

## **Developing Virus Resistant Dahlias**

Hanu R. Pappu, Professor, Department of Plant Pathology, Washington State University, Pullman, WA

Have you ever wondered why some dahlia plants look sick or 'virused' and others looked perfectly normal and healthy? This could be due to many reasons. One major reason is that the plants might have got infected either by virus-carrying insects (aphids or thrips) that happened to feed on the plants thereby introducing the virus into that plant. Or, another possibility is that the tuber already had the virus and the plant thus got diseased. There is another reason why some cultivars consistently have less disease than others. These plants may have genetic resistance to that virus. If that is the case, plants from that particular cultivar contain gene(s) that make them resistant to virus infection. Considered as 'host plant resistance' this resistance can operate at different levels: plants do not get infected at all – this reaction is called immunity. In other cases, plants may get infected but don't show any symptoms or they don't visibly get sick. This phenomenon is considered as resistance. This is very similar to what we face with many of the diseases/infections we get: some of us are more resistant to colds and flus than others.

The most effective means to reduce the incidence and thereby the negative impact of viruses is by producing dahlia varieties that are resistant to the virus/disease. Disease resistance is a complex trait and could be controlled by one to several host plant genes. Expression of these genes makes the plants resistant to virus infection. In case of dahlias, harnessing the host plant's genetic resistance is a complicated endeavor and little is known about the basis and the mechanism of resistance. There could be several genes operating and these could be different ones for different viruses that infect dahlias. Growing dahlias that have genetic resistance is the best strategy to reduce the impact of viruses but it takes time and needs some fundamental knowledge about the nature and mechanism of resistance before resistant genes could be transferred to desirable cultivars. The first step toward developing virus resistant cultivars is to screen existing ones to see any of them consistently had less virus infection/symptoms. Next step would be to test these selected cultivars under controlled greenhouse conditions to verify what was seen under natural growing conditions (=in the garden) holds true. Then, these cultivars could be looked at more closely to understand the genetics behind the resistant phenotype. Once we have this information, it is then possible to use breeding to test and see if the resistance can be transferred from one cultivar to another one. From the above, we see that the process of producing virus resistant dahlias is somewhat long term and time consuming and needs skilled personnel to carry out the screening of the material followed by breeding. This is one of the goals of my virus research project at Washington State University. I will keep you posted.