

00:00:02.080 --> 00:00:10.919

Jorge Manuel Ferreira: all right, so it's twelve thirty in our clocks in in room. So good morning, good afternoon, A good evening to the colleagues joining from the different

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00:00:10.930 --> 00:00:29.890

Jorge Manuel Ferreira: ah regions of the world, and welcome to this knowledge, dissemination, dialogue, this math knowledge, dissemination, dialogue. This is a Webinar series organized by the Fao Amr working group, and they feel sustainable lifestyle technical group where we address different aim. U and A are topics on a monthly basis

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00:00:29.950 --> 00:00:50.879

Jorge Manuel Ferreira: with colleagues in different areas. Today we have the pleasure and the pleasure privilege of having Philly Taylor test. He works for the center for Agriculture and Mary of Science International. It will give us an overview of our protection and the Emr. Just a quick housekeeping rules. Please do keep your microphone on mute.

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00:00:50.890 --> 00:00:59.639

Jorge Manuel Ferreira: We name yourself with your organization a country followed by your name. Note that the views presented are those of the speakers, and not necessarily a few ones,

6

00:00:59.650 --> 00:01:24.990

Jorge Manuel Ferreira: refrain from advertising your service, your company, or any other commercial product or brand, and both your questions in the chat, and please use the chat mostly for the to post. Your questions will aim to answer all the questions from the chattering discussion. At the end of the presentation. This meeting is being recorded, and the video registration or point will be posted on the Fao Youtube Channel and share with this.

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00:01:25.000 --> 00:01:29.140

Jorge Manuel Ferreira: So we'll plan to have about thirty minutes presentation by

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00:01:29.610 --> 00:01:36.720

Jorge Manuel Ferreira: then open up for a discussion at at the end. So thank you very much. I'll stop sharing the floor is all yours. You

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00:01:37.000 --> 00:01:38.900

Philip Taylor: thank you very much, George.

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00:01:39.250 --> 00:01:41.839

Philip Taylor: Okay. I'm going to share my screen.

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00:01:41.850 --> 00:01:42.979

Jorge Manuel Ferreira: Ah,

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00:01:47.990 --> 00:01:49.530

Philip Taylor: it's the

13

00:01:50.490 --> 00:01:55.749

Philip Taylor: so you should be able to see my screen. Is that correct?

14

00:02:00.500 --> 00:02:06.470

FAO, Jeff LeJeune: Okay, Can people see my screen? Okay, Some Some sort of looks. Good. It's good. Thank you. Okay.

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00:02:06.590 --> 00:02:18.939

FAO, Jeff LeJeune: Well, thank you very much to the Fao. Thank you very much to George for ah allowing me to speak to you on the subject of um, an overview of crop protection and amr. Ah! And as it says in the subtext, there's more to amr

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00:02:19.450 --> 00:02:23.080

Philip Taylor: antibiotics and human diseases, and

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00:02:23.200 --> 00:02:30.070

Philip Taylor: the work that i'm going to present the bits of our work. I'm going to present It was compiled by myself and Dr. Rob, reader,

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00:02:30.100 --> 00:02:48.770

Philip Taylor: So um i'm. I'm imagining that most of you will come from a a veterinarian or medicine background, and relatively few of you will come from a crop production background. So if people are from crop production background, it might be a little little elementary, but hopefully it'll be of interest for everyone somewhere.

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00:02:49.580 --> 00:03:06.770

Philip Taylor: Briefly, What is Cabbie Gabby is? Ah, as it says, A. Not for Profit Science organization. It's an international organization. And what does Cabbie do? It addresses issues of food

security, and it's very much a science-based organization as well.

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00:03:07.080 --> 00:03:24.139

Philip Taylor: There are many aspects to what cabbie does and i'm involved in the international development part of cabbie's work. But of course there's a publishing aspect to it as well, and many of you may have cabbie books on your bookshelves in your offices, and There's a microbial molecular biology aspect to it.

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00:03:24.150 --> 00:03:30.580

Philip Taylor: Well, cabbies across the world offices right the way across the world. Excuse me,

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00:03:31.180 --> 00:03:41.529

Philip Taylor: um big offices in Nairobi, in in Pakistan, India, as well as Ah, in Malaysia, but most people have to say are in are in Great Britain.

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00:03:41.890 --> 00:03:52.029

Philip Taylor: If you were a country you could become a member of Cabbie. These are the countries you pay your subs, and you get all the benefits of being part of cabbie cabbies at one hundred and twelve years old,

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00:03:52.120 --> 00:04:00.279

Philip Taylor: still going strong. But what I'm here to talk to you about today is, of course, crop production and amr in crop production.

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00:04:01.020 --> 00:04:14.749

Philip Taylor: We generally think of agriculture as a natural process, but the actual fact is anything far from it. Far from natural and agricultural monoculture just simply plays into the hands of

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00:04:14.780 --> 00:04:16.230

Philip Taylor: crop diseases.

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00:04:17.959 --> 00:04:31.159

Philip Taylor: We have identical plants which are actually genetically, completely identical, grown at the same time growing in synchrony. And it's just as simply a recipe for disaster with regard to disease control

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00:04:31.450 --> 00:04:32.720

Philip Taylor: to her.

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00:04:32.850 --> 00:04:37.390

Philip Taylor: This is what this is, how we set up the situation, and this is what we have to deal with

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00:04:37.400 --> 00:04:39.800

Philip Taylor: in in crop production.

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00:04:41.160 --> 00:04:45.639

Philip Taylor: So how can we stop crop diseases? Well, we can have crop rotation,

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00:04:46.300 --> 00:05:02.779

Philip Taylor: not growing things in the same field for the same year, year after yo. You can move the crops around to try and avoid the diseases. We can try and keep things clean, so we don't spread the diseases on tools or on our hands, etc. And we have resistant varieties as well.

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00:05:02.790 --> 00:05:11.129

Philip Taylor: So plants which have been bred specifically to become to be resistant to various diseases is an important part of disease control.

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00:05:11.180 --> 00:05:17.769

Philip Taylor: But, of course, once once an epidemic, or in this case an epiphytotic has taken off the

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00:05:17.860 --> 00:05:39.309

Philip Taylor: what is going to stop it, it will spread throughout the whole field very quickly, and and chemical control is often what's required to prevent the spread of the disease. The epiphytotic is ah is an epidemic for plants. We can't use the word epidemic, because epidemic means people. So it's a epiphytotic i'm not sure if That's a bit fiddle,

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00:05:39.320 --> 00:05:43.080

Philip Taylor: too technical, but that's what we sometimes call it,

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00:05:43.800 --> 00:05:48.409

Philip Taylor: just making the point that growing things on a big scale and growing things on a small scale

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00:05:48.530 --> 00:06:07.360

Philip Taylor: can be very different. People think they can grow things in their garden. They don't need protection products. This is because they're growing them on a small scale, and the diseases don't find their small plot. If you're growing things on a big scale, then there's a much bigger target for incoming spores, and once it's in the crop, it will spread

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00:06:07.400 --> 00:06:11.550

Philip Taylor: right the way through it, unless there's some sort of intervention made,

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00:06:11.930 --> 00:06:21.290

Philip Taylor: i'm. Assuming that many of you aren't familiar with plant diseases. So I've just got a few attractive pictures of plant diseases here to show you what they look like.

