

**Whither the Future of Forage Research?  
PERSPECTIVES AND FUTURE OF RESEARCH /EXTENSION  
FOR FORAGES IN THE WESTERN STATES**

**Panel of Recent and Near-Future Forage Retirees from Industry and Academy**

**Steve Fransen, and Emily Meccage<sup>1</sup>**

**INTRODUCTION**

It is our honor and pleasure to introduce ten key western forage specialists who have spent most of their careers and/or influenced producers' success and understanding of forages. Within a short period, a large number of the current generation of forage scientists will retire or have retired a short time ago. Our professors, those of the WWII and Korean War generation, used the G.I. bill to obtain graduate degrees. They set the scientific foundation for current forage-related knowledge and greatly benefitted dairy, beef, horses, and hay industries, while being our teachers/major professors. These forage scientists were of the highest integrity, professionalism, and work ethic. It was common during the 50's, 60's and 70's, after arriving early to work, these scientists worked hard all day, left work at quitting time, but then returned to the office/lab to work another three hours before going home for the day, not to mention weekends. Most of those traits were unspoken but passed on to their students, the 'boomer' generation, the generation now retiring. When they retired, all went quietly, leaving a legacy for future forage producers and scientists, but they seldom had the opportunity to share what influenced them, how they felt about their jobs, and how they balanced work and home life. In this platform, a select group of recent or near retirement forage scientists were given the opportunity to answer a series of six questions to share experiences and provide heart-felt suggestions and recommendations to the next generation of forage producers, agronomists, and scientists in both industry and academy. One missing name, Steve Orloff, UC Cooperative Extension forage agronomist, who would be retiring about this same time, unexpectedly passed on October 3, 2017. We dedicate the reflections and recommendation from his peers to Steve's legacy and future western forage specialists since his voice was lost too early.

**PARTICIPANTS**

Current and Near Future Retirees: Each scientist is listed alphabetically by last name followed by a brief sentence about that person. In the questions, a two-letter abbreviation is to be used to identify the author's responses to each question. Answers were not edited. We hope you enjoy their comments.

**Mylen Bohle (MB)**, Oregon State University is completing an Extension and research career in central Oregon. His focus has been with field studies mixed with lab forage quality.

**Dennis Cash (DC)**, Montana State University retired from Montana State University (MSU) then worked in seed/breeding industry. His MSU focus identified high nitrate forage issues.

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**Steve Fransen (SF)**, Washington State University forage research and Extension agronomist split his career on both sides of the Cascade Mountains at Puyallup and Prosser REC. His focus has been field studies followed by lab analysis for forage quality.

**David Hannaway (DH)**, Oregon State University, Corvallis, OR has maintained a three-way appointment, research, Extension and teaching, a very difficult assignment. His focus has been identifying environmental factors and agroecological zone maps nationally and internationally for different forage species.

**Don Miller (DM)**, alfalfa and teff grass breeder and director of product development with Alforex Seeds based in Nampa, ID. Don is also active in farmer education through many workshops and regional/national conferences.

**Mike Ottman (MO)**, forage Extension and research agronomist at the University of Arizona, Tucson. His focus has been with water and irrigation management of many different forage crops under extreme desert conditions.

**Dan Putnam (DP)**, forage Extension agronomist at the University of California, Davis. Dan's focus is alfalfa yield and quality for both domestic and export sales. He has led the Western Alfalfa and Forage Conference for decades.

**Glenn Shewmaker (GS)**, Extension forage agronomist at the University of Idaho, Kimberly, ID. His focus is with all forage crops and pastures in the irrigated zones of southern Idaho. Glenn has sponsored an annual winter forage crops educational meetings for years.

**Mark Smith (MS)**, alfalfa breeder for Pioneer and S&W seeds for many years. Mark has always been willing to share his expertise on grower farms and grower meetings.

**Dan Undersander (DU)**, Extension forage specialist at the University of Wisconsin, Madison. Dan's focus is broad but has spent much of his career with alfalfa and forage grasses. Dan has contributed numerous times to educational conferences and workshops in the west.

## QUESTIONS AND RESPONSES FROM RETIREES

### 1. What was the hardest thing that you learned during your early career? Do you have a different answer now, based on later career experiences?

