

# Cover Crop use in Horticulture

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## SUMMARY KEYWORDS

cover crop, crops, grower, ajay, cover, nitrogen, cereal rye, legume, soil, growing, rye, spring, add, weeds, terminate, strip tillage, organic matter, terms, summer, corn

## SPEAKERS

Christa Hartsook, Dr. Ajay Nair

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**C** Christa Hartsook 00:00

Welcome to the small farms podcast, a production of the small farms program at Iowa State University Extension and Outreach. This is Episode 13, where I interview Ajay Nair, Assistant Professor of horticulture and vegetable specialist for Iowa State University Extension and outreach. And we're talking today about using cover crops with horticulture. I'm Christa Hartsook, small farms program coordinator. And we hope you enjoy the show. Ajay, welcome to the show. Thanks for being on.

**D** Dr. Ajay Nair 00:28

Thank you very much, Christa, for inviting me and involving me in this fun discussion, which I look forward to.

**C** Christa Hartsook 00:34

Great! Ajay, let's just start out with some basics for those that don't know what are cover crops and how are they used?

**D** Dr. Ajay Nair 00:40

It's a good question because oftentimes, the definition of cover crop is lost in the objectiveness, or the use of it. So cover crops or crops that are not intended for harvest. And the the primary reason for using them is to provide ecological benefits to your farm. Now those benefits could be in different forms, it could be soil and water conservation, it could be increasing organic matter. So these are crops, which are not cash crop, and produced in a year. It's such a way that it doesn't overlap. Most of the time, it doesn't overlap. So once you finish your cash crop, instead of leaving your ground fallow, or barren, you put a cover crop and get those ecological benefits.

**C** Christa Hartsook 01:25

Okay, so you definitely talked about some ecological benefits to the soil. Are there other benefits Ajay to using cover crops?

**D** Dr. Ajay Nair 01:32

Yes, there are. So certainly there are benefits of adding cover crops of soil but in and some other benefits that cover crops can be used for is to provide a habitat for the beneficial insects. Okay, cover crops such as buckwheat, they attract a lot of pollinators, a lot of attract a lot of beneficial insects that can help in managing your pest populations.

**C** Christa Hartsook 01:32

Okay, great.

**D** Dr. Ajay Nair 01:34

So habitat for insects is great, you know, honeybee, we know that the population is going down. So this is another option for them to come and forage. Other than, you know, corn or soybean, they have some diversity in terms of Pollan's so that's also a benefit.

**C** Christa Hartsook 02:15

I think when you hear cover crops, I think people automatically tend to assume, you know, we're using that in traditional agriculture, but are there applications specifically for horticulture? You know, I've harvested my large garden What can I do now?

**D** Dr. Ajay Nair 02:29

Yeah, when it comes to cover crop using horticultural crops, there are a number of ways you can use cover crops because there is so much of flexibility and depending on the type of vegetable crop you grow, now, when I compare that or when we compare that with corn or soybean, the the timeframe when you can put a cover crop is very limited, okay, because the main crop will take a large amount of growing growing period in a year. But when it comes to vegetables, depending on the type of vegetable so let's say you were growing a short duration crop lettuce, which is a 45 day crop or a 50 day crop, compared to a long duration crop. For example, pumpkin, you know, might take 100 120 days. So you see a lot of variability in terms of duration of these crops. So if you're growing a crop, for example, pumpkin which takes about 100-220 days, then you are using cover crops as a corn and soybean grower is going to use it because most of the growing period is occupied by a pumpkin and once the pumpkin is done, then you put a cover crop and in that case, now the flexibility in terms of using cover crops is reduced a little bit because there are not many cover crops that will germinate well and established after a pumpkin crop which is like you're talking about September October. But

other crops you know short duration crop you can put in different cover crops. I'll give you another example. If a grower was growing sweet corn, and the sweet corn harvests, we try to get the harvest going by July 4. Yes, there'll be successful planting so that the grower will keep harvesting till let's say September and after September they're done or maybe like end of August they are done. Now they have this whole one month before October or November hits. So now there is flexibility of putting different cover crops which are short duration cover crops could be on the 50 day cover crop for example, buckwheat or oilseed radish, yellow mustard to the oats, the short duration cover crop as compared to cereal rye, which is like a six month cover crop so a lot of flexibility in terms of choices for the type of cover crops when it comes to horticultural crops.

**C** Christa Hartsook 04:26

Okay, great. So you mentioned a few of these different types of cover crops Ajay are their types that work specifically well with vegetables or am I limited on what I can use?

