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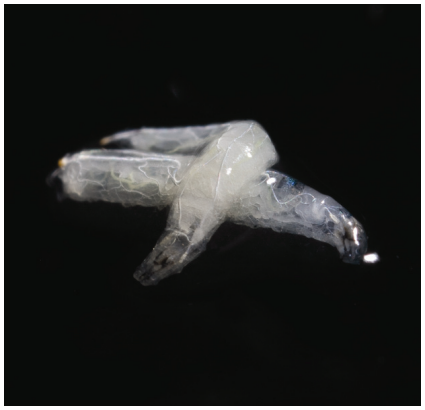
Plant volatiles as chemical markers for pest resistance

Breeding crop plants with durable pest resistance is a challenge to plant breeders. Search for pest-resistant trait in the available germplasm resources involves planting them in large fields, waiting till the harvest of the crop and evaluation by entomologists. The entire process of breeding a pest-resistant variety takes no less than eight to ten years with mixed success involving a huge public exchequer in terms of space and time. Meanwhile, the developed crop variety with pest resistance at the end of this process may become susceptible to the same pest, in the process of co-evolution. The second method of identifying resistance in plants is through molecular marker-assisted selection (MAS), which requires hundreds of DNA-markers to identify a resistant source. Moreover, Lowe *et al*. (1994) and Jones *et al.* (1997) have stated that the DNA-based technique has the disadvantage of lack of reproducibility over time. To overcome these barriers, Korada and his co-workers (**page 1247**), suggest using 'plant volatile organic compounds' as 'chemical markers' in their choice plant 'sweet potato'. Sweet potato is one of the world's important food crops and is severely affected by sweet potato weevil (SPW) *Cylas formicarius*. The authors have identified cyclopropane fatty acid esters (CPAs), emitted from sweet potato plants and storage roots which altered the feeding of *C. formicarius.* They propose a biosynthetic pathway, hitherto not known in sweet potato, wherein saturated fatty acid esters transform into unsaturated ones in the SPW-resistant genotypes and lack such compounds/pathway in the susceptible genotypes. The CPAs can now be used as 'chemical markers' to identify SPW resistance in sweet potato within a short span of time and with less expenditure.

Interchangeable punishments in *Drosophila*

Associative conditioning is a fundamental component of learning in animals. This type of learning, which is also known as Pavlovian conditioning, occurs when an innocuous cue is paired with an unrelated stimulus that normally evokes a strong response. The innocuous cue is normally referred to as the conditioned stimulus while the stimulus



that naturally produces a strong response is called the unconditioned stimulus. A learned association between the two has occurred when the cue evokes the same response as the conditioned stimulus. Although, associative learning has been studied for over a hundred years, the nature of the representation of the unconditioned stimulus, in a behaving animal, is not clear. Using fruit fly larvae, Robinson *et al.* (**page 1254**) address this basic question using two types of punishments as the unconditioned stimulus. These punishments, heat shock and electroshock, are shown to be perceived by different sensory modalities. However, during associative learning, it is shown that it is the negative value of the punishment and not punishment identity itself (heat or shock) that is associated with the conditioned stimulus. This must mean that the neural pathways that produce conditioning to these stimuli overlap downstream of sensation.

Crevasses detection using ground-penetrating radar

K. K. Singh *et al.* (**page 1288**) present the multi-sensor based technique to detect the crevasse-prone areas in a glacier. The crevasse signatures were collected from Siachen (J&K) and Samudra Tapu (HP) glaciers in the Indian Himalaya using ground-penetrating radar (GPR). The GPR surveys were conducted using the antennas of 250 MHz frequency in ground mode and 350 MHz in airborne mode. The experience gained from the ground-based GPR survey on Siachen glacier for crevasse detection was further used in the interpretation of airborne GPR data. The crevasse zones and buried boulder areas in a glacier were identified using a combination of airborne GPR profiles and SAR data, and the same have been validated with the high-resolution optical satellite imagery (Cartosat-1) and Survey of India map sheet. The thickness of Snow Bridge over the glacier ice is the critical parameter for safety of persons moving in the glacier and this thickness was measured by GPR with an accuracy of 11%. This hybrid methodology consisting of GPR in airborne mode, high-resolution optical satellite imagery and active microwave satellite data was found to be useful for detection of crevasse prone zones in a Himalayan glacier.