(MB): My master's degree was in dryland cereal production and I took on a much more irrigated agronomist work position, so the learning curve was steep the first couple of years. Early on the more I worked with different problems, the less black and white the problems and solutions became in many instances (a career farmer/Agribusiness man told me that he was happy to hear me say that). For an Extension Agent: Understand your producer's way of life (and each one may be different). Based on your new position, ask colleagues about conferences and trainings that would help you in your subject matter work area. There are subject matter opportunities that can help you gain subject matter expertise quicker at the beginning of your career.

(DC): To master a breadth of knowledge – forage science involves many different disciplines, so one must be proficient in many topics from basic crop growth through digestion by an animal. A proud new PhD must become a generalist.

(SF): Peers and colleagues give you credibility almost completely at your first meeting. Producers, in the field or first meeting will ask you tough questions (which they already know the answer to) just to see your response and find your depth of knowledge before you earn their credibility. Once you've earned that credibility, you never want to jeopardize it. That earned credibility will last your entire career.

(DH): It was stunning to me that forages are not respected in spite of their great importance to world agriculture and the environment. The lack of organized political support continues to result in a lack of support. Numerous regional and national efforts have not substantially changed this situation over my career; some lip service, little financial support or priority staffing to fill retirements.

(DM): I think the hardest thing I learned early in my career was to realize that even though I had a PhD and was trained as an alfalfa breeder there were times that I might not know the answer to every question a grower asked about alfalfa. Over time I eventually realized that there was nothing wrong with admitting that I didn't know the answer. In those situations, I found that the best course of action was not to rush my response, but to tell the grower I would research the problem and get back to him with my best answer. The second hardest thing I learned was that I needed to remind myself to keep an open mind and to consider other viewpoints when making any important research decision or grower recommendations. I found that if I was not careful, personal biases or preconceived ideas could influence how I approached plant breeding and/or diagnosing field problems. I always go back to the story I was told early in my career about a farmer that asked 4 researchers to diagnose a production problem he was having in his alfalfa field. The pathologist thought the yield loss was due to a disease, the entomologist said it was due to insect damage, the soils person said it was a soil structure problem, and the fertility specialist said the yield loss was due to a fertilizer imbalance or deficiency. In reality the field losses may have been due in part to all of the above, but each researcher looked at the problem from their narrow point of view and their personal bias influenced their response. In your career you must always keep an open mind, and don't be afraid to consider other viewpoints. Accept input from others and explore all the possibilities before you determine the best course of action for any problem you encounter.

*What was the hardest thing you learned...?*

Over time, I eventually realized that there was nothing wrong with admitting that I didn't know the answer. – DM

(MO): Early on in my career, I quickly realized that there was more to do in this job than there were hours in the day to do it. So I decided that I needed to be careful how I spent my time and to select activities that had the potential for impact. Earlier in my career my approach was to worker harder and smarter. Later on, I learned I needed to delegate more and seek collaborators because I could not do it all.

(DP): To be honest, I felt rather intimidated early on, thinking I didn't know enough to be useful. Probably didn't. I don't know if every young person feels this way, perhaps they do. However, as time went on, I began to realize that knowledge is truly infinite, and there is always more to know and learn. One learns by doing. My life experiences in agriculture were helpful. As one of my professors said – we are all born into ignorance, and knowledge comes, as to a kindergartner, by asking simple questions. One should humble oneself before the mysteries of the universe and seek understanding. Now that I've been at this ag. research and extension gig for more than 40 years, I'm fully convinced that there is lot more to learn than what I know, perhaps the first step towards wisdom. That actually gives me a thrill, since opening one's mind to new ideas and concepts is highly satisfying.

(GS): Time budgeting, priority decisions, focusing on several important issues rather than every "rabbit trail." The university expectation for external funding is a big driver in a helter-skelter approach to do projects based mostly on funding opportunity. The USDA-NIFA funding obtained by NAFA is a large contribution now that wasn't available in my early career. However, forage producers need to step up and establish state-funded research and extension to be competitive with other commodities.

(MS): The most difficult thing was learning to lead and manage a breeding program. We focus on science in school for many years, but we do not take business and management courses. This holds for both academics and industry positions and preparations are needed. My answer will remain the same today as 35 years ago, have this curriculum added to all graduate programs. People are complex and an introduction to management practices will be beneficial.

