

## Transcript: Plant Breeding Stories Podcast S1E8 - Wong Choo Kien



[Theme music plays]

Hannah Senior:

Welcome to this episode of the Plant Breeding Stories Podcast, where I talk to leading lights in plant breeding, asking what they do, what makes them tick and what fascinates them about the world of plants? I'm your host, Hannah Senior of PBS International, world leaders in pollination control. We design and produce specialist pollination bags and tents used by plant breeders and seed producers all around the world. And through this, I've been privileged to get a unique perspective on how plant breeding globally affects our diets, farming systems and the environment. I'm excited to share a little of this with you as we meet some of the amazing people who make plant breeding their life's work.

Hannah Senior:

Today I have with me, Mr. Wong Choo Kien, Head of Crop Improvement Division for Applied Agricultural Resources based in Malaysia. His work is in the oil palm sector, where he and his team are responsible for developing improved oil palm varieties and producing high performing seeds for oil palm plantations. So, Choo Kien, would you like to tell me a little about yourself?

[Theme music plays Fades]

Wong Choo Kien:

Right. I'm Wong Choo Kien liked Hannah introduce and I'm from Malaysia. I born in Ipoh, which is a city, middle of the peninsula in the State of Perak. So yeah, that's me and good fortunate to finish my bachelor degree in Universiti Malaya and also very fortunate to be able to experience and did my postgraduate in the United States, Minnesota for a Masters of Science. And now I've graduated from all these and I came back a plant breeder.

Hannah Senior:

So, tell me then how did you get into plants? Were you... I'm always curious, were you always interested in plants? Is it something that you discovered later on in life?

Wong Choo Kien:

I'm someone who has always liked biology and that I know for sure, because I did very well in school for biology. I like it because plants really fascinates me because of the beautiful outer structures, the anatomy of plants, when we put on different stains you see different colors and all the geometries from the plant cells, they are really a piece of artwork, I would say. Yes, whenever I see a slice, they are really beautiful. So, that's really something I enjoy when I was doing pure plant science.

Hannah Senior:

You said you did a bachelor's degree, was that in biology or was that in plant science specifically?

Wong Choo Kien:

In the bachelor degree it was a course offered by the School of Biology in Universiti Malaya, and there are many tracts. So the tract that I have chosen is called Agricultural Biotechnology and is obvious as its name it straddles across plants and animals. And somehow from all the different experiences I had during my first years of interactions with different lectures and exploring what suits me the best. I actually found, I liked plants the most. And subsequently what interests me a lot is food security. As I came across an article when I was doing some research work and reading and so on. So I find food security is something very important and that clicks on to me to really contribute something which I think would help mankind so that's how I got into plant breeding.

Hannah Senior:

I'm just going to interrupt for a second and ask you, did you have any previous experience in agriculture before choosing that course?

Wong Choo Kien:

My family actually has a small farm that plants pomelos so we felt that really created impact I suppose, to understanding, seeing things grow and appreciating the changes when things grow. So things that doesn't grow much like genetics somehow it eventually put me off and microbiology that's too smart to consider. And so I just naturally further pursue the plants. Yeah.

Hannah Senior:

You see that's a dream for me being involved in growing pomelos. I love pomelos.  
[Hannah laughs]

Wong Choo Kien:

[laughing] yes yes indeed!

Hannah Senior:

I recall you went into agronomy initially. So how did you get from graduating with a degree in agricultural biotechnology, into oil palm agronomy, and then to an MSc in Plant Breeding in the USA?

Wong Choo Kien:

What happened next was when I returned, I found an email just drop in saying that there's an interview to call for a researcher. So I then went and I got a job to do oil palm research in agronomy and things got so fascinating with a new crop with so little background and know about, that particular exposure really fascinated me. Which then I actually put down my thoughts of further studies. But somehow a year later I was approached by my guru, Dr. Soh from an Applied Agricultural Resources, if I would be interested to join him in this company. Which also offers an opportunity to further studies post-grad degree in United States with Dr. Rex Bernardo. So that's how I ended up in the States for my Masters of Science.

Hannah Senior:

Maybe at this point, for any of our listeners who aren't familiar with oil Palm, it would be helpful to explain a little bit about it. So perhaps you can just touch on what it is, how it's used - just give us a bit of an overview.

