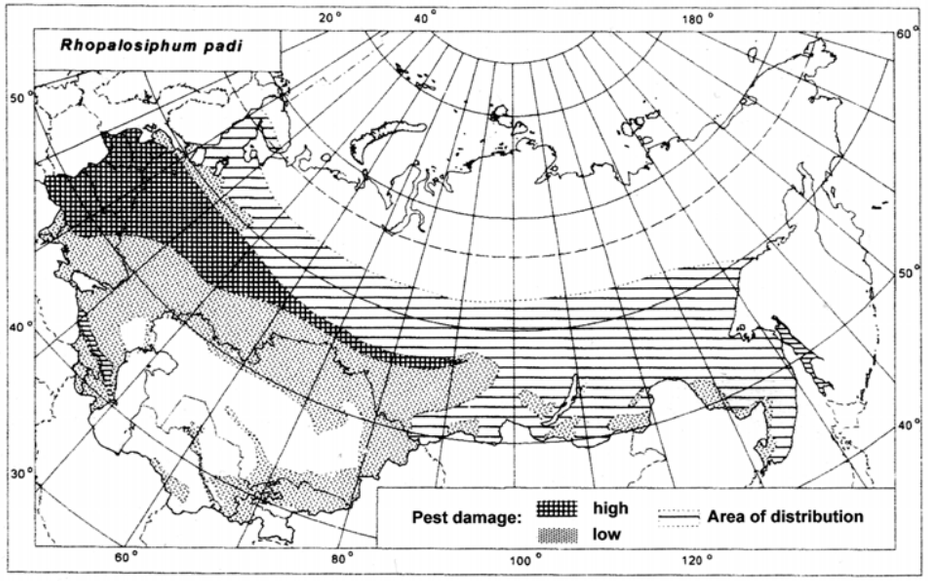

Fig. 2. The geographical distribution and ranges of harm of Bird Cherry Oat Aphid, *R. padi* L. (after M.N. Berim and M.I. Saulich)

Prospects of combined application of biological, microbiological and chemical preparation for IPM of cucumbers

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Перспективы совместного использования биологических, микробиологических и химических средств в системе защиты растений огурца от вредителей

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Development of IPM ensuring prevention of yield losses, formation of optimum phytosanitary situation and maximum effectiveness of protection measures is the basis modern strategy of cucumber protection against western flower thrips *Frankliniella occidentalis* Pergande (Thysanoptera: Thripidae) and greenhouse whitefly *Trialeurodes vaporariorum* Westwood (Homoptera: Aleyrodidae). Of particular impotance is development of environmentally safe systems under greenhouse conditions, where integration of different agents to restrict individual pests development is an acute problem. Development of effective and environmentally safe combinations of microbiological and chemical preparations with different mode of action, application of tank mixtures and optimum placing of

them with biological agents in the IPM to obtain maximum protective action at maximum reduced rates per a unit of the protected area is very effective for resistant thrips and whitefly population control and prevention of resistance development.

In 2004 the possibility of combined use of chemicals (Aleycid, Spintor SC, Admiral EC, Entonem-F), predatory *Orius laevigatus* (Fieber) (Heteroptera: Anthocoridae) and 2 strains of entomopathogenic fungi *Beauveria bassiana* №15 and *B. tenella* №11 (*Beauveria* (Bals.) Vuil.) for cucumber protection against western flower thrips and greenhouse whitefly with an account of their specific effects on the pests, ensuring long-term maintenance of favorable phytosanitary situation besides suppression of the pest population development has been analyzed.

Aleycid a metabolite biopreparation from actinomyces *Streptomyces aurantiacus* 775 has been developed by VIZR in cooperation with Institute of Antibiotics (St. Petersburg) (Konev et al, 1992).

Admiral EC 10% (pyriproxyfen) is a juvenoid, produced by Sumitomo Chemical (Japan). Entonem-F® is a biological preparation from entomopathogenic nematodes *Steinernema feltiae* (a. i. - invasion larvae). The formulation based on polymers has been developed by All-Russia Institute for Plant Protection (VIZR) (Danilov et al, 2001). Spintor SC (240 g/l) is insecticide from *Saccaropolyspora spinosa* produced by Dow Agroscience (USA). A predatory *Orius laevigatus* and entomopathogenic fungi strains *Beauveria bassiana* and *B. tenella* are from VIZR Collection. The tests were conducted in greenhouses of VIZR and Experimental Station of Leningrad State University. The test scheme included combined use of preparation at reduced concentration and release of reduced numbers of *Orius laevigatus* and nematodes for thrips and whiteflies control: 1) Spraying of plants with a tank mixture of Aleycid, Spintor SC and Admiral EC; 2) Spraing with a tank mixture of Spintor SC and Admiral EC + *Orius laevigatus* release; 3) Spraing with a tank mixture of Spintor SC and Admiral EC + Entonem-F soil application; 4) Spraing with Spintor SC, Admiral EC and tank mixture of chemicals with entomopathogenic fungi *Beauveria bassiana* and *B. tenella*. As standards, preparations at registered rates, recommended release numbers of *Orius laevigatus* and nematodes were used.

The data obtained have proved the possibility to increase biological effectiveness, to reduce chemical rates and number of spraying per a protected unit by using tank mixtures or by subsequent use of biological agent in the system of cucumber protection against thrips and whiteflies. Optimum variants of tank mixture and subsequent application of preparations at reduced concentration combined with the use of biological agents were as effective and sometimes even more effective than recommended rates of chemicals:

1. The tank mixtures: Spintor SC (0,01%) + Admiral EC (0,01%) and Spintor SC (0,02%) + Admiral EC (0,02%) proved to be highly effective (up to 99-100%) for 8 weeks. They an be recommended for the incorporation in the system of western flower thrips and greenhouse whitefly.

2. Foliar application of a tank mixture of Spintor SC (0,001%) and Admiral EC (0,001%) should be accompanied by application of Entonem-F biopreparation from entomopathogenic nematodes at a reduced rate against soil stages of the pest development or by the release of a predatory *Orius laevigatus*.