(DU): Research results are narrow in regions of applicability and care needs to be given when answering for different environments.

## 2. What methods did you use to search for effective collaborators for projects that you were interested in but needed help to accomplish?

(MB): I started putting out trials on-station, first based on past and present research and present conversations with Extension faculty. Then as I became more familiar with the area and producers and problems/opportunities; I then started putting out some trials on-farm. Some trial work is better done on station, and some done off-station. Although, on-farm research trials increase the risk of compromised research. On-farm trials were better done for different soil fertility research – it was not always available to be able to duplicate on-station.

(DC): First and foremost – address legitimate needs of producers. Then surround yourself with cutting-edge producers, Extension faculty, and academic or industry researchers to address those needs. (Funding was a larger hurdle than capable collaborators in my view).

(SF): Producers or colleagues will present you with many issues and opportunities. Do you have time and can find the resources to tackle that problem? Does this issue fall within your interest? Money and time are our most limiting factors. Look for good producers and colleagues to work with. They make ever project fun, and worthwhile.

(DH): Initiated a regional forage workers group including Oregon, Washington, Idaho, Montana, and northern California, and British Columbia and Alberta, Canada. Resulting friendships have provided excellent collaboration for decades. Participated in the California Alfalfa Symposium leading to connections with many outstanding alfalfa and forage specialists. Obtained NIFA grant support for a National Forage & Grassland Curriculum project that involved numerous state forage scientists. Reached out to scientists in other departments and colleges for expertise needed that was outside of forage agronomy.

*How to find effective collaborators...?*  
Surround yourself with cutting-edge producers, faculty, and academic or industry researchers. – DC

(DM): I think being aware of what projects other researchers are working on can help you find collaborators. Going to professional conferences and listening to all the papers being presented, helps you find and meet people that might have similar research interests or have expertise in areas that could be beneficial to your project. Another source of collaborators, outside the scientific community, are alfalfa producers. Sometimes alfalfa producers encounter significant production problems due to insects, nematodes, diseases, or just general agronomic issues. These producers have a vested interest in finding solutions and/or answers to their problems and are often willing collaborators. I have found that many producers are willing to provide land for field plots to test possible solutions. If there is chronic pest problem on the farm, producers are often willing to let you use or rent an acre or two of their farms for a selection nursery or in the short term, allow you to make plant selections out of existing fields that have a significant stand loss.

(MO): When I first arrived, I introduced myself and spent time with every Cooperative Extension and USDA-ARS employees who were potential collaborators. As new people arrived, I did the same with them also.

(DP): This symposium is an important demonstration of collaboration between 11 western states! I think that I have used mostly intuition to find collaborators – I've learned that one cannot work with everyone in terms of personality– some people don't play well in the sandbox. That's true with either academics or farmer-cooperators. However, when I truly lack in an area of expertise, and need an in-depth collaborator, I have been able to find one. I look for 'passion' or motivation on the part of collaborators – those people who have the zeal and motivation to follow through. My many collaborations with people like Steve Orloff have been particularly satisfying. Some academics can be protective of territory and aren't interested in sharing ideas or efforts – and I've learned that one cannot work with those folks. But in retrospect, I think I have learned more from collaborators (especially farmer-collaborators) than I have taught. Just a comment on this – having travelled in other countries, I've noticed that our American habit of open conversation in the scientific community

our collaboration and interaction with academics and farmers (in extension) is highly valuable – there are many countries where this is not the case. All of science is highly collaborative, either in real-time or by standing on the shoulders of those who came before.

(GS): Networking with professionals at regional, national and international meetings. My mentor, Hank Mayland, was a master at finding cooperators with skills and knowledge to complement the project. Many times, the essential skills are outside your field of expertise.

(MS): Collaborators are essential to all research programs. I use collaborator data and overall data quality that they publish. If a collaborator publishes poor quality data, I shy away from working with them. We strive to ensure high data quality and expect the same from top collaborators. I feel we have worked with the best in both academics and industry to help growers be profitable in their operations.

(DU): I used extension agents and some industry contacts to get collaborators.

