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Paranjpye, Rohinee ~ Oral History Interview

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Voices from the Fisheries
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Interview with Rohinee Paranjpye by Maggie Allen

Summary Sheet and Transcript

Interviewee
Paranjpye, Rohinee

Interviewer
Allen, Maggie

Date
August 16, 2016

Place
Northwest Fisheries Science Center
Seattle, Washington

ID Number
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Use Restrictions

Biographical Note
Dr. Rohinee Paranjpye was born in Pune, India in 1955 and has been working at the Northwest Fisheries Science Center as a microbiologist since 1979. As part of a microbiology product quality and safety team, she helped improve the safety and marketability of fishery products by identifying hazards in seafood. She also researches the role of abiotic and biotic environmental factors on the presence of marine pathogens in order to develop improved risk assessment tools for early warning systems. Rohinee has a B.S. in Chemistry from India, a B.S. in Microbiology from the University of Washington and a Ph.D. in Fisheries from the University of Washington.

Scope and Content Note
Interview contains discussions of: microbiology, food safety, shellfish, oysters, *Clostridium botulinum*, *Vibrio parahaemolyticus*, *Vibrio vulnificus*, genomics and collaboration.

Dr. Paranjpye discusses her work with various naturally occurring toxins and food safety. She describes the successful collaboration between stakeholders in the aquaculture community and her current work on finding ways to forecast increases of bacteria in the environment. She also is studying the effects of substrate on the concentration of bacteria and what conditions affect their populations.

Indexed Names

Eklund, Dr. Mel

Transcript

MA: This interview is being conducted as part of the Voices form the Science Centers project funded by the Northeast Fisheries Science Center. It is also a part of the Voices from the Fisheries project that is supported by the NMFS Office of Science and Technology. I am Maggie Allen and today I'm speaking with Rohinee Paranjpye at the Northwest Fisheries Science Center in Seattle, Washington. It is August 16th, 2016 at 2:00 p.m. Rohinee was born in Pune, India in 1955 and has been working at the Northwest Fisheries Science Center as a microbiologist since 1979. As part of a microbiology product quality and safety team, she helped improve the safety and marketability of fishery products by identifying hazards in seafood. She also researches the role of abiotic and biotic environmental factors on the presence of marine pathogens in order to develop improved risk assessment tools for early warning systems. Rohinee has a BS in Chemistry from India, a BS in Microbiology from the University of Washington, and a PhD in Fisheries from the University of Washington in 2005. Rohinee, thank you for doing this. So, why don't you mind telling me what inspired you to pursue a career in science and how you got to where you are today here in Seattle?

RP: So, I majored in chemistry from India because where I was from, from Pune, I did not have an opportunity to pursue microbiology, so chemistry was my default. I was always interested in human health and after I graduated from college basically, I was at loose ends because chemistry is not what I wanted to pursue. I was looking at opportunities to pursue microbiology and my husband at the time—[laughter] at the time and now—wanted to come to University of Washington for graduate school and basically I thought this was a good opportunity for me to further my career. It was a three week decision, I hopped on the plane and came to the University of Washington. That's how I got started in microbiology. I had to redo my undergrad in microbiology because of the differences in educational background, the number of years or whatever.

But when I was going to school in microbiology, I got a job as a work-study student at the Northwest Fisheries Science Center here and that was essentially my segue into being a microbiologist at the center. After graduation from the University of Washington with the microbiology degree, I was able to get a job here at the Center. At the time, our group worked—the focus of the group was in food safety and product quality working on *Clostridium botulinum*in semi-preserved foods. It was a very unique area. Of course, working with a toxin that can kill half the population in Seattle in a few days was very intimidating and we were reminded of that daily by our supervisor. It was also very interesting and we were looking at ways to inhibit the growth of this pathogen which is naturally found in seafoods in semi-preserved products. Can you stop that?

MA: You want me to stop the recording?

RP: For a minute.

MA: Oh, yeah. Sure. Ok.