**D** Dr. Ajay Nair 04:37

The end use of the cover crop depends upon what your objective is. Okay, so for. For example, let's say you're the group the grower wanted to simply increase organic matter in their soil. That was their major concern that organic matter is low, I need to improve it. There are specific cover crops that do that. For example sorghum, Sudan grass, it can produce anywhere from eight to 10,000 pounds per acre of dry wet dry matter in in a short period about 60 to 60 days. Okay, so if the organic matter is of importance go for sorghum Sudan grass. If nitrogen was an issue, you are an organic grower, your sustainable grower you want to cut down on the amount of synthetic chemicals or fertilizers you want to put in then you put then you incorporate a legume cover crop and legume cover crops could be red clover could be sweet clover, it could be crimson clover, Latino or white clover. So there so now the intention is different. So that's why you using legume if the purpose was to disinfect your soil or kind of sterilize your soil using natural means, and cover crops can do that for you, for example, brassica cover crops they help to disinfect the soil, get rid of some of the harmful pathogens and nematode population, they would not be as effective as a chemical would be like a synthetic chemical, but they can significantly reduce the amount of harmful pathogens in the soil. So again, the the intent of the grower what they want to do, if they have a specific thing they want to achieve, there is a cover crop to do that.

**C** Christa Hartsook 06:14

Okay, is there a best time or best practices I guess as a to put a cover crop in?

**D** Dr. Ajay Nair 06:22

most of the vegetable growers would be putting a cover crop after the harvest in the fall. Because that's the time then production is done. And all across Iowa, that's the time most of the cover crops go in because we don't want to leave our ground land fallow over the winter, and erosion can take away the topsoil. So most growers would plan there, there are some

growers who are a little more advanced, and they are much into the cover crops they have, you know, figured out you know, the duration and time and what are the challenges in terms of incorporating so they might even plant in the spring, some some short duration cover crops before they start their summer vegetable, for example, tomato or pepper, and they might do a spring cover crop. Another level to it is adding a cover crop in the summer. Okay, now that's a little odd when we talk about adding cover crops in the summer, because we do not have many growing degree days and we are short in terms of the growing period, we want to grow our vegetable instead of cover crop. But if a grower has decided that I am going to focus on my spring crop, and then I'm going to focus on a fall crop, and maybe not much into tomatoes or pepper. So let's say in the spring, they did a broccoli and lettuce and some of the spring crops. And then they have decided in the fall I'm going to do a cabbage or cauliflower, then there might be a fallow period in the middle of the summer. So they harvest everything by June. And the next planting is going to happen only by mid July. So that 45 days, again, instead of you can there will be weeds coming up. Sure. So instead of managing the weeds by cultivation, or using herbicides, may be a good idea to put a cover crop that can be there for about 45 days, provide some good habitat for beneficial insects improve increase organic matter, reduce erosion, reduce leaching. So that's another opportunity there to add a cover crop in the summer.

C

Christa Hartsook 08:18

Okay, what then do I do in this spring? Ajay you know, I've planted this cover crop in the fall am I letting it go in the spring? Do I need to knock it down? mow it? How do you manage that?

D

Dr. Ajay Nair 08:29

It comes to the resources which a grower would have? And that's very important. Very good question. Because before even you go into a cover crop, you need to know how to terminate that cover crop because you got to put a calf crop after that. And I would you know, I will just backtrack a little bit about applications. And this ties up with this question. So growers would plant a cover crop as I said, mostly in the fall. And for vegetable growers, and corn and soybean growers to in the state erosion is a big concern and cover crops help with that. But in vegetable systems also in the other system, there's a lot of nitrogen that is left in the soil after your crop is done. For sweet corn. It's a heavy feeder of nitrogen so a grower would have applied a lot of nitrogen in the spring or in the summer to get that high yield and good quality. sweetcorn. Now, what happens with that nitrogen if you're after September, if we do not have anything growing that nitrogen will leach it will go to the groundwater it will contaminate drinking water and then you have you know, the issues we are facing with nitrate contamination in rivers. So cover crops helped to sequester you know, scavenge that nitrogen and hold it in them throughout the winter. And then next year when you terminate them, they release that nitrogen so you are kind of removing that nitrogen from the soil and story. Now how to terminate knockdown that question. Depending on the cover crop you use, the approach will differ. For example, cereal rye, which is a very common cover crop Grow used by field crops and also vegetable growers. They become dormant in the winter and in the spring they start growing. And in the month of April, May, the growth is exponential. I mean, the rye cereal rye will look like a very small plant, you know, 12 inches, and within one month, it can be five feet. So it's an exponential growth. So how do you manage that much of biomass? Yeah, so if you're going cereal rye, and if you're growing it for the biomass, make sure you know how to