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00:06:21.330 --> 00:06:33.099

Philip Taylor: These are all fungal diseases. Well, four of the six are our fungal diseases. We have may smut peach leaf curl

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00:06:33.110 --> 00:06:51.760

Philip Taylor: bosses center at the bottom, slretinia, somato, and ergot on rye the ones with the yellow rings around them are these are actually water mole diseases, or they 0 my seats. To all intents and purposes, as far as control is concerned, they're fungal diseases, but they're actually caused by very different organisms. The o my seats

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00:06:51.990 --> 00:07:11.760

Philip Taylor: bacterial diseases don't look quite so spectacular. They look generally relatively boring compared to the fungal diseases. And these are bacterial diseases, as you can see, sort of rotting areas, leaf spots the only one of interest other than the the rotting areas is the is the tumor at the base of this plant,

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00:07:11.770 --> 00:07:13.720

Philip Taylor: right? This is

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00:07:13.830 --> 00:07:19.820

Philip Taylor: bacterial induced gall induced by a bacterium called agro-bacterium, the

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00:07:20.520 --> 00:07:31.990

Philip Taylor: which is ah um can be serious in some cases, but it's Ah, it's ah! An unusual anomaly, because it it isn't producing the

the traditional rots associated with bacteria,

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00:07:32.300 --> 00:07:36.540

Philip Taylor: so telling the difference between a bacterial rot and a fungal rot can be difficult.

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00:07:36.620 --> 00:07:43.990

Philip Taylor: Fungal rots are generally more. They're drier, and they're more. I have a stronger boundary around the leaf spots.

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00:07:44.000 --> 00:07:45.859

Philip Taylor: So on the left

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00:07:45.920 --> 00:07:55.610

Philip Taylor: the bacterial leaf spot is at the top fungal at the bottom, in the middle bacterial leaf spot is on the left angle on the right and

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00:07:55.640 --> 00:08:07.140

Philip Taylor: the photograph on the right the fungal leaf spots is the black spots and the tan area spreading from the base of from the tip of the leaf, is the bacterial pathogen.

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00:08:07.960 --> 00:08:19.990

Philip Taylor: Okay. So most proc pathogens are fungal. The complete opposite of ah medicine and veterinary science, and most are pathogens are fungal,

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00:08:20.150 --> 00:08:36.930

Philip Taylor: and I'm. Making the case that fungicide resistance has to be included in an Amr. And previously people have seen the resistance of plant pathogens to crop-based fungicides wasn't was unrelated to medicine and veterinary science, but increasingly being seen that they are related,

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00:08:36.940 --> 00:08:44.700

Philip Taylor: and as Bob Dylan says: Times are changing, and these various disciplines can no longer be considered to be separate.

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00:08:45.080 --> 00:08:49.529

Philip Taylor: Just a little bit on how to control plant diseases. Here's a plant,

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00:08:49.620 --> 00:09:00.069

Philip Taylor: and in order to protect it from from disease, we spray it with a chemical. We produce a film of fungicidal material over the surface of the plant.

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00:09:00.180 --> 00:09:11.399

Philip Taylor: So here's the leaf, and then, when it's sprayed, it gets covered in a fungicidal material, and when you spray the whole plant is the whole plant getting covered in the fungicidal material as well.

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00:09:12.090 --> 00:09:13.389

Philip Taylor: But of course

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00:09:13.520 --> 00:09:26.539

Philip Taylor: you can spray the plant, and you've coated it in this fungicidal material so that the fungus can't get at the actual plant without breaching this film of fungicidal material. Of course, as soon as the plant grows, then

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00:09:26.700 --> 00:09:28.530

Philip Taylor: the new material

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00:09:28.600 --> 00:09:38.840

Philip Taylor: isn't protected because it wasn't sprayed. So you have to spray a second time and spray a third time, and as the plant grows, so you have to add more and more chemical, go back and spray again and again

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00:09:41.700 --> 00:09:57.069

Philip Taylor: with regard a um with regard a systemic fungicide, this actually enters the plant, and it cannot be washed off much more analogous to taking a drug for a human or for an animal. It's actually within the plant,

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00:09:57.160 --> 00:10:14.420

Philip Taylor: and it's translocated within the plant. Mostly it's translocated up, so it moves from the base of the plant up into the up into the new growth, which is very useful. It's very difficult to get fungus, id and systemic fungicides down into the roots, because almost all of the growth is upwards.

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00:10:15.250 --> 00:10:18.540

Philip Taylor: So there we go, So it's difficult to get

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00:10:18.580 --> 00:10:22.469

Philip Taylor: growth down in sorry fungicides down into the roots,

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00:10:24.380 --> 00:10:38.320

Philip Taylor: and it's often considered good practice to include a contact fungicide. They're often cheaper with a systemic fungicide to protect the new growth, because that way any new growth will be protected to some extent by the systemic,

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00:10:38.330 --> 00:10:45.760

Philip Taylor: whereas the contact fungicide side is doing most of the work. And, as I said, the the contact fungicide size are often much cheaper than the systemics.

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00:10:47.360 --> 00:10:53.870

Philip Taylor: Okay. So this is a just the timing of what happens when you, When a spore lands on a leaf,

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00:10:54.180 --> 00:11:11.240

Philip Taylor: small land on the leaf on the left, it penetrates the leaf. It then grows within the leaf, and then finally, on the right hand side, you see, see symptoms diagrammatically. This is what we're looking at. Here from left to right, spore landing on the leaf, penetrates the leaf. It grows inside the leaf, and then symptoms appear.

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00:11:11.250 --> 00:11:16.140

Philip Taylor: And we're gonna just look at when to put on these various um treatments.

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00:11:16.190 --> 00:11:17.210

Philip Taylor: So

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00:11:17.460 --> 00:11:23.990

Philip Taylor: between the fungus penetrating the leaf and seeing symptoms. We call this the latent period. This is where the the

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00:11:24.540 --> 00:11:32.429

Philip Taylor: plant is infected, but you can't see any infection sites, and you need to put the contact fungicide on the

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00:11:32.630 --> 00:11:45.910

Philip Taylor: in advance of the fungus penetrating the leaf, because that's when they're active. Once the one to the fungus is inside the leaf. Contact. Fungicide generally won't help the situation. But to help that particular infection site

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00:11:47.670 --> 00:11:50.930

Philip Taylor: with a systemic systemic

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00:11:51.150 --> 00:12:07.929

Philip Taylor: will control it, even after penetration, provided that fungal colony, isn't very large. It has to be quite small, and then a fungus will pull it back. But if it gets to a substantial size. Then, even if even a systemic fungus won't, help won't control it,

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00:12:08.000 --> 00:12:16.150

Philip Taylor: the infection side. So, as it says, fungal growth is beyond chemical control. Once that fungal colony gets to a certain size,

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00:12:17.300 --> 00:12:29.990

Philip Taylor: so what happens is the spores produced by the symptoms. The spores are produced, and they either blow or they get splashed back onto fresh leaves, and the whole cycle repeats itself.