RP: Sorry, I want to let the intern know that the samples are here.

MA: Oh yeah, that's fine.

RP: 2:45. We'll be done.

MA: Ok, go ahead.

RP: So, I worked in different kinds of product quality and safety basically, with *Clostridium botulinum*, other bacteria like *Listeria monocytogenes*, following the different processes of the foods from the time they are harvested to the time they're produced and looking at various stages as to where they could get contaminated and different ways in which the bacterium can grow and cause toxin production and trying to address those critical control points during the processing and handling of the seafood.

This was all before the pre-genomics era, so when the genomics area started to come on board, I was interested in furthering my education in that department and furthering my background in that. The Center afforded me an opportunity to go back to graduate school while I was still working here. So, I was able to go back to the University of Washington. This time I was in the fisheries department because that was the department that allowed me to work as well as pursue my degree, my graduate degree. At that time, we also switched focus in our group from working on the safety of processed seafood products to marine organisms that are present in the environment and are important in fisheries, which was the bacteria we are working on which are *Vibrios*. These bacteria are normally found…they're naturally found in the environment, inhabitants of marine estuarine habitats. And the way they pose [a] problems to us humans is they do not effect…they concentrate in shellfish through filter feeding such as oysters. They are concentrated in all shellfish, but they are easily destroyed by heating. So, they're not a large concern in other filter feeders which are not normally eaten raw, but they're more of a concern in oysters because a lot of oysters are eaten raw on the half-shell. With Washington state having the largest aquaculture of oysters in the entire U.S., it's a pretty big concern in this part of the world.

MA: And this is the pathogen they said that can kill half the population?

RP: No, that was the prior one. That was the *Clostridium botulinum* toxin. *Botulinum* toxin.

MA: Ok, yeah.

RP: This one is not so dangerous. The *Vibrios* give you gastroenteritis. You have bad stomach upsets for a few days but you'll recover from it. But the reason it's important is it does effect the industry with all the recalls, product recalls. It does not give public confidence that they can actually eat the shellfish without being problematic so it is a health hazard in addition to creating economic problems for the industry.

MA: And so you said you lived in India for 20 years? You moved when you were 20 to the U.S. with your husband?

RP: Mmhm.

MA: Okay. And so you've been here ever since?

RP: Yes.

MA: Yeah, okay. And what was that like, transitioning from India to Seattle?

RP: At 20 years old, it was a big adventure. So, I would not say that transitioning was difficult. The opportunity to explore a different career or a different angle of the career was interesting. Washington's a beautiful place to live. I had not anticipated at that point that I would be here for the rest of my life. It was supposed to be a two, three year commitment. So, there wasn't that tension of "what am I doing?". So, it's something a young adult does and moves to a different part of the world and doesn't know what the future holds. It's kind of something that evolves.

MA: So, how did you end up—so you just kind of got attached to here and stayed?

RP: Well, it's a unique place to work. I'll just relate something, an interaction I had with my daughter when I went back to grad school. She was in middle school at the time and I used to be practicing some of my talks at home, and then she used to ask me what—well, I'll actually go back a little bit. One of her comments when she was much younger was, she asked me mom, "what do you do at work?" And I was explaining what I do and her comment was, "and you actually get paid for doing that?" [Laughter] So what I do at work here, work is interesting and there's always—there's nothing routine about it. There's always different problems that crop up, so it's basically like being in a science lab all your life and getting paid for it. So, it's hard to say that you'd want to move.

MA: How do you think—you talked about the genome, when that came in the picture. Was that technological advancements that…?

RP: It was technological advancements and it gave us an opportunity to look or examine what we were doing from a different perspective. With the bacterium we're working with, which is *Vibrio parahaemolyticus*, one of the interesting aspects—interesting and difficult aspects—is it has been hard to nail down exactly which strains cause illness or the presence of which genes indicate that this bacteria may be harmful. Part of the reason these bacteria in the environment are constantly swapping genes and we have to remember that these bacteria are not in the environment to cause illness in humans. Humans are an accidental host. So, these genes, whichever genes cause whichever the proteins from these genes cause illness in humans is because they have some role or function for them in the environment for surviving in the environment or different environments.

