

RESEARCH NEWS STORY

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Antibiotics in Crop Cultivation: Why We Should be Worried

New study presents concrete data on antibiotic use in crop production—a neglected topic—underlining the importance of regulating this in the face of rising antibiotic resistance

In the discussion on the resistance of bacteria to antibiotics, one deeply overlooked area is their use in crop cultivation. A recent study has found that antibiotics have been used in much larger quantities than is currently believed, with wide variation among regions of the world. Global cooperation will be required to ensure the judicious use of such products in the future.

It is safe to say that antibiotics have revolutionized healthcare. Since the mid-twentieth century, the use of antibiotics has consistently increased worldwide, and today, countless microbial diseases are treated with antibiotics, not only in humans, but also in livestock. In fact, antibiotic use is now so commonplace that bacteria are evolving to become resistant to them owing to selection pressure. Antibiotic resistance is now spreading through bacterial populations, meaning that it may not be possible to control infections with antibiotics in the future.

The rise of antibiotic resistance has often been attributed to the overuse and misuse of antibiotics in human health care and veterinary medicine. The debate rarely mentions antibiotic use in crops; yet, it is documented that antibiotics have been used in crop production for 50 years and have proven effective in controlling bacterial diseases in important fruit crops such as apples and pears.

This lack of conversation around antibiotic use in crop production partially stems from the fact that data on the subject are sparse, particularly from the developing world. According to a [2018 joint investigation by international organisations involved in human, animal and plant health](#), only 3% of the 158 countries surveyed have a regular monitoring system for the types and amounts of antibiotics used on crops. This contrasts with human and veterinary use, where 26% and 23%, respectively, of the countries have systems in place for monitoring antibiotic use.

Now, in a new study, researchers at the Centre for Agriculture and Bioscience International in the UK have attempted to fill this gap by analyzing records of recommendations made by crop advisors and presenting new perspectives on the data from these records. As Dr. Philip Taylor, lead researcher of the study, published in [CABI Agriculture and Bioscience](#), explains, *“The lack of information on antibiotics used to control plant disease in low- and middle-income countries means that the world has been generally unaware of antibiotics being recommended for use on crops, sometimes in large quantities.”*

Dr. Phil Taylor and his colleague Dr. Robert Reeder analysed data from Plantwise, an initiative that promotes training and supports agricultural advisory services across the tropics. They found that agricultural advisors were recommending antibiotics to

be used on crops in the World Health Organization (WHO) regions of America, Eastern Mediterranean, South East Asia, and the Western Pacific, but not in Africa. In total the data contained recommendations for antibiotic use on over 100 crops. In some cases, 10% of the recommendations on rice contained an antibiotic and it is estimated that in South East Asia alone, approximately 63 tons of streptomycin and 7 tons of tetracycline are being sprayed annually on the rice crop. In some cases, antibiotics are thought to be used prophylactically to prevent bacterial infection as they are recommended against problems that will not be cured by antibiotics.

Dr. Taylor explains the potential consequences of continuing in this manner:

“Resistance to antibiotics is a global problem and as far as possible, we should all do our part to prevent it from spreading. The use of antibiotics on crop plants is alarming, both in the scale of use and in the unregulated manner in which they are applied. Antibiotic use on crop plants provides additional routes through which resistance can spread. The blending of chemicals within a spray mix has been shown to increase the chances of antibiotic resistance developing. Since some crops are eaten raw, there is plenty of opportunity for horizontal gene transfer, where bacteria can inherit genetic information from nonrelatives. This allows resistance to be transferred between plant bacteria and our gut bacteria rendering the pathogens resistant to the antibiotic.”

Dr. Taylor believes that studies such as this could be the first few steps towards inspiring a greater inclusion of crop agriculture in the antibiotic resistance debate, and perhaps, to spurring the requisite action. *“International cooperation will be required to bring the practice under control,”* he says.

If appropriate measures are taken now, antibiotics can continue to be the wonderful lifesavers that they are today.

Reference

Authors	Philip Taylor and Robert Reeder
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Antibiotics are routinely sprayed across vast tracts of agricultural land to fend off bacterial infections. Though this amount is believed to be much less than that used in the livestock industry, this could be a significant contributor to the growing antibiotic resistance problem that we are faced with today

Photo courtesy: Shutterstock



Antibiotics are routinely sprayed across vast tracts of agricultural land to fend off bacterial infections.

About Dr. Philip Taylor from CABI

Dr. Philip Taylor has been associated with CABI for a decade now. At present, he is the global plant clinic coordinator and is involved with the identification of plant pathogens in samples from all over the world. He has a degree in plant sciences and has worked in the area of plant-pathogen interactions. He has also worked as a managing director of farms in the past and is therefore well versed with agricultural practices and problems faced by farmers. He is part of the European support structure for Plantwise, an agricultural development organization.