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00:12:30.000 --> 00:12:42.669

Philip Taylor: So you have to put the chemicals on to is a onto a healthy leaf. So this is all prophylactic spraying to prevent the new infection sites from beginning.

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00:12:44.480 --> 00:12:47.389

Philip Taylor: Okay, the kind of chemicals that we have at our disposal.

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00:12:47.410 --> 00:12:48.520

Philip Taylor: We have

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00:12:50.080 --> 00:13:16.079

Philip Taylor: antiviral compounds, anti-fungal compounds, and antibacterial compounds. To say we have antiviral compounds is a bit of a cheap because they don't work they simply there aren't any chemicals on the market, which will cure a plant of a virus once infection has taken place. So there aren't any antiviral compounds which lead us with Anti-fungus and o my seats, and to my seed compounds, compounds, and antibacterial ones.

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00:13:16.670 --> 00:13:17.690

Philip Taylor: So

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00:13:18.410 --> 00:13:36.580

Philip Taylor: what could go wrong with Ah, a funny side application? Well, a lot of reasons why a fungicide might not work the one in yellow. The pathogen is resistant. This is the one which you're interested in at the moment, because we're talking about, Amr, but there are lots of other reasons to be washed off could be degraded by sunlight.

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00:13:36.590 --> 00:13:55.980

Philip Taylor: It might have been the wrong chemical was put on. In the first place, it may not have stuck to the plant when it was put on. Maybe the spraying process was was incomplete, and you didn't get proper coverage. So you've left spaces where the fungus can attack the plant. It might have been counterfeit product. It's not just medicine. Where you get counterfeit products. You get counterfeit

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00:13:55.990 --> 00:14:12.349

Philip Taylor: crop protection products as well. And finally, there are quite a lot of calculations that someone has to make in order to get the right amount of chemical on the plant, and so it may have been put on at the wrong dilution. So these these are all reasons why there may be fungicide failure.

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00:14:13.660 --> 00:14:40.990

Philip Taylor: It can be difficult to work out if a fun side is actually working, because, of course, you're preventing something from happening, and anyone doesn't know what would have happened had you not intervened. So it's not a case of like an animal or a human where you you make ah, an make an application or make a treatment, and and the patient gets better. This is preventing it from getting worse within the whole population, so it can be tricky, because, of course, weather has a huge influence on disease development as well.

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00:14:42.610 --> 00:15:00.599

Philip Taylor: Just briefly to say that, unlike ah medicine, where um trained people are administering the drugs. Often it's unskilled people who are making the diagnosis relatively unskilled people who are making the diagnosis and certainly unskilled people who are who are putting the chemicals on,

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00:15:00.610 --> 00:15:16.269

Philip Taylor: and you want to avoid repeated use of the same chemical, which will, of course, lead to ah resistance; and farmers, in order to save money, will often put on reduced doses which will to some extent play into the hands of creating resistance.

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00:15:16.280 --> 00:15:34.109

Philip Taylor: But the most important aspect of making a resistant population is where farmers find that there's resistance, and rather than changing to a different chemical, they will just simply increase the dose of the chemical that they were using, and that's when you really start to ramp up the resistance within the population.

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00:15:34.350 --> 00:15:53.440

Philip Taylor: So the whole plant protection. Ah, industry is very aware of underside resistance, and there's something called the Frac Group. The Franchise Resistance Action Committee produces and collates the information on Puncside resistance, and they produce a lot of literature, one of which is this poster

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00:15:53.450 --> 00:15:58.190

Philip Taylor: and the poster. All of the hexagons represent various

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00:15:58.350 --> 00:16:04.389

Philip Taylor: antimicrobial compounds, active ingredients, and the colors of the of the

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00:16:04.550 --> 00:16:08.259

Philip Taylor: Hexagons represents the different groups that they are in.

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00:16:08.270 --> 00:16:28.010

Philip Taylor: So just briefly moving around this poster. Ah! Moving around a slightly simplified form of this poster, this is the the nineteen. This is already. This is the twenty twenty two poster. But going back Ah, my slide is from a slightly earlier poster, so we can move around this poster, we can see that

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00:16:28.020 --> 00:16:44.480

Philip Taylor: the Nbc's are represented here. This is chemicals like Carbendism and Benamil, all very old chemicals, the Nbc's widespread resistance to these chemicals. Now they're not really of much use in many aspects of agriculture.

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00:16:44.780 --> 00:17:02.790

Philip Taylor: Ah! The the phenyl amides, the most famous of which is metal axle, an extraordinarily widely used, chemical, active against the O. My seats Widespread resistance to metal axle now, but a very, very important chemical in its day.

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00:17:02.980 --> 00:17:21.029

Philip Taylor: These are the Strobel Urines over here as oxytrobin, daclistrobin, and the other stroke of Urines over here, still very currently important part of the armory against fungal pathogens, and then finally we have the the azoles

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00:17:21.040 --> 00:17:33.360

Philip Taylor: um, the triangles. There are lots of them who are used in agriculture, hexagonozole, karachla, prefia conisol propiconozol there are lots and lots of them. But of course

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00:17:33.370 --> 00:17:42.599

Philip Taylor: medics are familiar with these, because the some of them are medical medical applications as well as you can see on the left hand side.

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00:17:42.690 --> 00:17:43.730

Philip Taylor: So,

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00:17:43.880 --> 00:17:54.539

Philip Taylor: looking at the frack data, looking at which fungicides are at risk, we can see quite a lot of the groups the frac groups are

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00:17:54.570 --> 00:18:00.009

Philip Taylor: have I levels of resistance to them. So you can see that

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00:18:01.460 --> 00:18:09.359

Philip Taylor: quite a few of them up a high height and medium or medium risk to resist resistance building up,

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00:18:09.400 --> 00:18:17.130

Philip Taylor: and the British Government is very concerned about this, and they produce quite some detailed information

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00:18:17.680 --> 00:18:24.429

Philip Taylor: how to manage countryside resistance in various crops. And This is the kind of literature that they produce, the

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00:18:24.730 --> 00:18:30.300

Philip Taylor: trying to make sure that buncheside resistance doesn't spread any further than it already has To

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00:18:31.570 --> 00:18:38.370

Philip Taylor: This is a page from two pages from the Frack Directory, just with the the ones which are

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00:18:38.510 --> 00:18:48.109

Philip Taylor: showing resistance are ringed in red, the ones where resistance has been recorded, and is looking likely ringed in yellow, and the ones where no resistance

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00:18:48.130 --> 00:18:49.189

has been recorded

111

00:18:49.200 --> 00:18:59.509

Philip Taylor: yet a ringed in green. So, as you can see in many of these fung sides have resistance to them in plant pathogens are resistant to these chemicals,

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00:19:00.760 --> 00:19:11.809

Philip Taylor: so this information is quite difficult for for some farmers, so cavi produces some very simplified information, and if we distribute these sheets,

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00:19:12.150 --> 00:19:30.740

Philip Taylor: these sheets are whereby the different fract groups are color-coded. So, as you can see, the The triangles are in this sort of a light blue colour, so epoxyconis all profile conisol, tetrachonosol. They're all in the light blue color, whereas the strobels urines are in the greens, and

114

00:19:31.010 --> 00:19:53.910

Philip Taylor: as you can see, other other chemical groups are in different colors. So we distribute this to our farmers um and to our farming advisors, and we say that in order to ensure that you're moving between fract groups, you need to move between colors so moving to a different active ingredient. Isn't enough. You need to move to a different color on this chart, so to help make sure that they're not

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00:19:53.920 --> 00:19:58.500

Philip Taylor: um increasing the chances of our fungicide resistance developing.