So, the whole issue, based on genomics, is very, very interesting and it's going to take years

before we figure this out, but just thinking about it and that aspect is what is it that for these bacteria that cause illness—and it's important because only about 5% of the total population of these bacteria actually are capable of causing illness, but it is difficult to distinguish them currently. We can look for total concentrations of these bacteria, but it doesn't really make sense until—it makes sense, but it's not really accurate until you know the proportion of the strains or which strains actually cause illness. So, it's a constantly evolving…I mean, there's a lot we still need to learn about this and a lot of work that still needs to be done.

MA: Okay. And then how else does technology help you in your work and how has that changed since you've been here?

RP: Well, the whole genomics revolution has been the big change, the big change that has helped. I mean, ten years ago, being able to sequence the genome was a big deal and now it's like, you send it off and you'll get your results back in two days for a fraction of the cost. These kind of things are routine things that are going to keep evolving much faster and so the challenge is going to have to be for people to constantly keep—not get vested too much into things that can be done easily somewhere else but to keep the thinking machine going as to how do we actually answer the questions based on the technology that is available? Because a lot of it is just decoding, but how do you translate that code that you get out? Sorry.

MA: No, that's fine. [brief pause] And so once you've done the science, how does that translate into regulation for shellfish?

RP: What we are doing now actually, which is another very interesting and very encouraging part of it, currently we at NOAA—and this is a couple of line offices of NOAA, it's not just the Northwest Center, it's NOS [National Ocean Service] and the Weather Service—we are coordinating our efforts in the research that we have done to develop models to be…and working with FDA, the Food and Drug Administration, and with the state shellfish authorities as well as the shellfish growers to come up with ways of forecasting increases of these bacteria in the environment. We've had workshops where we've prioritized the needs of the shellfish growers, we have—and this is together with the FDA, so all the officials and the growers and the stakeholders are all getting together to see what tools are needed by the growers to be able to do these forecasts. What's interesting is that we cannot all be modelers and forecasters or researchers, but the coordination effort of all the different groups. So that's kind of very encouraging to know that all the research we are doing is actually moving forward in an area that would be of benefit to the industry.

MA: Yeah, cool. Where do you see climate environmental changes in the region affecting the toxins—does ocean acidification or things that affect shellfish, do you see that affecting the *vibrio*?

RP: Definitely. There was actually an article in the *Seattle Times* last week, there was a major report which was looked at 50 years' worth of increases of *Vibrios* in the northern seas with changes in climate showing the trend of increasing *Vibrios* and so there's a very clear expectation that these bacteria with increasing in temperature are going to grow. Right now for

the Pacific Northwest, the species of concern is *Vibrio parahaemolyticus*, which although it is a bacterium of concern, it causes gastroenteritis, which is not something that normally kills people. But another species, *Vibrio vulnificus*, which is present in the Gulf Coast and even on the Atlantic Coast, is very harmful. It has a 50% mortality rate in certain populations and that can be contracted even while wading in the water which has this bacterium. This bacterium has never caused problems in the Pacific Northwest. We hope it remains that way and the reason it hasn't caused problems is our waters are not warm enough, but with climate change and warming, it's definitely something public health officials are going to have to keep their eyes open for and they've already started monitoring for it. So, they are aware of it, but we hope it doesn't cause an issue but those are the kind of concerns that we are going to have to deal with changing climates and increasing temperatures.

MA: Is wading in the water, they have to have like an open…?

RP: Open wound. Actually it's open wounds, but it can be just a small scratch, it doesn't have to be an oozing wound or anything. Sometimes people, even when they're just cleaning fish, can get enough wounds to contract the bacteria. It's a select population. Usually it's in older males and usually it affects people with some kind of underlying illness or liver dysfunction or immunocompromised condition, something like that. It is still something to be aware of. You hear of these cases—in the newspapers they call them "flesh-eating bacteria," which they're not really flesh-eating, but what happens is it gives the person primary septicemia. The disease progresses fairly fast, even within 24 hours, so that's why they refer to it as flesh-eating.