terminate it, when to terminate it. So you might need you know, you might come with a flail mower and then you might have to till it under so you need the tractor you need to do that. If you want to manage the cereal, rye and don't want to let it grow that big and you want to just terminate it in March or April, then a tiller would do you can go and till. There are cover crops in which you might not need any resources or tools. And those are the cover crops that winter kill. Okay. Think of oats. They're not going to overwinter here in Iowa, buckwheat, they're not going to overwinter you know, oilseed radish, yellow mustard, those cover crops won't overwinter crimson clover so in that case in when the fall comes and the winter comes you know wherever hard frost everything is dead. And but they in the spring you know, all you find when you start is this dead matter which is brown and once you just come with like pillar and tell it under it's gone. Some growers might not even use a tiller, they might just go directly plant in that residue, because it provides nitrogen slowly and weed suppression some other advantages. So in that case, you did not need any tool to terminate a cover crop. Okay.

C

Christa Hartsook 11:39

Ajay I know, you're doing research specifically on cover crops and vegetable systems. Can you tell us a little bit about what you're finding?

D

Dr. Ajay Nair 11:46

Sure, we found that growing legume cover crops which is you know, as we all know, adds nitrogen we found that the summer fallow where a grower is not growing anything. Adding a legume crop certainly helps in terms of increasing the yield and the quality of the crop in the fall. So we have tried lettuce, we have tried cabbage, we have tried cauliflower, all those cover all those cash crops did better than there was a legume cover crop before them and in our case it was we use sun hemp, which has not traditionally grown here but more in the south we use sun hemp. hairy vetch was another one, but hairy vetch is more of a fall cover crop. But sun hemp is quick growing and cowpea. So some hemp and cowpea really benefited that's that was very clear evidence we got using these cover crops. We are also doing some advanced research in terms of incorporating soil conservation with cover crops. So integrating those two together so if I grow if a grower is growing cereal rye in the fall, see that we let the cereal rye grow in the spring get about five to six feet and then instead of tilling it under a flail mowing it we roller crimper. Okay, so we use this is more for the organic growers. The roller crimper to the Rye is just laid down. And then we don't till the entire plot but we till just a strip in that heavy mass. So it's called strip tillage. So integrating strip tillage with cover crops to grow crops such as broccoli, we have done experiments with broccoli with pepper this year we are doing with melons and we are finding some interesting results that having the cereal rye up there certainly reduces erosion, it helps the soil to conserve more moisture. Maybe this year, it was not a big effect because we had no frame but years when you have very severe you know dry and hot periods of July and in July and August. Those cover crop helps to conserve moisture. And an initial advantage when you're growing melon is that your melon is not sitting on the soil, but it is sitting on the soil the mat of cover crop. And our collab we have Dr. Angela Shaw from Food Science and Human Nutrition who's helping us with the Food Safety part of this project. She's helping us analyze the amount of bacteria that are on that melon compared to what's sitting on the ground. So that is something new we are trying strip tillage with cover

crops right now we started with cereal rye, we are also looking into using other cover crops for example sorghum Sudan grass in the fall so that we can grow garlic in a no till system or strip till systems.

**C** Christa Hartsook 14:21

And I would think Ajay with something like that where your roller crimping down, you would have more weed suppression as well.

**D** Dr. Ajay Nair 14:27

That's true. So when we have when we crimped, rye, we have a heavy mat and then when I say heavy, it's about four to five inches. And that provides an excellent weed suppression. I would say about two and a half, three months, okay, if it's no annual weeds in there, oftentimes some weeds are very competitive, they would come up here and there so you need to go and pull them out. The most important thing is that the mat of rye which you have should be very thick. So for that you need to make sure you see you're right early enough All so that they can produce enough biomass and a higher seeding rate, we go with about 100 pounds per acre. So those things are critical. Otherwise, the purpose is lost. It's very difficult to manage weeds in a matter of rye. You can't hoe you can till. So you need to take precautions. And we try not to do this, this kind of a system or a setup such a system in a plot where you know that a lot of perennial weeds, yes. So because then you can't fight with the perennial weeds that easily but annual weeds, you can certainly take care of them.

**C** Christa Hartsook 15:28

Okay, great. Ajay let's say our listeners out there have become very intrigued by this and there's still time, obviously in Iowa's growing season to put a cover crop down. Where do I go to find seed?

