



Animal-pollinated crops provide essential nutrients for humans

Crop pollination is a vital ecosystem service, yet the numbers of animal pollinator species, such as bees, are in decline. Now, a team of German and American researchers have demonstrated how crops that provide the highest levels of vitamins and minerals essential to our diet globally depend heavily on animals for pollination.

Most calories consumed by people around the world are provided by staple crops that either self-fertilise or rely on the wind or vegetative propagation (reproduction without seeds or spores). However, many other crops containing micronutrients (nutrients required in small quantities, such as vitamins and minerals) essential to our health are solely, or mostly, pollinated by animals.

Researchers have known for some years that the numbers of animal pollinator species are falling. As well as the well-publicised colony collapse disorder that is devastating honey bee colonies in Europe and elsewhere, habitat degradation, often caused by intensive farming methods, has caused the numbers of many other pollinator species to fall.

To establish how significant a problem this could be for human health, the researchers, partly funded by the EU STEP project¹, quantified the amount of nutrients produced by animal-pollinated crops using US Department of Agriculture information on the nutrient content of 150 crops. They combined this with data from the Food and Agriculture Organization of the United Nations (FAO) on the worldwide production of these crops.

The data revealed that most of the crops that produce lipids, vitamin A, vitamin C and vitamin E are pollinated by animals. A large proportion of some minerals in our diet, such as calcium, fluoride and iron, also come from such crops. For instance, the researchers noted that over 98% of vitamin C from crops produced annually around the world comes from those that are animal-pollinated. The majority of this comes from citrus fruit and other fruit and vegetables.

Similarly, 55% of the folic acid available around the world comes from animal-pollinated crops. Folic acid is particularly essential during pregnancy. Of the minerals found in crops, 62% of the available fluoride and 58% of the calcium come from crops such as beans, fruits and nuts, all of which rely on animal pollination to some degree.

Crops also produce a number of micronutrients that play a role in reducing the risk of cancer. Of these, more than 98% of the global crop production of carotenoids, including cryptoxanthin and lycopene, comes from animal-pollinated crops, such as red, orange and yellow fruits and vegetables.

Although dietary supplements and fortification of some foods with micronutrients is possible, and is mandatory in some countries, the researchers suggest such an approach would not be able to address the potential deficiencies globally. In particular, the researchers note that a decline in the availability of micronutrients is likely to most severely affect developing nations, where people do not have access to dietary supplements.

They also note that the plants from which supplements are created also require pollination, so costs would rise as pollinator numbers fall. Additionally, crops contain other, as yet unidentified, nutrients that appear to provide health benefits, such as lowering the risk of cardiovascular disease and some kinds of cancer, which supplements cannot replace.

1. STEP (Status and Trends of European Pollinators) is supported by the European Commission under the Seventh Framework Programme. See: www.step-project.net

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