MA: Yeah, I think I've heard of those. And then right now, you said you're work—before this interview you talked about how you have to wait for the tide, you're dependent on the tides in Hood Canal. Can you talk about how that affects your work and what you do with that?

RP: Well, the tide is just because of the sampling. Most of the areas [shellfish farms] in Washington State are intertidal and that has affected how the models are developed actually for this area because the shellfish are exposed so much…being…intertidal conditions. And so one of the projects we're looking at right now is how the different kinds of substrates affect the concentrations of the bacteria in the oysters. It's one of the aspects that we can incorporate into the model.

MA: Okay. And so is that a challenge, being dependent on environmental conditions for your work?

RP: Definitely. I mean, that is the whole challenge…It's dependent on environmental conditions and there are a lot of environmental conditions that are difficult to understand. We have been working and trying to figure out what conditions besides temperature really affect populations of these bacteria. We have looked at everything from nutrients to different kinds of harmful algal blooms and phytoplankton populations, but it continues to be a problem. We are looking at different climatic conditions and weather conditions and some of this information can be used from the forecasting models, so we're definitely hoping that will help us moving forward.

MA: Right, yeah. And what are some other challenges you face working in science or in the government?

RP: In the government, it's mostly restrictions due to funding restrictions as to where you can apply for funding. It's not as easy—and I'm not saying academia is easy—but the restrictions on funding opportunities is definitely difficult, and then trying to work within the parameters of what the government priorities are also becomes difficult. I mean, these research projects are not something that you can pick up and drop. They're long-term and a lot of times you have to end up working under the radar or working on very minimal support systems. It becomes challenging for research to work with long-term funding not in place.

MA: Yeah, sure. And did you ever think about trying to work in academia as a professor or researcher?

RP: Not really. Again, because…I mean, every area has its challenges and opportunities, but I think the main motivation for staying here was the interest in the work I was doing—I am doing.

MA: What's it like collaborating with other scientists here or anyone outside of NOAA?

RP: Well, it's really been actually very easy and interesting to work with collaborators within the Center and outside. I mean, within the Center I've worked with people in different areas. Our group had developed a zebrafish model to look at virulence in these bacteria so that was a piggyback project on other investigators in the Center working with zebrafish…that was very helpful. We have been able to count on the help of statisticians from different divisions with a lot more expertise in statistics then we have and it's been interesting to them to look at different biological questions to answer besides what they do. So, I would say collaborating has been very easy within the Center and a lot of times these collaborations are based on little or no resources and it's just the kindness of the hearts of the collaborators we're working with. We have not worked very much…we have worked with a few academic partners, but again, those collaborations have mostly been restricted because of the funding opportunities…like there are several grants that federal employees cannot be on and that makes it difficult.

MA: Yeah. And do you often go out in the field, or are you mostly in the lab?

RP: I do go out in the field. It's not part of my daily job, but at the beginning of each project or whatever projects, we've gone out in the field starting from when we worked with *Clostridium botulinum* in fish processing plants at the different sampling sites, but our usual, normal work does not involve field work.

MA: Right, you're in the lab.

RP: Yes.

MA: Okay. How have you seen the office environment change since you've been here, just in general, changes that you've seen?

RP: Well, the changes have been mostly due to technology. The computer age…I mean just the different kinds of technological advances that we have had. I mean when I first came here, I think we had those little punch cards in one big computer room, so it's a big…it's a lot different than that and things move a lot faster because of that.[These technological advances help the science to move forward a lot faster.]

MA: And what about a lot of people have mentioned more women in the workplace, have you seen that as well?

RP: We have actually had always in the area that I've worked in, have been a fair number of women in the lab, so I would not say I've seen that as a big difference.