Wong Choo Kien:

Oh, yes it is. I think they are quite some perceptions about oil palm or probably impressions from many different people. But from our perspective is a really magical crop. I remember that was a tagline saying that "Oil palm is the gift to Malaysia and it's Malaysia's gift to the world". I think it says that very well because this crop is really a productive crop. And when it came to Malaysia in about a hundred years ago and being domesticated further in this country, then it has grown so much because of its suitability to the climate of Malaysia. This crop can produce 40 kilograms of oil per tree per year. So imagine 40 kilos in a usual supermarket tin, you are probably looking at things like about a kilo. So there are 40 bottles of those that can be produced by a tree a year.

Wong Choo Kien:

And it's perennial. So every 10 days, harvesting can be carried out and it's sustained there for at least 25 years of productivity.

Hannah Senior:

Oil Palm, or more specifically the African oil Palm *Elais Guiniensis* has played a major role in Malaysia and Indonesia's economic and social development hasn't it?

Wong Choo Kien:

It's not really something that is that new in its use because 10,000 years ago, this crop has already been consumed as food. So I still remember some very interesting presentations that look into the archeology of this palm, where they found jars of oil, known to be palm oil, in the Egyptians civilizations in those pyramids archeological

sites. So that's how there's what I call it evidently this particular crop has been used even to the nearest human civilizations. So it is really interesting.

Wong Choo Kien:

And to our country is really important because this particular crop is doing so well here, that it's contribute near to.... Of course together, Indonesia, is near to 85% of the productions of Palm oil and it creates jobs for people. And it was said, well there's some estimation saying that one workers in eight hectares. So that's how important is in reference to the career or job possibilities with this crop.

Hannah Senior:

You mentioned it's productivity, and this is a really important for oil palm – that it yields more calories per hectare than any other crop that humans farm. Can you put that in context for us?

Wong Choo Kien:

So he gives us about near to four tons of oil per hectare, as compared to other oil crop, like rape, sunflowers, soy that lingers around 0.8 tons per hectare to 0.5 tons per hectare. So I think it is a very productive oil crop, yeah.

Hannah Senior:

So oil yield per hectare is already very high compared to other crops, which is one reason oil palm is so important to the world food system. And of course, yield is always an objective in a breeding programme, even if you start from a high baseline. But oil palm also relies heavily on manual labour, which is becoming more expensive and harder to secure. How does this feed into breeding programme priorities?

Wong Choo Kien:

Yes. As you have said, that's very true. Yield is the utmost important trait and we're still looking forward to improve the yield. Other than that, we understood that there is some limitation in this crop typically in harvesting. Although we can harvest it 10 days per time

or per round the difficulty is the tree will grow tall. And with current technology, it is still quite manual. So we are targeting materials that we can harvest it easier. For example, if the stalk or the peduncle is longer, which obviously will facilitate the need in easy harvesting, and probably things like non-abscissions. So there'll be less loose fruits to collect in the process of harvesting. So all these are agronomic features that the breeders are looking for, apart from yield. So these are the couple of things that also in our mind, like high increments... Anything that can make harvesting less complicated, easy... With... Is our objective because the crop needs people to work with.

Hannah Senior:

I guess the other thing about oil palm, and you mentioned this right at the beginning, is it's a perennial. And that means that the breeding cycles are quite long, aren't they?

Wong Choo Kien:

Yeah.

Hannah Senior:

It will take a long time to go from seed to productive palm. And it requires lot of space to grow plants to maturity for progeny testing. How does that influence the way that your breeding program runs and what technologies you use?

Wong Choo Kien:

Yes. Breeding with oil palm that has long cycle and the need to run progeny tasks with such a big tree crop that occupies quite some land to do testing anything that can reduce the cycle will definitely benefit the program. Now, typically in our work in molecular breeding we look into this aspect. The program that I had in University of Minnesota with Dr. Rex Bernardo looks into this aspect that we would like to turn the cycle early. Though the crop is perennial and can stay more than 25 years in the ground, it actually physiological mature around two to three years after planting. So that

means if we can do without progeny testing and could do selection with molecular technique and things of such, it will allow us to turn a generation earlier.

