Reports

At 1:00 PM, the **Research/Demonstration Directions and USDA Agency Reports** began. James Cropper moderated this session. Tom Griggs led the session off with the *Dung Beetle* report on research and education needs. Below are the group's findings:

NEEDS:

- Need for educational resources in terms of parasite control that lessen impact on dung beetles. (i.e., Fact Sheet, You Tube videos, a web "guide to dung beetles" – NC – Traps/on-farm monitoring)
- Pasture Walks
- Parasitoids that work in barns and feeding areas, but not in dung patches in pasture
- Database on various modes of action for treatment (Insecticide Resistance Action Committee?)
- Advocating for more research on "modes of action" on insecticides.
- IPM updates from PSU/Cornell
- Management Methods/Cultural Controls
- Dung beetle dispersion rates research needed
- Connection to Soil Health/Nutrients/Biology
- The Impact of Climate Change on dung beetles
- Funding Opportunities
 - CIG Nutrient Management/IPM /Soil Health
 - NESARE
 - Match Salaries, Farmers
 - CSP Enhancement

What can we do/Promote?

- On-Farm demonstrations/monitoring
 - NRCS CIG program- Nutrient Management, IPM, Soil Health
 - USDA CSP Enhancements could also support Dung Beetle through on-farm demonstrations
 - NESARE Farmer Grants Programs
 - Survey to assess conditions/baseline
 - Youth Program (4-H, FFA)
 - Flotation method, education, monitoring
 - Training on methods of trapping and monitoring
 - Along fence line? Bait made by scooping dung into paper towel then freezing
 - Delay rotation with chickens following cattle wait for a few days for beetles to burrow
- Pheromone Traps?
- Molecular Study of Fly vs Beetles vs Grasshopper

The next report was given by Dr. Geoff Brink, Research Agronomist, USDA-ARS, U.S. Dairy Forage Research Center, Madison, WI. He covered the *Orchardgrass Die-Off research and demonstration needs* concurrent session.

Needs:

- 1. Variety evaluation based on seed origin, including older varieties, to gauge susceptibility to premature loss of stands.
- 2. Evaluation of harvest management practices
 - a) Cutting frequency and timing
 - b) Cutting/grazing height effects a various times throughout the growing season
 - c) Early versus late cut for hay
- 3. Involve grass breeders in efforts to ascertain cause of premature die-off Dr. Michael Casler at US Dairy Forage Center, Edzard van Santen at Auburn University, and the Oregon Orchardgrass Seed Producers Commission

Current Research:

- 1. Gordon Jones' experiments at Virginia Tech
 - a) Fertility variables with best management practice harvest management
 - b) Orchardgrass, orchardgrass/alfalfa cut at 4 heights (2, 4, 6, 8 inches)
 - c) Growth chambers temperature by cutting height interactions
 - d) Literature review of 18-year experiment early versus late first cutting by cutting height on regrowth
- 2. Sid Bosworth summer cutting heights

Action Items:

- 1. Gordon Jones reports results of doctoral experiment work at next conference.
- 2. Update Mid-Atlantic Orchardgrass Task Force with report and presentation.
- 3. Ask Marvin Hall to more closely monitor stand persistence in orchardgrass yield trials.
- 4. Summary of potential research directions sent to Experiment Station Directors and Extension Directors as part of the Northeast Pasture Consortium reports.
- 5. Evaluation of historical weather data to assess stress periods across the Region by Gordon Jones and Dr. Edward Rayburn, WVU.
- 6. Sid Bosworth will evaluate current plots and consult with Gordon Jones regarding summer defoliation management.
- 7. If funds are available, conduct experiment using variety by management by environment variables. Pathogen impacts should be noted.

Dr. Peter Kleinman gave the *Riparian Pasture Grazing Management to protect water quality* concurrent session report.