### **3. What was the point of ‘no-return’ in your career that determined this was what you were meant to do with your professional life?**

(MB): After completing a multi-year Peace Corps assignment, and pursuing a master’s degree in Crop Science in order to head back overseas... But once finished with the degree... I thought I better stay in the states... I was then offered an Extension position more focused on crop production, but thought I might be more interested in a Hort position with focus on more Master Gardeners and homeowner horticultural work... I attended a quarterly state Master Gardener meeting and then attended the PNW Forage Workers Conference annual meeting within a week of each other. I sat down and listed out the pros and cons of the two positions and the work vs. social aspects of the position locations. When I did that, it became crystal-clear to me which work I was most interested in and that the social aspect of the position locations was not as important. So, I accepted the present offer and chose not to pursue the other position. And 32 years later... no regrets.

(DC): The completion of that first successful project which led to producer success AND kudos at the University (i.e. a publication, recognition, etc.).

(SF): I was a summer student assistant doing field plot work, running photosynthesis in the lab, grinding samples with different grasses and legume. I came from a wheat farm and these forages were much more interesting than wheat. A couple years later, that same ARS forage scientist (whom I’d worked with for two years) came to me with an offer from another professor to do a M.S. in barley breeding. I said, “I really appreciate this offer, but I like what we do here, and I want to learn more and stick with these forages.” I have ever since, that was 50 years ago!

(DH): Being hired as an Extension Forage Specialist with a partial research assignment. Other Extension specialists were excellent mentors, providing encouragement and sharing projects. Working with supportive hay growers and 4-H colleagues who showed appreciation for the efforts made.

(DM): After I completed my bachelor’s degree in Biology, I was still unsure of what career choice would best fit my biology background. It was during that time I got a job as a technician for the alfalfa breeder at New Mexico State University. While working for him on the alfalfa project, I realized that a career as an alfalfa breeder would allow me to utilize my biology background and give me the flexibility of working both in the lab and outside in the field. It was at that time, with the encouragement my boss, the alfalfa breeder, that I decided to continue my education and get a PhD in Agronomy and become an alfalfa breeder. I would encourage anyone trying to decide on a career choice to get an entry level position or work as an intern in that field. Even a summer job in a related field will give you a good look at possible career choices. That job experience will give you two things, first some insight as to whether that’s the career is for you, and second it also puts you in contact with potential future employers in that profession.

(MO): I knew I wanted to have a career in agricultural science during my MS program and was enjoying what I was doing so much.

(DP): I think there was a career advisor in college who asked me to draw a vin diagram of those things I loved and though that I was more-or-less good at. I drew several circles, including one for science, one for agriculture, one for being outdoors, and another for being of service to others. One should look for overlaps. Bingo. That and the fact that I had worked a lot on farms, even though my father was not a farmer. There was also a circle for art and music somewhere, but that got left behind! Perhaps someday. Newbies: draw your own vin diagram and do what gives personal satisfaction.

*What was the point of 'no return...?'*  
I was determined I would not be happy with an 'office job' – I entered as a temporary technician in forages, that was the point of 'no return.' – GS

(GS): I began my college education in agricultural engineering. I determined I would not be happy with an "office job" so I changed to animal science. It was difficult to schedule range and forage classes with this major, so I applied to graduate school and received a more complete education. I returned to the farm/ranch for several years until I had an opportunity to work in research in plant nutrition of forages. Although I entered at a temporary technician level, that was the point of "no-return."

(MS): The publish or perish issue and lack of publications made it impossible to return to academics after 5 years. I also understood that breeding alfalfa would impact more growers' programs and that has always been my goal. My father was an extension agent and helping others be successful has been one of my professional goals. I hope that the products that our team provided accomplished that goal.

(DU): When I started in Wisconsin (33 years ago) and saw the need to translate research results to farmers.

#### **4. Advice to younger faculty / scientists to balance life demands of teaching / research / Extension (outreach to customers and colleagues) while securing / defending funding for labs, field plots, publishing / product promotion, administrative demands, and still have a home life?**

(MB): It is hard to do. Utilize a departmental mentoring committee! Talk to faculty who have more years on the job, from time to time. Ask them what you should be attending and why for professional development. Learn to say "No" sometimes. Finish what you start before taking on more, if possible. Develop both a Work and a Life Plan. If your family is telling you that you are neglecting them, you most certainly are... then rewrite your Work and Life Plan and stick to it.