Wong Choo Kien:

So which then, in a way, reduces the need of the progeny test time that is usually 10 to 12 years or so. So, that's in a way we consider that is a route to reduce the breeding cycle in duration. So, that's really helpful. Any things of that kind of direction, even on the technology, like Haploid Technology in generating inbred lines in the fastest speed, will also facilitate this kind of research. So those are the things that we are looking into actively in our breeding program.

[Theme tune plays]

Hannah Senior:

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[Theme tune fades]

Hannah Senior:

So, Wong Choo Kien, we've been talking about breeding priorities at AAR - What's attracting your energies and interest at the moment?

Wong Choo Kien:

[Laughs] Well if we looked into oil palm breeding, we now started to look into this species called *Elaeis Oleifera*. We think that there is a great potential in this particular species.

Hannah Senior:

And this is the South American oil Palm?

Wong Choo Kien:

Yes, it is. Yes. So there are many desirable characteristics in it that we think will suit really well to the program like its low height increment and non-abscission characteristics. So all these characteristics from the South American oil palm *Elaeis Oleifera*. If it was in the commercial variety, it would really benefit the industry. So we are engaging quite a bit of our effort in our breeding in exploring the species itself by its pure and the hybrids need that interspecific hybrid the *Oleifera* with *Guineensis* which is the South American oil palm with the African oil Palm to see what kind of possibility from these two species when it comes as a form of hybrid.

Wong Choo Kien:

So we are investing quite some of this effort in breeding for with this new... Or I should say, this species. I mean, there are people that were looking at it aggressively too, but somehow I think the interest was... The interest dies off in the eighties due to the results from rather very specific *Oleifera* that was obtained then. Yeah. But I think that these pictures look different because the *Oleiferas* also have many origins. So we are looking at all possible combinations from this particular species with the Africa oil palm. And hopefully we could really identify something useful to the industry. So that's something that we have been working on.

Hannah Senior:

Your role is Head of Crop Improvement which includes both seed production and new line development work. Could you tell me a little bit about your role and the functions that you oversee.

Wong Choo Kien:

You have introduced me as a Division Head for Crop Improvement and yes... I need to oversee the different sections that are under this division. So there are three sections,



the plant breeding section, then the tissue culture and the molecular biology. But what's good about the team is that they are very competent and they function really independently.

Wong Choo Kien:

So therefore I would see myself more like a moderator in the role as the Head of Crop Improvement Division. Because the goal for us is really straightforward. And we all have a common goal. Which is to create variety and yeah, and while we are developing variety, we understand more about sciences and that's help us to change the way we do things. But at the end, we still reach to the final goal, which is variety development goal.

Hannah Senior:

And you mentioned the team there. And on one of my impressions of AAR, Applied Agriculture Resources, is that you invest in people, in training people and bringing good people through and keeping them with the business. Do you think that shows in the way that you yourself have been treated and also the way that your team aligns and stay loyal to the business?

Wong Choo Kien:

Yes, definitely. The training opportunity in reference, like further studies, is always encouraged and attending scientific conferences, be it local or international is also encouraged. So that particular part is well set up in the company. That has always been the case in our belief. Development in human resources is never unprofitable. If you look into it as a economic proposition is never an unprofitable situation. Yeah. It's always been our goal to develop people.

Hannah Senior:

Mmmhmmm [affirmative noise] And you have first hand experience of this because your boss Dr Soh supported you to study in Minnesota. How did you find that? It's a big difference moving from tropical Malaysia to very chilly in winter Minnesota – tell me a bit about your student experience.

Wong Choo Kien:

I suppose many of us are influenced by Hollywood movies. So knowing States through the movies and experience it in real life, I would say it's not really that different minus... Of course we minus out all those actions and things of such-

Hannah Senior:

Not so much drama in real life.

Wong Choo Kien:

Yes. It's yeah. I kind of know what's going on. So when I was there, is in a way, mentally I was really well prepared. So that really doesn't come to shock when I was there. And of course the chilly winter is bad, but like I said, with a hot cocoa in hand, when the snow comes it's really enjoyable. After all, with all the years of experience of a tropical country. So it's fun, I would say. Yeah. And of course learning is wonderful. I love learning in USA.

