

# Report on trip to Russia and France, 1994

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DUTY STATION: Bozeman, Montana

DATES OF TRAVEL: June 28, 1994 through July 17, 1994

DESTINATION: Russia, France.

PURPOSE OF TRAVEL: For the collection of plant pathogens of leafy spurge, and establishment of a pilot field plot to assess the possibility of soilborne transmission of *Puccinia* spp. caused rusts of *Euphorbia* species.

PARTICIPANTS: **Anthony Caesar**, USDA, ARS; **Massimo Cristofaro**, Entomologist, NEA, Rome, Italy; **Dan Spencer**, Soil Conservationist, Bureau of Indian Affairs, Ft. Belknap Reservation, Harlem, Montana.

CONTACTS: **Vladimir Pavlyushin**, Vice-Director, All-Russian Scientific Research Institute of Plant Protection, Pushkin; **Mark Levitin**, Head, Laboratory of Mycology and Phytopathology, All-Russian Scientific Research Institute of Plant Protection, Pushkin; **Victor Krivahatsky**, Entomologist, Zoological Institute, Russian Academy of Sciences, St. Petersburg; **Musa Adiloff**, Range Scientist, Agricultural Institute, Stavropol, Russian Republic; **Lloyd Knutson**, Director, European Biological Control Laboratory, USDA, ARS, Montpellier, France; **Richard Groves**, Director CSIRO Laboratory, Montpellier, France. **Siraj Hassan**, Plant Pathologist, CSIRO, Montpellier, France.

## Highlights

I visited the All-Russian Scientific Research Institute of Plant Protection in Pushkin based on the recommendation by Dr. Knutson that I do so to learn firsthand about the work of that institute in the isolation of potential biological control agents of some major target weeds and their work in compiling a literature review and database on biological control of weeds and weed pathogens in Russia and from the Russian literature. A soilborne pathogen *Fusicladiopsis euphorbiae* was isolated by Dr. Levitin's group, and was

said by them to be highly effective. That there was even a single promising species with potential for biocontrol of *Euphorbia* was quite a positive development of their work. To promote the possibility of a practically useful outcome of the work of the Dr. Levitin's group, Dr. Levitin suggested that a student in his laboratory spend time in the U.S. learning techniques and about major U.S. weed problems.

Field work to survey in the vicinity of Stavropol for plant pathogens of leafy spurge began on July 3. Interestingly on the road north from the airport i.e., from Mineralnye Vody to Stavropol, abundant *Salsola* was noticed by Dan Spencer along the roadside. We mentioned our need to return and survey this stretch of Highway, but we were not able to. Twelve sites were surveyed for leafy spurge diseases, none of which had been visited previously by me. *Euphorbia stepposa* predominates in these sites. Material resembling *Euphorbia esula/virgata* (or leafy spurge) as seen elsewhere in Europe was completely absent, as observed previously.

Root and crown disease symptoms were widespread and abundant in the area, Further strains of *Rhizoctonia solani* and *Fusarium* spp. were isolated. These symptoms occurred most on *E. stepposa*, and *Euphorbia siguriana*, the only two readily recognizable phenotypes seen in the area.

Of note however, was the abundance of sites with *Centaurea diffusa* and *C. maculata*. There was prolific insect activity on these two species, with root and crown rot occurring as a result of insect feeding in these tissues. Pathogens could be isolated in stem tissue quite distal from feeding sites, indicating that certain species and perhaps strains of a given species are differentially able to colonize tissue upon ingress through feeding damage by the insects. Everywhere *Centaurea* species occurred, the plants were found a singly or in small groups of 3-10 plants lacking robustness or vigor.