(DC) Never give up. Those tedious annual reviews and P/T reviews are to be reflected upon seriously by their authors – if you are performing well at work, you must insure that you are also successful at home and in relationships. Surround yourself with successful peers.

(SF): Really tough on new faculty because changes due to moving (death, divorce and moving are the most stressful issues in life) to a new location, new job and new people. Need to be true to yourself and the goals you've set for yourself. Need to do your job with the greatest integrity because producers / others depend on your expertise. But you must also guard home-life time, so both are nourished. Set your priorities and dig your heels in the ground firmly.

(DH): It's mostly impossible. We have all sacrificed home life. Administration pretends to care but makes continual demands on young faculty. This is especially problematic for forages, since technician and Hatch project funding has declined precipitously over the decades. Advice to younger faculty is to reach out for help from established faculty to allow joint publications and participation in grant supported projects. Initiate a needs assessment among clients you will be serving; farmers and ranchers, state and regional forage associations, NRCS, SWCD. Read forage and agronomy association documents on priority research areas. Focus. Don't let phone and email determine your days. Start early in the morning with emails. Turn it off, phone and email after 2 hours in the morning and do something useful for 2 hours.

(DM): Balancing your home life and work demands can be difficult, especially early in your career. However, you have to make time for the family. Without their support, work becomes very difficult. During the early years of your career there are a lot of demands on your time when you are trying to establish yourself in your new position. There is a tendency to agree to take on more projects than you actually have time to complete. It is very tempting to work extra hours during day and even on the weekends to complete these projects, often at the expense of your family life. However, you have to learn to prioritize your work load and realize you don't have to take on every project that comes your way. Sometimes you have to learn to say "No" to non-critical projects. One other thing I found helpful in balancing home life with work, was to whenever possible, plan family vacations around work related travel. If you have a professional meeting in some other state or country, extend that trip a few days to include a family vacation at those locations. This can be a memorable event for the family, allowing everyone to see and experience new places and cultures.

*Advice to younger faculty to balance work and life...?*

It's mostly impossible. This is especially problematic for forages since funding has decline precipitously over the years. – DH

- (MO): Remember that even though your career is your passion, and you enjoy your work, it is still "just a job." Do not make a habit of bringing your work home. The most important thing in life is your relationship with your spouse, family, and friends.
- (DP): OK so this is a tough one. Very clearly young faculty and scientists have a hard time with balancing life and work. I certainly have had a hard time with this, for sure. Perspective is always important – one of my (senior) faculty colleagues early on kept saying to me 'smell the roses' as I was rushing out of the building, which was of course, good advice. To live for the moment and value each moment, and have perspective, since one's 'job' is not the only thing that critical in the larger scheme of things. For me, family always came first, but perhaps many times I was not able to follow through with this. Eventually, I've taken a strategy of 'just this, no more' – so that I will routinely work a specific number of hours per day and per weekend (lots of hours), but when done, it's done, turn the channel to family, recreation, meals. As a lesson, I'm reminded of a senior faculty member at Minnesota who (in the 1950s) was scheduled to be married – but then postponed his wedding since he HAD to put his experiments in that spring. Understandably, she flew the coop. Predictably, he never married, lifelong bachelor, made many excellent contributions to agriculture – but at what cost? This served as an important example of the importance of a life-work balance. These days, I count my relationship with my wife, children, and grandchildren the deepest reward of a career. Here's the advice – don't miss out.
- (GS): Unless you are exceptionally organized, you will likely not be successful doing 8-hour work days. Narrow your focus to a few projects with a high likelihood of success with cooperators. Keep working until you reach a stopping place for optimum efficiency. For me, that was never at 8 hours per day.
- (MS): Set your long-term goals early and stay true to them throughout your career. Everyone has a different balance between home life, colleagues, and work and that balance will have to be found early. Just remember family is always number one in that balance.
- (DU): Young scientists should establish themselves in research and/or teaching and then move into extension when have some years of service. Research and teaching are familiar to faculty and they feel comfortable evaluating, not so with extension.