MA: There's always been, okay. Where do you see the future of your field going in the next five, ten years?

RP: I think a lot of it is going to be dependent on collaborations, not just within the agency but outside NOAA. One of the [changes]that has happened over the past five years or so is[that]everybody's resources are getting reduced and...So I see across…again not [just] across government agencies but across academia also, that people are more willing to collaborate. So I think it's going to be interesting with people collaborating [more] to answer the bigger questions rather than everybody working in their own little areas or in their own little niche.

MA: Because of resources?

RP: Because of the resources. The [limited]resources are really encouraging people in a good way to collaborate more…[to] answer the bigger questions.

MA: What are some big questions you see coming up?

RP: Well…the issues in my area [are] the issues that people have to deal with [concerning] climate change. How things are going to change[as the climate changes].

MA: That's pretty much everything, yeah. Okay. And what's been one of the projects you've most enjoyed working on or you're most proud of since you've been here?

RP: There have been several projects we've been…I can say I'm proud of. Just giving little bits of information [to state public health officials] where some of the things that the state monitors…[inaudible]…monitor are additional to the changes that the state incorporates into their monitoring practices [for the detection of potentially pathogenic Vibrios]…because of the results of our experiments. Lately, the more encouraging aspect has been to see the different agencies come together and work together.

MA: What other agencies?

RP: That's when I say...the FDA, WDOH [Washington State Department of Health][and] other NOAA line offices. That has been the biggest change I would say from 20 years ago…that people are working a lot and in what I'm doing [research-wise] people are working closer together and want to move forward in a more generalized [or collaborative] direction than everyone working on their own.

MA: What advice would you give to someone who wants to have your kind of career and is maybe first starting out?

RP: Wow, that's a tough one…That's a tough one! But…basically, keep your eyes open for where the opportunities are but opportunities not just within where you are working. But how you can work across…other people working in other departments or institutions besides your own.

MA: Kind of cross disciplines?

RP: Cross disciplines, yes.

MA: Yeah. And then, that is kind of most of the questions but…what would be…I guess going back to when you first started here, who was your supervisor and how did they influence you?

RP: Dr. Mel Eklund was my supervisor. He always encouraged us to think outside the box. It…we of course worked at that time with *Clostridium botulinum* which was and which continues to be [one of]the most hazardous organisms [or toxins] in the world, even today. So lab safety and being very, very careful about your lab working practices was something that was stressed a lot. And he always encouraged us to think outside the box. One of his famous sayings for the lab was, "Don't work in the sand pile when you have a gold mine sitting next to you."

MA: Can you talk a little more about the *Clostr*-? Sorry, what was it?

RP:*Clostridium*

MA: Yeah, *Clostridium.* Can you talk a little bit more about that and what that is?

RP: So, *Clostridium botulinum*…these are spores that again, are present in the environment.[1]They're present in the dirt a lot so anything that comes with the environment, they

[1]*Clostridium botulinum*are rod-shaped bacteria that live and grow in low-oxygen conditions. The bacteria form protective spores and remain dormant when conditions for survival are poor. The spores are commonly present in the soil, in marine sediments and are often found on the surfaces of fruits and vegetables and seafood.

In low oxygen conditions such as improperly processed canned food or improperly processed semi-preserved fish, the spores can germinate and form toxin. The toxin is one of the deadliest known toxins, affects the body's nervous system and can cause death if not treated immediately. The disease is called botulism.

At the Northwest Fisheries Science Center in Seattle, previous research in our laboratory was aimed at improving

can be present on. It germinates under certain…it's a spore so it's not…but it germinates under certain conditions…and a lot of it is anaerobic conditions when there is less air available. And so this is an organism that used to cause problems in home-canned food. When you see the swelling of the cans and but…of course it still continues but the reason we worked on it here at fishery products is [that] smoked fish and those kinds of fish products are semi-preserved. They're not canned. Canning processes are so well developed that it's not a problem in canned food anymore. But of course people are always told [that] if they have a swollen can to never eat that. A lot of the deaths due to this bacterium are still continuing to be caused by home-canned food. But the fishery products, the semi-preserved quality of the products is of interest to us, being in fisheries.