Hannah Senior:

A nice change.

Wong Choo Kien:

Yes. Nice change.

Hannah Senior:

When you were in the U.S. you studied more than just oil palm, you studied lots of different crops as in the course of the curriculum. I just wonder, did you ever consider switching crops or staying in the U.S. or moving somewhere else? Was it always going to be the case that you chose to go back to Malaysia?

Wong Choo Kien:

Well, when I'm having so much fun in the States, of course, this is a really something that came across in my mind, all crops is really similar. So searching from crop to crop is really not a very big issues. However, one thing strikes me when I have a

conversation with my colleague that happens to be a sponsor students from Syngenta. And he told me that the community that we are dealing with, especially in your crop, like oil palm and he was in the crop like maize, regardless, how extensively this, the crop has been planted. Generally, the scientific community for crop is not big. So we really have to think about the situation, not upon oneself, but rather as a community. So I decided to stay really loyal to what I have started off with. And that's really helpful in making decisions, when we look beyond just ourselves.

Hannah Senior:

Are there any influences on your career so far that you've been particularly grateful for?

Wong Choo Kien:

I am really fortunate that we have strong support from the principals. I think the principals have the foresights that believe that oil is a crop... That is... That has no alternative. So therefore I think they see the potential and they believe in its potential. So with that sights they have, or the vision they had, we believe with such belief that that really creates good motivation for us to do our research and commonly you don't see CEO's really work so closely with you. Our CEO's has such interest to join us in selecting all tasks for cloning. So this is how interested and how much faith he has in R&D in creating the wider variety for the plantation and make a significant impact. So that is something that we are always grateful to the principals. For the financial support and the faith and the belief they have in the team and the crop. Yeah. So I suppose that creates a really strong sense of security for whether the job security or in general. Yeah.

Hannah Senior:

The next question I'd like to ask is what concerns do you have for the future? I was thinking in particular about the conversation we had in the past about engaging younger people with agriculture. How do you view the need to engage young people in the future? Do you have any thoughts on how that could be done differently, or more effectively?

Wong Choo Kien:

Yes, that's certainly my concern because the brain to R&D we need good brain to really work to it. With innovations, creativity, in the inputs to the R&D for oil palm in general. But we are seeing poor engagement in the newer generation in agriculture, generally. Somehow it's being perceived as a "Three D's" career, the three D's stands for the dirty, dangerous and difficult. So this perception that being created, I think, is not giving a fair picture about agriculture in general. So we at the station, do run some... What we call that? Visitors or open days to schools and primary and secondary schools to really create awareness to the students that know the possibility from agriculture.

Wong Choo Kien:

And with that engagement, we hope we could put in our little bit of effort to create awareness about this industry. Yeah. So these are the things that we have done, and it has been our concern because we do find difficulties in getting good people and qualified... competent people to join this industry. Be it R&D or the productions, no, the plantings, planters in the industry. So we are really looking forward that something can be done to increase the awareness about the importance of this industry.

Hannah Senior:

One final question from me, and it's a question I ask many of my guests - is, what motivates you when the going gets tough?

Wong Choo Kien:

The first thing that came into mind with this question is Romans 8:28 from Bible. And it says, "We know that in all things, God works for the good of those who love him". So that always motivates me in difficult times.

Hannah Senior:

Great stuff. Well I'm going to wrap it up there, thank you so much for your time today it's been great talking to you. Wong Choo Kien from Applied Agricultural Resources, thank you for sharing your Plant Breeding Story.

Wong Choo Kien:

Thank you, Hannah. It's my pleasure.

[Theme music starts]

Hannah Senior:

You've been listening to Plant Breeding Stories by PBS international. And I'm your host, Hannah Senior. This was the last episode in season one, but season two is already in the pipes and we will return with more plant breeding stories soon.

This podcast is about a pretty specialist topic, which can make it difficult for people who share our interest in this kind of thing to find it. So if you've enjoyed the podcast, recommend it to your friends and colleagues and please help others in the plant science community to find it by rating this episode and subscribing to the series. I'd love to hear from you. If you want to suggest people you'd like me to interview, you can contact me on Twitter @PBSInt or on Instagram @pbs\_int until next time, stay well.

[Theme music fades]