5. **We have seen issues come and issues go over a long forage career. With fewer trained forage agronomists today (compared to when we were trained) and knowing new issues will be forthcoming, how can we (as 'retirees') help those producers, who ultimately pay the price / receive the benefits from our work, so our grandkids can enjoy the same high-quality animal products / bioenergy that we have during our lifetime**

- (MB): Be open to letting younger faculty know that you are always available to help replacement faculty out; much like an experienced farmer helping-out a younger generation farmer. Replacement faculty will be working with their area's producers. We need to offer to share our knowledge and experiences.
- (DC): Producers and commodity groups should encourage the new generation to involve the old scientists in field days, conferences, etc. ("Encouragement" might mean simply an invite, or might include some travel expenses). There are a few great examples I've seen, including Dr. Joe Bouton is still very involved with the "Alfalfa in the South" program (which itself has a great cadre of excited young forage scientists). A couple of seed companies still keep Dr. Dan Undersander in front of producers.
- (SF): Use your creativity and mind to develop solution and strategies for those issues and changes that happen. Be open to learning new areas that intersect with the forages that you grow, e.g., biofuels from grasses. I learned so much from the chemical engineers and they also learned from me, so together we could make progress better than working independently. Keep an open mind and level of curiosity.
- (DH): Identify farmers and ranchers for frequent conversations; at their property or coffee shop. Ask about their immediate issues and their opinions about important issues. But, remember, you need more than an immediate need perspective. Look for medium-term issues. When promoted to full professor, you can focus on longer-term issues. Important issues include nitrogen (adequate but not excessive and use of legumes) and water (species and cropping systems that are water use efficient). Get informed about GHG, especially methane in animal agriculture; most of the information in the public domain is incorrect. Do the work to learn what's real and what's politically expedient.
- (DM): I think many retirees still want to contribute to our industry in some way. It would be a shame that all those years of experience and knowledge was not utilized in some fashion. Below I have listed several ways I feel the knowledge and experience of retirees can be utilized, helping to fill the void of trained forage agronomists and research personnel. A retiree can pass on their knowledge and experience to future generations by: 1. Continuing to work in your current position, but on a part time basis, 2. Work as a consultant, 3. Make yourself available as a guest speaker at forage events, 4. Write articles for national and regional forage publications, 5. Write or contribute to chapters in forage text books, 6. Teach a forage course or give guest lectures at universities, 7. Conduct "Zoom" type training seminars on forage topics for grower meetings, 8. Provide technical support as an advisor for forage seed companies, 9. Advise national and regional forage organizations on forage related projects, 10. Collaborate with state researchers on forage grants, 11. Act as reviewer on forage related scientific articles, 12. Conduct seminars on the web or YouTube on various forage related topics.
- With fewer players, how to be effective extensionists in the future...?*  
The revolution in communications, which brings information to every corner of the globe is highly beneficial to further research and knowledge. – DP
- (MO): I would encourage the current forage agronomists to band together, get to know each other, and establish some sort of formal communication network to support each other.
- (DP): There have been profound changes in the issues facing agriculture, and there will continue to be large changes looming in the future. Economic viability is the key one, and has always been. The smaller number of farmers and even smaller number of researchers will be a big challenge. However, the revolution in communications, which brings information to every corner of the globe is highly beneficial to further research and knowledge. Fewer participants will mean covering more with less – but there is technology that can help with that. We clearly have a paucity of people intensely interested in agricultural sciences, especially applied – and need to reach out to non-traditional and diverse people who can dive into solving problems of the present and future.
- (GS): There is an abundance of "snake oil" products on the market. Producers should ask for verification by Land-Grant University studies. If something sounds too good to be true, it probably is! Salesmen who claim ounces of product per acre can significantly increase production don't pass the smell test,

when you are exporting 100's pounds of nutrients with each season. A basic problem is that private industry crop advisors—although knowledgeable—are paid by sales numbers, not how they help producers make profit.