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00:19:59.620 --> 00:20:15.219

Philip Taylor: Okay. So just looking at moving away from plants briefly moving as a human pathogens, the very famous case of Candida auris which many of you will be familiar with wasn't a pathogen until two thousand and nine. It burst onto the scene

117

00:20:15.230 --> 00:20:26.319

Philip Taylor: about just over ten years ago in multiple locations, and it arose as a pathogen in lots of different locations around the globe. Ready, fungicide resistant.

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00:20:26.410 --> 00:20:32.449

Philip Taylor: So this is just a concern from the medical field that many of you i'm sure of aware of

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00:20:32.750 --> 00:20:51.420

Philip Taylor: the other aspect where there's overlap bundeside resistance, and agriculture is the the the flower of the bulb fields of Holland, where the Dutch industry grows vast amounts of of bulbs, and they protect the bolts with

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00:20:51.430 --> 00:21:09.089

Philip Taylor: a whole suite of different chemicals, and when the bulb production is finished they rake up the debris, and they compost the material. Or if the composting material is very, very rich fungicides, and so unsurprisingly you're selecting for

121

00:21:09.130 --> 00:21:15.830

Philip Taylor: fungi which are resistant to undersides in the compost. He and that is indeed what has happened,

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00:21:16.700 --> 00:21:21.700

Philip Taylor: so that in within the compost heaps of the Dutch bulb industry

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00:21:21.710 --> 00:21:22.800

Philip Taylor: he's

124

00:21:22.860 --> 00:21:30.489

Philip Taylor: selection has been for is fungi, which are resistant to the fungicides. In this case the triangles and the

125

00:21:31.910 --> 00:21:44.630

Philip Taylor: fungi which are occasionally plant Occasionally human pathogens have acquired resistance from the from these compost heaps, and it's now a problem in in human medicine.

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00:21:46.680 --> 00:22:08.609

Philip Taylor: Where are the triangles used around the world? This

is a little bit of my data, and you can see that we we looked at the data, and i'll come on to where the data has come from in a minute. But the the regions of the world are Southeast Asia, Latin America, and the Caribbean South Asia and Sub-saharan Africa reading left, to right and and the the yellow quarter of the pie is the proportion of

127

00:22:08.620 --> 00:22:11.700

Philip Taylor: undersides. We are from the triangles,

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00:22:12.040 --> 00:22:19.000

Philip Taylor: so you can see that they're quite widely used in Southeast, Asia, Latin America, and less so in Sub-saharan Africa,

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00:22:21.350 --> 00:22:24.429

Philip Taylor: just thinking about moving away from a

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00:22:24.450 --> 00:22:43.629

Philip Taylor: fungal pathogens and thinking about bacterial pathogens. I have a look at the types of pathogens, which, in fact, plants that, as I said, most plant pathogens are fungi, and relatively few bar pathogens are bacteria. But here are the main ones. These are the main

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00:22:43.640 --> 00:22:45.949

Philip Taylor: pathogens which affect plants.

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00:22:46.170 --> 00:23:00.959

Philip Taylor: It's not quite as simple as it might seem, because um, each of these different species have various path of ours within them. So, as you can see, pseudomona syringe broken down into these various pathogen path of ours.

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00:23:00.970 --> 00:23:11.849

Philip Taylor: It's a lot more complicated than it might first seem, and as, and as with many aspects of molecular biology, the more closely you look, the greater the variation there is as well,

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00:23:11.860 --> 00:23:12.700

Philip Taylor: so

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00:23:12.800 --> 00:23:19.590

Philip Taylor: it's fair enough to say that a relatively few bacterial plant pathogens, but the situation isn't quite so simple as this.

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00:23:20.480 --> 00:23:34.649

Philip Taylor: How do we control bacterial pathogens? Well, much the same way as fungal pathogens, clean seed, clean equipment, crop rotation, resistant varieties. Try not to spray them with too much water, so trickle irrigation and also the control of vectors,

137

00:23:34.660 --> 00:23:50.900

Philip Taylor: because some bacterial pathogens are carried around on the mouth parts of insects; and when a beetle has been chewing on one particular infected leaf that can then transfer the pathogen to a new site. How do we treat

138

00:23:51.260 --> 00:24:18.580

Philip Taylor: bacterial pathogens? Well, We have a range of copper salts which are widely used copper, sulfate, copper, oxygen, chloride, copper, hydroxide, all of which are used widely to control bacterial diseases. There are also two disinfectant type comic chemicals, which are not very widely used. Bismar thumbs of Bronopol. They're sort of like a disinfectant. And of course, in addition to these chemicals, there's the antibiotics both medical antibiotics and agricultural antibiotics which i'll be talking about further,

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00:24:19.530 --> 00:24:23.340

Philip Taylor: but a brief little foray into

140

00:24:23.360 --> 00:24:24.700

Philip Taylor: Ah!

141

00:24:25.270 --> 00:24:43.659

Philip Taylor: The work of Cavi has had this intention of trying to help smallholder farmers across the world, and it was noticed that they weren't very productive. And the question was, Why are they not more productive? What do they require? Do they need more research? Do they need more equipment?

142

00:24:43.720 --> 00:24:53.560

Philip Taylor: If they do need more equipment and research? What is it? What is it that they need? But the information what they needed was information. They were starved of information.

143

00:24:54.140 --> 00:25:11.399

Philip Taylor: They didn't have anyone to give them that information as to what to do about the problems that they were facing. So cavi pioneered the whole concept of a plant clinic. You have computer clinics. You have fuel, injector, clinic. You have fuel. Doctors.

You have

144

00:25:11.410 --> 00:25:24.280

Philip Taylor: dog, cat, and bird clinic, so why not even a phone clinic? So if you have all of these clinics, why not have a plant, clinic and cabbie has been extremely influential in promoting

145

00:25:24.370 --> 00:25:36.470

Philip Taylor: the concept of the plant clinic. This plant clinic is in Kenya, and here are the plant. What we call the plant doctors who are on on hand to look at the crops brought in

146

00:25:36.870 --> 00:25:41.320

Philip Taylor: by the farmers, So the idea is that the farmer will bring in

147

00:25:41.330 --> 00:25:59.340

Philip Taylor: material they're growing, and ask the plant, doctor to diagnose in exactly the same way as a human health clinic. You bring your symptoms in, or an animal you bring the animal in, and you bring the crop in and ask for the diagnosis. So the the plant clinic is under the green umbrella in the left hand Photograph

148

00:25:59.610 --> 00:26:06.689

Philip Taylor: the plant doctor looking at the sample is top right, and there's some of the patients bottom right.

