

Introductory Remarks Delivered at the Conference

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The occasion of this meeting is important for we are dealing with the fundamental support of man's food chain. As our populations grow it is evident that mankind needs a greater array of weapons for use against pests which threaten his food and his shelter.

We know that pesticides have not fulfilled our needs although they have given us spectacular pest control over the past three decades. However, pesticides present an imperfect solution. Their effectiveness declines with use due to induced resistance of the target organisms. They are hazardous to humans, and destructive to non-target organisms. In short, they are not capable of providing a sustained solution to world pest control problems.

Instead, we need to broaden our approach to pest control to discover and put into operation pest control measures with long-lasting and economical control capabilities. This Conference is a move in that direction. The fact that it is an international meeting shows acceptance of the basic needs by all participants.

Indeed, an international approach is necessary. If we view man's history on this planet, it is noted that as he explored and moved on the continents, he transported his food, animals, and food plants with him from their early place of origin. Not only did he transport his food, plants and animals, he also transported their pests. Unfortunately, he often did not take the beneficial pest control organisms with him for he was unaware of their existence.

And so it is the business of this Conference to help remedy that oversight. As scientists we recognize that an international effort is a logical approach to solution of these problems. From the earliest

involvement in 1972 with the US/ USSR program on pest control, we have seen a need for research on biological control of pests. The limits of potential for biological control are not known for many of our pest problems. We should explore them. This meeting, which is but one of many which have occurred and will occur in the future, is part of the exploration.

There are many needs to be met for future use of biological pest control. Let me suggest a few:

- We need a crop-by-crop, pest-by-pest search for beneficial pest organisms.
- We need to know the basic biology of these beneficial organisms; how they live and reproduce.
- We need to know the ecology of these organisms, how they function within life systems and within crops and other ecosystems of value to man.
- We need free exchange of this information such as is occurring at this meeting.
- We need to devise means to convert this basic information into pest control systems which we can implement for practical day-to-day and season-to-season effectiveness.

If the deliberations of this meeting help meet these needs, the rewards are self evident in bettering the well-being of our citizens and citizens of other countries throughout the world. Consequences of our failure to meet these needs are equally self evident.

Therefore, let us proceed with the business at hand. The work before us is important. The results will be useful to all.

Prospects for Development of Biological Methods of Plant Protection in the U.S.S.R.

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The application of biological methods of plant protection is systematically increasing in the U.S.S.R. In 1978, biological means were applied on an area of 15,500,000 hectares, including the use of *Trichogramma* wasps on 9,300,000 hectares for control of insects, and bactorodencide on 3,600,000 hectares for control of rodents. In indoor cultivation biological methods are applied on vast areas: *Phytoseiulus* mites on 19,300,000 square meters, trichodermin on 1,900,000 square meters, bactorodencide on 5,500,000 square meters, and antiviral vaccination of tomatoes on 400,000 square meters.

Successful solution of some problems in mechanization of the production and application of *Trichogramma* have created favorable ground for further expansion of the scale of utilization of these parasites. One of the major aspects of increasing the effectiveness of *Trichogramma* utilization is the selection of

specialized species and forms of the parasite, and serious attention is now being paid to these types of studies.

Application of *Trichogramma* on large areas promotes the creation of industrial technology for rearing the parasite, in particular the creation of automated biological factories. Such biological factories are already operating in some areas of the U.S.S.R. and they enable the production of large numbers of *Trichogramma* wasps in a short time.

For the purpose of eliminating the seasonal character of the operation of biological factories, methods for long-term (up to half a year) storage of large numbers of *Trichogramma* are being developed as a result of the study of the conditions required for diapause initiation and termination for these organisms.

At present, intensive studies are being conducted on the development of mechanized methods of *Trichogramma*