**D** Dr. Ajay Nair 15:42

PFI has done a great job in terms of coming up with a resource directory okay of cover crops dealers. Yeah. So you people can go there on their website, they can find information there. Some other sources which we buy for our research, this one in Albert Lea in Minnesota Albert Lea seeds. They have, they cater to a lot of horticultural crop growers so you can get information and seeds from them. Another one we have used in the past is a green cover seeds. They are in Bladen, Nebraska. And if you go to the website, I think it's green cover seeds.com. If you go to the website, they do a great job in listing all type of cover crops they have. And there's so much of diversity and on a per pound basis, because small acreage owners might just have half an acre. And if they're planting crimson clover, which is only 15 pound to an acre, you don't want to buy a 50 pound bag, you would rather buy a small five pound 10 pound whatever you need. So green cover does a good job. But again, there are other growers and other coops that sell cover crops in Iowa. A lot of cereal rye easily available,

because a lot of corn and soybean growers would use that. But if you're looking for specialized cover crops, you know, Sun hemp or any crimson clover, so you might have to look at the directory and find the resource.

**C** Christa Hartsook 17:04

And you know, Ajay we talked about how you know you're using some of these different types of blends? Is a dealer putting that blend together? Or is that kind of on you to come up with how you want your mix to be?

**D** Dr. Ajay Nair 17:15

Yeah, the green cover seed folks in Bladen, Nebraska, they would they have different blends, okay, they would give you the different types which they have tested. But as a grower, it's not hard. You kind of have a good mix of different species. So you need to have a grass species. So it's cereal rye and rye grass, and you add it with a broadleaf. You know, it could be winter pea, or it could be yellow mustard, oilseed radish, and then you can add a legume to it. For example, hairy vetch and other clover. So if you keep that broad thing in mind having a cereal having a legume having a broadleaf you can, you can certainly make come up with a good plan and I'll be happy if there are folks who want to pursue this further and want to know, okay, I have give me the right proportion, sir. I'd be more than happy to give okay, because there are a lot of combinations possible.

**C** Christa Hartsook 18:10

Yes, that's a great resource.

**D** Dr. Ajay Nair 18:11

Again, again, depending on when you are planting so we can cater that and I can provide recommendation or help if they require specific information on those aspects.

**C** Christa Hartsook 18:20

Okay, great. Ajay is there anything else that we need to know if we're getting started about cover crops?

**D** Dr. Ajay Nair 18:26

Again, we discussed this in our conversation but have an exit strategy. That is the first thing which I tell grow anybody is going to use? Okay, so if you're putting a cereal rye and you're going to get busy in the spring and you don't attend to it, it starts growing How will you terminate it because you don't want somebody driven away from cover crop because they did not manage it but they will never come to realize Oh no, it doesn't work. It doesn't work

because we did not plan for it right. So I would say have an exit strategy. Know how you do have resources to manage a cover crop. Sometimes if the purpose is only to add organic matter is sometime when he honestly tell them use compost. That's an easier way to add organic matter. But if you're you're interested to add nitrogen by natural fixation, use a legume they are interested in yes use a legume. If there was a patch of ground I often hear oh, it has not been doing great for a long time. I don't know what's happening. Maybe diseases are too many times have grown tomato after tomato, which is the lack of crop rotation. Then we would say okay, then in that case, try to use a brassica cover crop tried to use oilseed radish or yellow mustard that will help to keep push the pathogen level down because it acts as a biofilm again and often and those cover crops winter kill and I tried to push people who are just getting into it to use cover crops that winter kill so that they don't have to worry about killing it in the spring. That's a good way to start using cover crops cowpea had nitrogen and organic matter weed suppression and so those are good cover crops to start with. And once they get the handle on it, then they can look at different mixes and when to plant and can I squeeze it in here, and then you become a cover crop enthusiasts where you don't like to see barren land. Anywhere, their soil exposed for the cover crop.

**C** Christa Hartsook 20:17

That's great. I like your suggestion to have the automatic winterkill that gives you an automatic exit strategy when you're getting started.

**D** Dr. Ajay Nair 20:25

That's true. Yeah. And I do have resources for growers who are interested if they go to my lab page, which is [extension.iastate.edu/vegetablelab](http://extension.iastate.edu/vegetablelab). We have different publications for vegetable growers to integrate cover crops. There is a publication on short duration cover crop. There's one on just general cover cropping in vegetable production and some advanced when with strip tillage and conservation tillage so listeners can always go there and get free download those resources.

**C** Christa Hartsook 20:56

All right, Ajay, thank you so much for being on the show today. We appreciate it.

**D** Dr. Ajay Nair 21:00

Thank you very much, Christa for sharing some of my cover crop enthusiasm with everyone.

**C** Christa Hartsook 21:05

All right, and look forward to this episode on our website. [www.extension.iastate.edu/smallFarms](http://www.extension.iastate.edu/smallFarms). Thanks for listening