149

00:26:07.870 --> 00:26:16.820

Philip Taylor: So the whole of the cabbie plant-wise process involved training which you can see top left training these evil to

150

00:26:16.830 --> 00:26:31.820

Philip Taylor: in the concept of of plant clinics They were already ah advisors of farmers. So these these farming advisors were trained, given more training by Cabbie, and then encouraged to set up these plant clinics. And here's a plant public in Sierra Leone on the right

151

00:26:31.830 --> 00:26:39.979

Philip Taylor: a plant clinic in Nepal gain the same thing, the plant doctor examining the sample, and there's the farmer waiting for the result.

152

00:26:40.400 --> 00:26:50.399

Philip Taylor: This is a photograph from Malawi. There's the looking

over the plant, Doctor's shoulder talking to the farmer Who's who's anxiously waiting to see what the diagnosis might be,

153

00:26:50.420 --> 00:27:07.929

Philip Taylor: and the process that takes place is that a form is filled in describing the interaction with the farmer. So where the farmers come from, how much of the crop is grown. Where which crop what are the symptoms? How severe is it? Et cetera, et cetera.

154

00:27:07.940 --> 00:27:11.720

Philip Taylor: Copy is given to the farmer, and a copy is retained by cabbie.

155

00:27:13.570 --> 00:27:31.150

Philip Taylor: This is the bit that I'm interested in. This is the diagnosis, as in What do they think the problem is? And of course I'm. Also interested in the recommendation. What are they going to suggest that the farmer does about the problem as well? These are the two bits of information which I I particularly i'm interested in.

156

00:27:31.610 --> 00:27:43.970

Philip Taylor: Increasingly we're moving away from paper forms, and we're moving to electronic means whereby the information is put into a tablet, and then it's. It's sent by Sms to the farmer's phone, so that's increasingly the way.

157

00:27:44.800 --> 00:27:47.519

Philip Taylor: So the the process is uh

158

00:27:47.670 --> 00:28:05.080

Philip Taylor: it's described here. The farmer visits the plant doctor and the plant doctor should be able to give information directly back to the farmer as to what the problem is, and what what can be done about it. If the plant doctor doesn't know he can, he or she can consult the Knowledge Bank, the plant-wise knowledge bank

159

00:28:05.090 --> 00:28:21.599

Philip Taylor: and that can help with diagnostics, and then information can be fed back to the farmer and the the plant-wise Knowledge Bank is freely available. And anyone can access plant-wise knowledge Bank to a Google search, and you'll be in it straight away. What Isn't available to the general public is

160

00:28:21.610 --> 00:28:36.399

Philip Taylor: part-wise online management system. And this is where

we keep the data which is collected from the clinics, and this is an enormous database, which is, which isn't made available because it contains sensitive information. So

161

00:28:37.680 --> 00:28:49.619

Philip Taylor: countries are often reluctant to share their pests and disease lists with with others, in case there is a trade embargo that slapped on them for for fight of sanitary reasons. So

162

00:28:50.000 --> 00:29:03.679

Philip Taylor: we we hold this information on behalf of the country. We don't own this information, and we certainly don't share it with other people, but that doesn't mean. Say it's not being used, and we can. We can share it with the National government, and reports can be made from it

163

00:29:03.690 --> 00:29:12.090

Philip Taylor: so very briefly in a nutshell plant-wise that's been very successful in what it's achieved, but it's set out to do

164

00:29:12.690 --> 00:29:22.339

Philip Taylor: increasing pharmacy, yield increasing farmers in income cutting down on the amount of chemicals which are used in appropriately and working with people all over the world.

165

00:29:23.600 --> 00:29:31.710

Philip Taylor: So now we've got to ask, Where is plant-wise active? This is these are the countries in which part-wise has been working,

166

00:29:32.190 --> 00:29:33.330

Philip Taylor: and

167

00:29:34.130 --> 00:29:51.240

Philip Taylor: the the data that comes into us is in the form of a spreadsheet. So we have these enormous um excel files with the with the information in it. And this is the data where we look for antibiotic use, and

168

00:29:51.360 --> 00:29:54.070

Philip Taylor: we looked for anything that

169

00:29:54.140 --> 00:30:12.949

Philip Taylor: contained an antibiotic. Both the trade names of the antibiotic chemicals, as well as the antibiotic themselves; and our definition of antibiotic is some probably something similar to

yours. It's it's what most people would consider to be an antibiotic, not a disinfectant, or a, or a or a fungicide, phonicidal, chemical, or anything like that,

170

00:30:12.990 --> 00:30:30.860

Philip Taylor: and we disregarded um any antibiotic use on animals, because there were some examples, and we disregarded any countries where there was less than ten records containing antibiotics, and, as you can see, we had an enormous amount of data to wade through. This is A.

171

00:30:30.870 --> 00:30:42.469

Philip Taylor: From the Eastern Mediterranean, For example, we had over ah nearly one hundred and eighty thousand records um less. So in the other reasons, but an enormous amount of data. So we were able to

172

00:30:42.960 --> 00:30:47.029

Philip Taylor: drill down, as they say, to find out where antibiotics were being used.

173

00:30:47.470 --> 00:30:48.580

Philip Taylor: Ah!

174

00:30:51.050 --> 00:31:10.639

Philip Taylor: Is there a link between, and the control of bacterial pathogens and medicine? Well, this is how most of you think of um tetracyclin and streptomycin, whereas in a crop environment this is. This is what it looks like. As you can see, this is Tagmycin, and it's active ingredients are streptomycin and tetracyclin.

175

00:31:11.210 --> 00:31:19.150

Philip Taylor: So this is what we we found. A lot of crops were being coated in or treated with antibiotics.

176

00:31:19.560 --> 00:31:36.999

Philip Taylor: So which of these countries were um using antibiotics? I don't want to name names, but of the different regions. You can see that in the Americas. Three of our countries were using antibiotics in Africa. Surprisingly, none of our countries were, whereas it was more widespread. In Southeast Asia,

177

00:31:37.010 --> 00:31:51.579

Philip Taylor: where five of the countries were using antibiotics, and one in the Eastern Mediterranean, and in the Far East we the Plant-wise works in China. But China Doesn't share its information

with us, so that we have no information from China

178

00:31:51.650 --> 00:31:53.919

Philip Taylor: directly from the plant-wise data

179

00:31:55.890 --> 00:32:12.669

Philip Taylor: which antibiotics are being used in these various places. Well, some of them will be familiar to you, such as tetracycline, streptomycin, gentamicin, others possibly less so. Ning nanomycin, kasuchamycin maybe less familiar so

180

00:32:13.400 --> 00:32:22.579

Philip Taylor: the emeritus, most of the antibiotics used were Casugamycin, whereas in the eastern Mediterranean most of it was streptomycin

181

00:32:23.300 --> 00:32:38.600

Philip Taylor: Southeast Asia, a good split between streptomycin and tetracycline and then in the Pacific Northwestern Pacific region. Over half of it was sugamycin, but also other ones as well. Ning Nanomycin and Streptomycin

182

00:32:38.610 --> 00:32:42.309

Philip Taylor: also represented in the Western Pacific region.