Needs:

- 1. Explore the impacts of changing landuses in riparian areas on ecosystems services. Weigh the pros and cons that impact both the farmer and resource health. Do ungrazed grass buffers add any measure of additional water quality benefits over a rotationally grazed pasture? Are forested riparian buffers superior to grassed buffers? Or, do they have different attributes that make either one an effective tool depending on the circumstance?
- 2. The first audience that needs to be trained in riparian area management are the various state and federal agencies involved in environmental policy making, regulation, and financial and technical assistance.
- 3. In Karst topography areas that are pastured, best management practices need verification that

they do in deed have an impact on reducing contamination of groundwater.

- 4. For exclusionary fencing along water courses or bodies, there needs to be a more comprehensive set of prescriptive measures on when and where to use either permanent fencing materials or portable fencing materials. To cut down on livestock access to a stream with a floodplain, will a single fence on just one side be effective enough to limit direct contamination? Half the cost to install and maintenance required of fencing both sides.
- 5. Develop a framework for riparian area conservation planning.
- 6. Build a tool to help planners arrive at alternative plans to protect pastured riparian areas that meet landowner objectives and TMDL goals.
- 7. Build a predictive model that shows the impacts on ecosystem services based on a suite of best management practices or alternative suites of practices being proposed or evaluated for a site.

Current research and synthesis work:

The Pasture Systems and Watershed Management Research Unit and the Pennsylvania State University Riparia Center have formed a Riparian Conservation Team. This is a 4-year project. They will develop and test a Riparian Conservation Planning Tool during this time.

Dr. Andre Brito followed with the report for the *Supplementation of Dairy Cows to enhance omega-3 content in milk* concurrent session.

Needs:

- 1. More research on why grass pastures increase omega-3 fatty acids and lower omega-6.
- 2. Cow supplement research to cut down on nitrogen excretion and methane output from grass fed dairy cows.
- 3. Effect of annual and perennial forage dietary choices on fatty acid and protein composition in milk and animal performance reproductive efficiency, methane generation, milk flow.
- 4. To counter high feed costs in supplementing lactating dairy cows, develop low cost supplementation rations that still produce the desired effect on fatty acid and protein composition and milk flow while decreasing nitrogen excretion and methane emissions.
- 5. More collaboration among animal scientists, plant scientists, soil scientists, and milk chemists to produce milk with the desirable fatty acid and protein composition. For instance, cheese properties are affected by lactating dairy cow diets due to the protein composition of the milk. If the right kind of raw milk is produced, how does homogenization and pasteurization affect the desirable milk components?

Current on-farm and university research work:

Several different projects have been done by Dr. Kathy Soder and Dr. Andre Brito with other collaborators for some time now and presently for both organic and conventional dairy farms on supplementation of barn fed and pasture fed dairy cows. Other studies have looked at molasses and beet pulp supplementation of dairy cow rations. An all pasture diet tends to fall short of net energy of lactation requirements; therefore, requiring energy (carbohydrate) supplementation.

Funding has been primarily through the National Institute of Food and Agriculture research grant programs, such as the Organic Agriculture Research and Extension Initiative (OREI), and Sustainable Agriculture Research and Education (SARE) program.

Mr. Eric Noel, Chair of the Northeast Pasture Consortium Stakeholder Action Committee, presented the next concurrent session report, *New Forage Crops & Varieties to enhance and extend pasture productivity*.

Needs:

- 1. New varieties of warm season annuals that are suited for grazing to fill the gap created by the summer yield depression of cool season perennials for beef and dairy cattle.
- 2. University research trials on brown midrib nonearing corn which tillers profusely.
- 3. University research trials on brown midrib (BMR) dwarf pearl millet higher leaf to stem ratio, better standability (less lodging), high digestibility, and extensive tillering makes it a good grazing forage.
- 4. University research trials using different means of preparing forage seedbeds on lake-laid clay soils. Mr. Noel has a 5-acre plot using three techniques of preparing forage seedbeds: (1) rota-vator, (2) field grazed, subsoiled, and lightly tilled, and (3) grazed, subsoiled, and no-till seeded.
- 5. Investigate the use of tree-of-heaven as a drought hedge. (Editor's note: Although tree-of-heaven is very drought tolerant, it is an invasive plant species propagating itself by prolific seed production (>300,000 wind-dispersed seeds per mature tree annually) and vegetative reproduction by suckering off roots of mother trees. It is extremely difficult to eradicate once established.)
- 6. Fertility trials on annual warm season grasses to investigate what rate is needed to keep them adequately fed with nitrogen during successive harvests.