(MS): We retirees must remain vigilant and active after retirement to ensure the forage industry remains viable with continued improvements that match future needs. Both industry and academics/extension forage positions continue to be lost, which should be a concern to all animal producers. All of us will need to advocate for funding of these lost positions. When I started as an alfalfa breeder, over 20 industry research programs existed. Today, there are 4 and 2 of those are for sale. Same goes for academic research and extension programs located throughout North America. Today a handful exist and those are in Minnesota, New Mexico, and California and are all in danger of being defunded. NAFA has been the voice for forage producers and the checkoff program has assisted in keeping forage research funded. Future projects need focus to ensure forage needs are met with the limited funds. We need to all advocate and support NAFA's efforts in Washington DC.

(DU): This will continue to be a challenge since funding for production agriculture (both for agronomy and animal sciences) is slim and declining. A few thoughts: 1. Use of the web for information has increased greatly and will continue to do so, 2. Use of various distance education techniques (such as Zoom) will increase, 3. Farmers will have to follow the European model and get information from paid consultants or industry (while buying product from a company)

**6. What advice can you share with future forage agronomists / beginning forage producers, that can be viewed as a yard stick to monitor their progress, as they approach mid-21<sup>st</sup> century and beyond?**

(MB): Work with your local clientele to form and nurture a forage association either connected to NAFA or AFGC (or both), if there are none working in your geographic area. The need of and future success of a forage association is a two-way street and a win-win situation for the University and producers. We need and benefit from each other. Then utilize their association boards as advisors. Concerning research (and could work for Extension), an OSU Crop Science Dept. professor's advice was to write your research article before you planted the trial and use it as your guide and then all you had to do was fill in the numbers in the already set up tables and maybe edit a bit.

(DC): Producers have straightforward metrics – improved bottom line, better ADG on pasture, etc. In my opinion a successful forage agronomist should accumulate a portfolio of ag producers that have become successful by those metrics. The icing on the cake is when that portfolio leads directly to publications and future grants (academic metrics).

(SF): Nothing stays static. Our producers change, politics changes, we change. But our goal is to make things better for the future generations. Progress demands we monitor and record what has been done so we can review those differences today. Our minds tend to play tricks and forget so writing things down brings us back to reality, we can then determine if progress was made. In forages we work with Mother Nature, the government, and constant changes every day. This keeps us motivated so make a daily list of tasks to be done, work on a calendar basis on what needs are coming up and prepare now for months / years ahead. Ask colleagues for help and provide help to them when not even asked. And try to have fun, even on the worst days!!

(DH): Get a copy of the promotion and tenure requirements (metrics) for your institution. Focus on making sure each requirement will be met within 5 years. Partner with colleagues for joint publications. Identify a signature area you will be known for Identify a support staff individual who can help you write progress reports. Ask for help!

(DM): I think there is always a tendency to stick to what has worked in the past and not push the envelope and try new things. Young agronomists and producers must be willing to move forward and try new technologies or they will never improve alfalfa production and/or increase the alfalfa producer's profits. Progress is difficult to obtain if you do the same thing year after year. When I think back in my career of how hard it was to get some farmers to try new technology or a new improved variety, I

often refer back to a story that my old boss Dr. Bill Melton told me about a farmer in New Mexico. Dr. Melton was trying to convince a farmer to try a new variety he had just released. This farmer had always planted an alfalfa variety called “Zia” that his father had used and he didn’t think there was anything better. Finally, Dr. Melton gave the farmer a bag of seed of his new variety “Mesilla” and told the farmer to plant it next to the old variety. The next year the farmer came back and said the new variety significantly outperformed the old variety and the new variety was what he was going to plant from now on. Ten years later Dr. Melton released another new variety and when he approached the same farmer about trying the improved genetics, he got the same response he got ten years ago. The farmer didn’t want to try the new variety, since surely nothing could be better than the variety “Mesilla” that he had been growing the last 10 years. I think this illustrates the point that if we want to make progress, we need to consider new things and not be comfortable with the status quo. It’s hard to measure progress if you don’t do anything different. New forage agronomists and producers must be willing to try new things and conduct appropriate comparisons to see if progress can be made using new technologies and/or improved genetics. Compare apples to apples, and see if there are measurable improvements. To document any progress, you need to keep good records of your testing procedures and the materials used. These records will help you measure, evaluate, and interpret any progress that has been made. Not everything you try will provide a benefit, some will and some won’t. Often it is just as important for you and the producer to know what didn’t work and why. If you keep accurate records, you will be able to document and quantify any progress that was made. These year-to-year records will provide a new forage agronomist and/or producer an archive of records by which they can measure their progress overtime. Progress is sometimes hard to see in just one year, especially with a perennial crop like alfalfa. Measuring your progress overtime will often provide a better evaluation of your progress. Forage agronomists and producers must also be aware that progress can be measured several ways. Did your recommendations or changes to the farming operation result in an increase yield or forage quality? Did it reduce input costs, add persistence, or just increase the overall profitability of the farming operation? If any of these have been achieved, you have made progress.