183

00:32:44.030 --> 00:32:54.450

Philip Taylor: Overall It looks very similar to the Southeast Asia region. That's because most of the data containing antibiotic containing data came from Southeast Asia.

184

00:32:55.090 --> 00:33:00.569

Philip Taylor: So we found ten sixteen brand names in our data,

185

00:33:00.970 --> 00:33:18.179

Philip Taylor: but this is a small fraction of the ones which are available. If you go to some of the Far East websites, you can find a lot of antibiotics being sold under many different brand names. They're often blended together, and they're often often mixed with oxygenic, acid, and or copper,

186

00:33:18.190 --> 00:33:24.060

Philip Taylor: which is quite interesting for various reasons which we can talk later and talk about later.

187

00:33:24.450 --> 00:33:29.510

Philip Taylor: It's often suggested that antibiotics are only used on high-value crops

188

00:33:29.830 --> 00:33:49.100

Philip Taylor: because they're too expensive to use on cheaper crops, and that simply isn't the case. Because if you go to the Alibaba page you can find streptomycin for one us dollar per kilo, and if you go to similarly, you can find tetracyclin for about ten Us. Dollars per kilo. So,

189

00:33:49.110 --> 00:33:49.980

Philip Taylor: by, sir,

190

00:33:50.060 --> 00:33:57.170

Philip Taylor: they're very, very cheap to buy when you buy large quantities of them, and they're relatively in pure.

191

00:33:57.510 --> 00:34:01.219

Philip Taylor: So what was the diagnosis of these?

192

00:34:01.510 --> 00:34:19.200

Philip Taylor: Of what? What was the problem that antibiotics were being prescribed for. Well, as you can imagine, most cases with a bacterial problem. That's the blue in the larger circles on the left hand side. But also other things were being used, as you can see.

193

00:34:19.239 --> 00:34:33.559

Philip Taylor: Um orange is fungus, and each of the different regions has quite a big proportion of fungal diagnoses, and in some cases such as southeast Asia, it seems like

194

00:34:33.690 --> 00:34:47.539

Philip Taylor: antibiotics are being prescribed against insects. You think Well, do these people really think that antibiotics are controlling insects. Probably not. These people of the farmers have come in with an insect problem, and it would seem that

195

00:34:47.550 --> 00:34:57.210

Philip Taylor: the farming advisors are giving them a cocktail of an insecticide and a fungicide, and an antibiotic to control diseases which they may not know that they have,

196

00:34:58.910 --> 00:35:07.739

Philip Taylor: which crop is that which crop receives the most

antibiotics. Well, it's by far and away. Rice is the most commonly is the most common

197

00:35:08.750 --> 00:35:18.390

Philip Taylor: which receives antibiotics. You can see others tomatoes, citrus capsule of Nebraska's potato receive some but head and shoulders above everything else is rice.

198

00:35:20.030 --> 00:35:21.140

Philip Taylor: So

199

00:35:21.200 --> 00:35:22.840

Philip Taylor: from our data.

200

00:35:22.850 --> 00:35:41.960

Philip Taylor: In some years in southeast Asia nearly ten percent of the recommendations to rice can take an antibiotic, and if you multiply this up with the area of rice grown in Southeast Asia, it would seem that approximately sixty, three tons of streptomycin and seven tons of tetracyclin are sprayed over the rice from

201

00:35:41.970 --> 00:35:48.309

Philip Taylor: Yeah. So so not insignificant amounts of of antibiotics being sprayed or to the crops.

202

00:35:50.270 --> 00:36:09.389

Philip Taylor: In China antibiotics are, as I said, we have no data for China, but in China antibiotics are very widely used. They're considered to be an organic and green and environmentally friendly means of protecting plants, and they're subsidized in in many aspects

203

00:36:09.400 --> 00:36:12.150

Philip Taylor: of a Chinese crop production,

204

00:36:12.190 --> 00:36:13.689

Philip Taylor: and

205

00:36:13.870 --> 00:36:20.109

Philip Taylor: from this paper here it's that you can read the fact that extension workers serving cooperatives sometimes advise

206

00:36:20.530 --> 00:36:24.600

Philip Taylor: four point. Five percent of all. Their

recommendations contain an antibiotic.

207

00:36:25.190 --> 00:36:34.559

Philip Taylor: The ones which they use mostly are Zhong, zen, mycen, and streptomycin. These are the ones which are most widely used for crop protection. China,

208

00:36:35.900 --> 00:36:47.880

Philip Taylor: however, other countries that are going the other way. This is some news from India, and you can see that as of the third February, two thousand and twenty-two

209

00:36:47.890 --> 00:36:56.090

Philip Taylor: streptomycin and tetracyclin have been banned for use on crops in India. Of course that means that farmers have moved to

210

00:36:56.100 --> 00:37:00.580

Philip Taylor: other antibiotics, and validomycin is now being used more extensively

211

00:37:02.090 --> 00:37:12.279

Philip Taylor: just to make the point that antibiotics are not seen as anything controversial for this audience, I'm. Sure everyone understands the importance of the unique aspect of antibiotics, whereas

212

00:37:12.290 --> 00:37:29.600

Philip Taylor: to farmer. They're just not seeing there's anything important at all. They're just another crop protection product Here's a farmer who just sprayed his crop behind me with with antibiotics. I asked him why he'd done it, and he said he saw one plant who was looking sick, and he showed me the plant. And

213

00:37:29.610 --> 00:37:45.849

Philip Taylor: ah! This is the plant that was sick. This is why he sprayed the whole area with antibiotics. It's not just food crops. Other crops as well are being sprayed with antibiotics. This is a mixture of a five-phanet methyl, which is a fungicide with streptomycin.

214

00:37:46.010 --> 00:38:05.040

Philip Taylor: And then, finally, just like to make the point the fact that this isn't an accidental release of antibiotics into the environment. This is the deliberate release of antibiotics. This isn't run off from a manure pile this isn't a spill from a from a factory. This is people deliberately putting antibiotics out into

the environment,

215

00:38:05.170 --> 00:38:07.000

Philip Taylor: and as a summary,

216

00:38:07.020 --> 00:38:13.959

Philip Taylor: it's like to say that Amr is not just a medicine and veterinary thing. Amr is real in crop production,

217

00:38:14.820 --> 00:38:33.769

Philip Taylor: and just making underlining the point. There's considerable overlap between human and animal and crop health as well as the environment, and the one health approach is needed now more than ever, and although the one is paying attention, for example, such as this seminar. The message needs to be given to the policymakers and the politicians,

218

00:38:33.780 --> 00:38:49.989

Philip Taylor: and with that i'd like to thank you and to thank the organizers, and just to make the point. That plant-wise and cabbie have been very generously generated, supported by many different aid agencies across the world.

