Honeybees as biological indicators

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Honeybees are widely used as sentinels for environmental pollutants, mostly for monitoring heavy metals, pesticides, radionuclides and explosives. During the vegetative season, one honeybee colony can have 50 – 60,000 bees. Due to their morphology, ecology and behavior, bees can be used as biological indicators throughout the bee products, collecting other particles in the environment, or the bees themselves. Bees fly up to 3 km distance and the collected sample (nectar, pollen) is composite and representative for an area up to 20 km^2, in contrast to the spot sampling. Bee products via residues, mainly in honey and pollen, are used for monitoring of pesticides and radionuclides. Bees are covered with electrostatically charged hair collecting molecules (different particles) and bringing them into the hive where they lose charge, and all the particles are released in the hive chamber. These accumulated particles can be sampled and analyzed. This mechanism is used in mine detection and toxic waste sites monitoring.

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