MA: Um, right. Is that, you have been able to contain it by studying it?

RP: Not just by studying it. By developing processes where they add enough other salt or they're processed in a certain way so that this bacterium does not grow out. You cannot eliminate it. It's in…it's on the surface of the fish so it's not something you can eliminate. But when we studied it, we did look as to where and how it contaminates fish. I mean if it's smoked fish, it is on the surface but once the skin is gone it can be removed. But in commercial smoked fish where they brine it for example, one of the examples was they used to insert the brine with needles in some of them and that's how you'd get the bacteria from the surface into the interior. But under normal circumstances, it's not present in the flesh so it doesn't create a problem.

MA: Okay

MA: Okay. Do you see the public becoming more informed about these, just everything you've worked on, through better outreach or like, internet sites?

RP: Ah…the industry is…internet sites…the public is aware of the *Vibrio* issue. With the *Clostridium* issue, it has been dealt with by the industry and for that part actually, the encouraging aspect of that is [that] it's been 20…25 years since we worked on it. We still continue to get…people still ask for our publications from that time because these are…

[*Phone rings*]

MA: No, that's fine. Go ahead. [brief pause] We are pretty much finished. That's pretty much it unless you have anything else to add about your career, your life here and…

RP: I think the hardest one for me was what would you tell somebody.

MA: That's always one I throw in there.

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the safety and marketability of fishery products by identifying the hazards and critical control points of processing (HACCP) in products such as smoked fish, crab, crab analogs and shrimp, specifically in relation to the growth and inhibition of microorganisms such as *Clostridium botulinum.*

RP: Yeah, it's like….it's not just what you learn, it is how you apply it.

MA: Are you able to go back to India?

RP: I go back quite often

MA: Once a year or so?

RP: Or sometimes more.

MA: Your family is still…

RP: My parents are still there so they are getting elderly so I go back sometimes twice a year.

MA: Wow, and is that in north or south India?

RP: It is middle. It is near Bombay so it is the mid-west coast

MA: So it has been good overall coming over here? A good decision?

RP: It, well, it wasn't a decision at the time. It was just an evolution of how things happened but I have no regrets. It is hard to be away from family especially when they get older but I can't complain about living in Seattle.

MA: True especially this time of year.

RP: Yeah. Where are you from?

MA: I am from Florida originally

RP: Oh, okay

MA: So I heard a lot about the bacteria that is down, the flesh eating

RP: Florida has quite a few cases.

MA: Yeah. It's never, I mean I have never run into it but the one that scares people a lot is the amoeba in the brain that's in fresh water.

RP: Oh

MA: I mean, it is not a problem up here because it is not warm enough. *Naegleria fowleri* It is in really warm water and it is like 100% mortality.

RP: Wow

MA: Because it is an amoeba that they call it the brain eating amoeba so. Another…so that is what it does, I guess. So, it is interesting, all the toxins that are out there.

RP: Yeah

MA: How old is your daughter?

RP: My kids are grown. They are 35 and 33.

MA: Do they live around here?

RP: One has come back. They were both away for a while. School and jobs and different things. One has moved back actually in our neighborhood. Neither of them are in science. Well, one is a math major but that's not biological science. But the other one is an attorney so completely different but they both did take one microbiology class for Mom's sake [laughter].

MA: Just to try it out. Yeah. Do you plan on retiring any time soon or?

RP: Yes, I do

MA: In the next five to ten years?

RP: Yes, probably the next five years.

MA: Then just enjoy

RP: I just want to travel a lot. I like to travel while I can still walk. [laughter]

MA: Yeah well, there are always options even if you can't walk.

RP: No, but definitely would like to retire in the next five to ten years and travel.

MA: Well, that sounds good. Well, thank you

RP: Thank you.