219

00:38:50.000 --> 00:38:51.899

Philip Taylor: Thank you very much.

220

00:38:52.660 --> 00:39:02.929

Jorge Manuel Ferreira: Thank you very much, Phil, for keeping the time in such an interesting presentation, and a broad overview of the topic that you propose to present on for protection.

221

00:39:02.940 --> 00:39:26.870

Jorge Manuel Ferreira: Uh, for many of us that are. And this is even more interesting, I guess, because it's It's similar, but uh different. So we have the the chat, popular with questions and comments, and we'll try to address the most um of them uh one of them. If you could clarify. If there is no treatment, or

222

00:39:29.420 --> 00:39:38.470

Philip Taylor: there is, I think we always fall into this. There's no therapy in as much as it will cure the problem.

223

00:39:38.860 --> 00:39:51.279

Philip Taylor: Plants are quite different from animals in as much as you're treating the population rather than an individual. So you

have to look at the population as a whole. So if you see infection aside on one leaf on one plant.

224

00:39:51.290 --> 00:40:07.630

Philip Taylor: You can't do anything about that, but you have to prevent it from spreading onto other areas, so you often spray plants to keep them healthy rather than to cure them. Once they are diseased. You're trying to always limit the amount of spread rather than

225

00:40:07.660 --> 00:40:12.529

Philip Taylor: pull back that infection level as you as you would in animals or in humans. You

226

00:40:12.620 --> 00:40:18.030

Philip Taylor: um. So there there are no, and there are no treatments to

227

00:40:18.580 --> 00:40:27.819

Philip Taylor: to cure a leaf spot, for example, or cure a symptom which is already developed. Plants have to just grow away from the problem.

228

00:40:28.010 --> 00:40:46.279

Jorge Manuel Ferreira: Okay, thank you, Phil. Then the one, the next one is more, perhaps a common. But you might want to add something on to that, some a collection. Thank you for your excellent presentation, and just to clarify the regulatory mode of holding, and the situation of Mademoiselle was used for the treatment of plant diseases,

229

00:40:46.290 --> 00:40:56.950

Jorge Manuel Ferreira: stating that currently this sale is free in developing countries. This is the case elsewhere. Is this the experience and the knowledge, the field knowledge that you have elsewhere that the sale is free?

230

00:40:56.960 --> 00:41:15.159

Philip Taylor: Yeah, there there are in some countries there there are regulations, but the regulations are widely flouted, and people often don't adhere to the regulations. Most countries have some sort of pesticide board, and there is a list of a registered pesticides for any particular country.

231

00:41:15.170 --> 00:41:16.209

Philip Taylor: You

232

00:41:16.280 --> 00:41:25.040

Philip Taylor: and some countries you have to be a registered dealer in order to sell chemicals, but in many cases, in many cases that

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00:41:25.270 --> 00:41:34.939

Philip Taylor: that isn't adhered to, and lots of people sell chemicals who aren't regulated, as for which chemicals can be sold.

234

00:41:34.950 --> 00:41:57.219

Philip Taylor: Ah! There are chemical shops which are extremely good, and they sell the proper chemicals, and they they regularly sell it other places. You get these pop-up markets, and they're selling all sorts of dubious chemicals in all sorts of often in food containers, and so counterfeit chemicals is a real problem. So it's. In some countries it's properly

235

00:41:57.230 --> 00:42:01.600

Philip Taylor: uh, at least in many countries it's like the Wild West.

236

00:42:01.610 --> 00:42:17.860

Jorge Manuel Ferreira: Yeah, okay. And the same colleague is interested in the residual effects of the microbes on perimeter grazing of fields and so surface water points after. So the residual effects of on the grazing fields, if you could Please comment on that.

237

00:42:17.920 --> 00:42:31.540

Philip Taylor: People Haven't really studied this people. Haven't looked at it a great deal. What has been much more widely studied is that is, run off from manure piles and such like. But people Haven't particularly looked at

238

00:42:31.550 --> 00:42:38.970

Philip Taylor: the effect on grazing from runoff, from application of crop applied

239

00:42:39.380 --> 00:42:48.250

Philip Taylor: antibiotics that simply hasn't been done. It's something I'm. Interested in. The work that has been done is looking at the effects on

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00:42:48.480 --> 00:42:54.580

Philip Taylor: bacterial populations in orchards which have been

sprayed with antibiotics, because

241

00:42:55.150 --> 00:43:10.340

Philip Taylor: the countries which the the high-income countries which spray antibiotics are mostly um North America. And They are the ones who have done these studies, and they've looked at changes in the populations of bacteria as a result of of spraying antibiotics, and

242

00:43:10.380 --> 00:43:29.390

Philip Taylor: the results are somewhat mixed on this on this topic, because On the one hand, if you spray, keep spraying antibiotics, you get resistance in the pathogen population. And yet there's other data to say that population doesn't shift towards resistance. So there's a bit of confusion there as to

243

00:43:29.400 --> 00:43:33.949

Philip Taylor: the how the population of

244

00:43:34.060 --> 00:43:39.039

Philip Taylor: resistant and bacteria changes as a result of our antibiotic use.

245

00:43:40.310 --> 00:44:01.179

Jorge Manuel Ferreira: I think. Then there was some some discussion comments sharing uh, regarding the the rotation of the the the different products used with a colleagues in that one of the main promoters for Fonti size. Resistance is the frequently using the same active ingredient, and there's a specific comment that I don't know if you can refer to it. If you are familiar with it or not,

246

00:44:01.190 --> 00:44:24.919

Jorge Manuel Ferreira: perhaps we can refer to other sources. The question is, Is it possible to revise the U. S. Isolations to permit more than four active ingredients to be used. Are you familiar with any you legislation regarding this specific aspect, or maybe referred the colleague to a some. I'm sorry I can't help you on that one. We We do encourage the farmers to change change

247

00:44:24.930 --> 00:44:36.990

Jorge Manuel Ferreira: product regularly and to mix them as well. But um, i'm not sure about mixing more than four. I'm not sure about that. Normally two is considered good practice, but I can't help you on that one sorry

248

00:44:37.000 --> 00:45:06.239

Jorge Manuel Ferreira: like there's a comment on some that you you started collaborating with us. It's a comment that I will briefly mentioned. A colleague is asking if a list of antibiotics, antibiotics approved for using plans for which infectious, and in which countries is available. So, as as feel is aware, if you has been working on this is for now an internal government, but we are trying to follow as much as possible the the same principles that follow the Cia, the people important the purpose of the double show

249

00:45:06.250 --> 00:45:21.990

Jorge Manuel Ferreira: focusing on on antibiotics to start with implants. So for now it's an internal F, your document. But to hope to to move it through the approval process, and then to put it out as a risk management to about anything else.