(MO): Extension Agronomists need to do a better job of measuring the impact of our programs. This can be done by using yield, quality, or changes in production practices as a yardstick. For producers, the yardstick could be profitability, consistency in production of a quality product, and/or reduction in the environmental impacts of agriculture so that succeeding generations can follow in our footsteps.

(DP): We need visionaries and imaginative people who are rooted in agriculture but not afraid to ask important hard questions and examine real problems. Focus on what’s useful but also long-term. What is the sustainability of our irrigated systems, or how can they become more sustainable? Can forages contribute important environmental benefits that are now not appreciated but can be monetized? How can farmers reduce costs to survive economically? What about mitigating and adjusting to climate change and greenhouse gasses (and regulations)? Can forages produce both food products and energy products? Future researchers should always build upon the history of research and ‘what’s known’ but not be afraid to plow new ground and challenge the conventional wisdom. While some previous findings are worth repeating, we need to keep asking new questions. In terms of a ‘yardstick’ don’t measure by publications or money, but whether what you are doing has an impact and are leading to innovations in agriculture and whether people benefit from your work. Some of the key issue for western agronomists and farmers will be limited water and ‘how to produce more with less.’ The goal should be ‘sustainable intensification.’ Crop scientists have a key role to play, in cooperation with progressive farmers and industry partners to envision these highly productive, environmentally-beneficial cropping systems for the future.

*What is your advice...?*

All agronomists should have clear, measurable goals. – DU

(GS): Forage agronomists: 1. Seek stakeholder (producer and industry) input, 2. Identify a research project that will solve a problem, 3. Organize a collaborative core of specialists, 4. Prepare a successful grant application, 5. Plan to be successful and be prompt and don’t procrastinate the

project, 6. Report on time and with nuggets of preliminary results, 7. Complete the project on time, apply for extension if reasonable, get the science published and create the extension products.

(MS): Beginning forage producers - Do your research and due diligence from the start. Watch data quality, look at long term yields and not individual studies. Forages are adaptable to many environments but no one variety fits all programs. Try different products and always look for future improvements that fit production needs. Forage agronomists – You’re the future of the forage industry. Push to make gains through management practices, continue to show how forage benefits to the environment, use your imagination and find the many unknown uses of forages that are critical to the industry stakeholders. Stakeholders – we need to be advocates for forage research funding to exist into the future and beyond.

(DU): All agronomists/forage producers should have clear, measurable goals. Measurable is a key component – what was yield, quality, etc. The goals should be evaluated and potentially changed every 5 years.

### SUMMARY

The words spoken by these ten retiring forage agronomists and specialists, regardless of their positions during those 30 and 40+ year careers, speak from the heart and their own experiences. Many common themes can be found in some questions, in large part because of the forage crops we work with. For other answers, there is a wide diversity of responses, again due to the diversity of the forage crops we grow. Part of what likely attracted each of us, in different ways and reasons, to forages is the uniqueness, resiliency, adaptability, the unassuming role but giant importance to so many other industries and the food supply chain, how they can change but still stay the same in different environments, their continued persistence of asking us to discover what other secrets they still possess. One common thread among these ten retirees, they all loved going to the field and observe that bond between Mother Nature – the forage plant – the research objective – the producer need / issue – the challenge to figure out what is right and what is wrong. Each draw upon their accumulated expertise but always has other colleagues to ask for a second opinion. We hope these experiences and recommendations will be useful to the next generation of forage agronomists, forage plant breeders, Extension faculty, ag industry scientists, and the generation of producers who will be supplying food to our grandkids and great grandkids. Good luck and have fun as life is pretty short. So, as one retiree commented “Don’t forget to smell the roses!”

*What is your advice...?*  
Don't forget to smell the roses.