The setting-up of a pilot plot was discussed in St. Petersburg and Stavropol. The purpose of the plot is to study 1) the feasibility of soilborne transmission of inoculum of *Uromyces* spp. from plant to plant of the same species or 2) between species and 3) test for the transmission of *Uromyces* spp. to genotypes from North Dakota, Montana and Colorado, in effect, a small-scale host range study. A search was made of the area in the vicinity of Stavropol for rusted plants of genotypes that resembled leafy spurge to use in the tests and none were found. Thus the plot was restricted to *E. stepposa* and *E. siguriana* and the N. American types. The aims of the study were still obtainable under these conditions. The funding of the field plot was also discussed with Musa Adiloff, Victor Krivahatzky, Dan Spencer and Massimo Cristofaro. A field plot plan was discussed. Further discussions dealt with the practical aspects of the set-up of a plot. None of the Russian scientists had seen the original proposal by Bob Masters. This was unfortunate in regards to an understanding the intended long range goals of the plot as well as what was and was not feasible and how we might address the feasibility issue. Many other difficulties, personnel, financial and administrative were also discussed. The plants brought to set up the study were given to Musa Adiloff and funds totaling \$83.00 were given to Adiloff through Krivahatzky to pay for equipment, salaries, and expendables to be used in the set up of the plot.

Finally, I traveled to Montpellier with Dan Spencer, so that I could complete processing of samples and discuss with the French authorities a possible field plot there along the

same lines as the one in Stavropol. I was accompanied by Lloyd Knutson, which I believe was quite helpful, since he obviously has excellent relations with the head of the Office of Cooperation, Mr. Thiessen. Mr. Thiessen was quite receptive to my proposal to set up a field plot insofar as his concerns were to be addressed in the protocols of the field plot.

Again, as in previous reports I would emphasize that that the Montpellier lab is of great value and proves that ARS is making a serious effort to provide for the practical ARS mission and good science. I found it to be of great value in ensuring that the considerable resources that are expended in foreign exploration are more likely to bear fruit. The facilities there went a long way toward compensating for the difficult conditions encountered in Russia by serving as a place for cleaning up cultures, making new media, receiving fresh media and other supplies from Bozeman to complete sample processing and preparation of cultures to be brought back to the U. S.

## Recommendations

1. The trip taken by our group in 1994 was the first taken in the area to survey for soilborne pathogens in which Plant Pathology was more than an accessory or subsidiary undertaking. For various logistical reasons attached to its decidedly accessory nature in previous trips, the full potential of plant pathogen work has not been possible to realize. The potential for achievement should be exploited and would benefit from an increased emphasis. A collecting trip specifically for Plant Pathology should be undertaken. This is because the work done by a plant pathologist necessarily requires specific conditions that cannot be obtained everywhere in Russia. The emphasis necessarily must be on quality of samples and sample handling, and not quantity. This is not easy to achieve, and this fastidiousness as to conditions needed may not coincide with the interests of scientists in other fields. The need to at least refrigerate specimens cannot be emphasized enough. Portable coolers that run from car battery power when in motion, or propane when camping, could serve this purpose. The use of centralized, adequate facilities, with surveys ranging out from this point is another possibility.
2. Because of the lack of *E. esula/virgata* or leafy spurge phenotypes, the *Euphorbia* material seen in the areas around Stavropol visited are not representative of typical *Euphorbia* types seen in the North America. This has implications in several areas of research on leafy spurge. In regards to plant pathogens, the varying collection of species that can be observed may harbor a great range of possible diseases. This great variation could be used to advantage in studying the host specificity of pathogens from *Euphorbia* species, collecting a pathogen for example, from species A and testing reactions to the pathogen among species B,C,D, etc. A frank disadvantage to be noted of working in this area is the lack of adequate facilities to isolate, subculture, and purify microbial strains collected. Facilities (laminar flow hoods) were only available for culturing in 1993, being said to be unavailable in 1992, and closed for maintenance in 1994. The use of a cottage was a great advantage over 1993, and provided good facilities to continue processing of samples in the evening, and record keeping, not as practical when camping.

3. Insect and pathogen interactions or synergism should be more thoroughly studied. There is great potential benefit in identifying species that are able to take advantage of insect damage, or strains of the same species that may differ in this capacity. Areas with *Euphorbia* or *Centaurea* species that have abundant insect activity are excellent places for this type of potential study. Regions of “Czechoslovakia”, Hungary and the refuge near Pisa, Italy serve as excellent such places, as observed by me in 1992. The practical benefit is that information may be obtained that could help identify what domestically occurring soilborne pathogen species may be needed to supplement insect releases to obtain optimum synergism similar to the levels observed in Eastern Europe. Such a study could provide a role for scientists such as me who work in the midst of the problem alongside entomologists working on identifying optimum conditions for successful insect releases to control leafy spurge and other rangeland weeds.