250

00:45:22.710 --> 00:45:37.380

Jorge Manuel Ferreira: Another colleagues state that precision, application, recruitment and professional plan. Protection and the integrated Agricultural Highest service are also important to prevent resistance. I'm sure you'd agree with the best. So

251

00:45:37.390 --> 00:45:56.070

Jorge Manuel Ferreira: and then data computational data you you mentioned uh, in some of the slides, some several aspects about this. The The comment is is in a short version plan. Tiny piece and name are some data about that. How much data do we have for which we available on this plan

252

00:45:56.080 --> 00:45:57.790

Jorge Manuel Ferreira: and the and the Amr,

253

00:45:57.950 --> 00:46:17.920

Philip Taylor: the the thing that's the most at risk. Um. The things that's threatening the honeybee population is insecticized rather than antimicrobials, and we are very aware of pollinators and honeybees and a whole insecticide story has a parallel with with anti-fungal anti insecticide that there there's lots of parallels there.

254

00:46:17.930 --> 00:46:21.940

Philip Taylor: So yes, we're very aware of the honeybee population and

255

00:46:22.150 --> 00:46:41.080

Philip Taylor: insect resistance is almost a parallel story to fungicide resistance. So um cabbie is very aware of insecticide insecticide use, and the damaging effect it has on the honeybee

population. So so yeah, in fact, Cave is coming up with some new training. Now, we're training on

256

00:46:41.090 --> 00:46:59.889

Philip Taylor: what I think the course is going to be called reducing pesticide risk. So it's going to be promoting chemicals which are of reduced risks to the environment, reduced to risk of the operator and to the consumer as well. So this is a course which we're putting together, which we, which will be rolled out probably next year.

257

00:47:00.120 --> 00:47:16.430

Jorge Manuel Ferreira: Okay, a question about if you can still say that the impact of a antibiotic using plants on public health or human health remains minor in practice, but likely much more important in animals

258

00:47:18.260 --> 00:47:23.640

Philip Taylor: Well, in with regard public health, I think the important thing is that

259

00:47:24.020 --> 00:47:28.309

Philip Taylor: vegetables are often eaten raw, and so you're eating.

260

00:47:28.320 --> 00:47:55.910

Philip Taylor: You can wash the vegetables, but you can. You will still be eating the bacteria which are on the surface of the vegetables, whereas most meat is all all meat is cooked, so you'll be killing the bacteria. So um I think the concept of. If you take a um a lettuce which has been treated with antibiotics as the danger that you'll be consuming antibiotic, resistant bacteria, whether they be plant, pathogens, or human pathogens, and then this could lead to

261

00:47:55.920 --> 00:48:13.300

Philip Taylor: um human pathogens becoming resistant to the antibiotics, and it's so it's the so. Although the amount of antibiotics used in crop product is relatively small, it's there of the fact that these the crops are eaten raw. That's the issue here. That's That's certainly for me. That's the issue.

262

00:48:13.490 --> 00:48:33.090

Jorge Manuel Ferreira: Okay, so we'll take one more uh question. And then there is a colleague a plan protection officer from file. But let's see if we can um hear from him as well a question uh if you have heard of evidence showing that there has been a transfer of resistance genes from planned pathogens to human pathogens,

263

00:48:34.030 --> 00:48:52.550

Philip Taylor: and there has been for the in the Dutch bulb industry whereby Asperger's fi. Mccarthy has become resistant as a result of the activities of the of the Dutch bulb industry. But i'm not aware of anything in the bacterial field yet.

264

00:48:52.630 --> 00:48:56.399

Philip Taylor: Doesn't say it Hasn't happened. I'm just saying we're not aware of it yet.

265

00:48:56.760 --> 00:49:17.950

Jorge Manuel Ferreira: Okay, thank you. Phil, and uh Medina is is our colleague assisting us with the the the management of the Webinar. I don't know if you can hear from uh. There is a um, a colleague, a plan protection officer in a file, so perhaps you'd like to directly add something to the discussion if you could open his microphone, and if you can hear from there,

266

00:49:17.960 --> 00:49:19.249

Jorge Manuel Ferreira: can we try it.

267

00:49:20.840 --> 00:49:33.959

Thaer Yaseen (FAO): Yes, thank you, Philip, for the nice presentation. This was very, very good. My question goes back to the resistant and connection between this resistant and legislation

268

00:49:33.970 --> 00:50:02.429

Thaer Yaseen (FAO): um Eu legislation. Recently they start asking to reduce the number of molecules used in h crop, and this is based on the request of the marketing market distribution. They ask for minimum, a maximum for molecule residue, for example, for a grapevine or other crops that's indirectly insist or push the farmers to use the same molecule physically during the production season,

269

00:50:02.440 --> 00:50:18.940

Thaer Yaseen (FAO): and this is frequently may enhance antimicrobial resistance. The tangible example is the botritis scenario with the resistance to switch. Where this product have two active ingredients. One is a fantastic work done by this.

270

00:50:18.950 --> 00:50:40.280

Thaer Yaseen (FAO): So this car, the fluid destination going in in the opposite direction in a chemical resistance, reducing the number of molecules, we may ask for less er minimum residual limit, but can

induce the number of molecules that can permit for farmers to make use for more than active ingredients.

271

00:50:40.310 --> 00:51:10.210

Thaer Yaseen (FAO): This is my question regarding the the the fundraising regarding the bacteria. I see that that that you collect is missing an important part for the developing country. We know that in in in America and North America many ah antibiotics are permitted. I'm managing in North Africa and Middle East, where ah antibiotics are not permitted to to be used in plant health. Maybe they could

272

00:51:10.220 --> 00:51:14.670

Thaer Yaseen (FAO): in a legal way, but officially are not permitted

273

00:51:14.680 --> 00:51:16.530

Thaer Yaseen (FAO): over. Thank you again.

274

00:51:17.290 --> 00:51:18.490

Philip Taylor: Thank you.

275

00:51:19.440 --> 00:51:24.849

Philip Taylor: I'm. Unaware of the of the reduction in

276

00:51:25.310 --> 00:51:42.859

Philip Taylor: active ingredients used on particular crops, reducing it to four, as you say, and that would make it easier for the legislators. But, as you, as you correctly pointed out, this would be increasing the likelihood of resistance developing. So i'm not familiar with that legislation. But that sounds um. I'd like to learn more about that.

277

00:51:43.400 --> 00:51:44.569

Jorge Manuel Ferreira: All right.

278

00:51:44.580 --> 00:52:14.300

Jorge Manuel Ferreira: Thank you very much, Phil. This was a um excellent, and thank you for all the colleagues that uh attended and uh posted the questions Th: the The recording of this session we posted on our social media as well as some curated resources that um feel kind of prepared for us, and we put it up together there. If you want to refer to for the knowledge on this specific topic. The next um Webinar will be on the second Thursday of the the

279

00:52:14.310 --> 00:52:43.599

Jorge Manuel Ferreira: over, as always, so it will be on October, thirteen per month from at the same time as today, and we will focus on, Am I inorganic production in small produces in Uh California? So it will be done by a colleague doing extension services in California via the University of California in Davis, and you will focus on the different top. So a mark production in the small running services there in telephone. So that's it for today. Thank you very much, and confuse you next time. Thank you again.