Current on-farm and university research work:

Dwarf varieties of millet, sorghum, sorghum-sudangrass, and sudangrass have been developed with the BMR gene inserted in them. The dwarf varieties have shorter stem internodes than the conventional varieties. There are four major annual warm season grass breeders in the US currently developing these new varieties. The dwarf varieties, except for sorghum, tend to make better grazing varieties as they are leafier and tiller more. The BMR varieties have improved forage quality over the non-BMR ones, having more sugar, digestible fiber (less lignin), and protein. Dwarf variety yields are lower than conventional varieties, but with their improved quality, produce similar or better livestock performance. MasterGraze corn is a new grazing BMR variety that is non-earing and multi-tillering. Its stems have a high sugar content. It is ready for harvest in 60 days.

Mr. Don Wild, Wild Acres Family Farm and Stakeholder Action Committee Liaison to the Executive Committee, gave the *Goat and Sheep Parasitology progress on pastures* concurrent session report.

Needs:

- 1. More genetic resistance to stomach worms in sheep and goats.
- 2. More persistent forage varieties with condensed tannins in them, such as birdsfoot trefoil, that act as natural dewormer feeds. Birdsfoot trefoil has the right kind of tannins, but is not as persistent as it could be with more resistance to disease. Seedling vigor improvement would also be a plus.
- 3. More producer awareness of the loss of sheep and goats to meningeal brain worms (*Parelaphostrongylus tenuis*) that are hosted by wild deer populations. These worms can cause

high mortality rates in flocks infected by them. Wormers must be administered to reduce losses.

Current on-farm and university research work:

West Virginia University, in cooperation with Virginia Tech, is running trials on crossbreeding hair sheep, such as Texel, Katahdin and St. Croix, that have a natural resistance to stomach worms with wool sheep, such as Dorsets and Suffolk. Genetic selection of ewes and rams that have a genetic resistance to worm infestation is also being done. WVU researchers prevent new infections by keeping sheep on raised metal floors. All their feces fall through the floor, so if there are eggs in the feces, they cannot get reinfected with worms from their feces. They have also fed fishmeal to sheep and got an immune system response to it. They are also feeding some small doses of copper to sheep that act as a wormer without also being toxic to the sheep. Birdsfoot trefoil is being fed to small ruminants in a study being conducted cooperatively among WVU, Cornell University, Rhode Island, and the University of Maine to see how well its condensed tannins control worm infestations.

Action items:

- 1. Letters of support from the Northeast Pasture Consortium when Dr. Scott Bowdridge applies for research grant money.
- 2. Follow-up to get updates on WVU and other cooperating land grants' work on parasite control.

Ms. Jennifer Colby reported on the concurrent session, *Energy Audits on Grazing Farms using the Self-Audit Form*.

On-Farm Demonstration Needs:

- 1. More energy audits of Northeast Pasture Consortium farmer members to fine tune the self-audit form.
- 2. Energy use of all terrain vehicles needs quantification for the tool similar to what was presented for tractors since ATV's are commonly used on many farms, especially grazing ones.
- 3. Subsoiler energy use needs to be quantified as well since they exert a heavy draft on tractors that pull them above that of other tillage implements.
- 4. Further background information needs to be put in the modeling tool.
- 5. Initiate a website for grazing farms energy audits.

Current demonstration work:

See Results of Energy Audits on Grazing Farms in Northeast US session beginning on page 18.

USDA-Agricultural Research Service Report

Dr. Peter Kleinman, Research Leader at the Pasture Systems and Watershed Management Research Unit at University Park, PA led the presentation by ARS. The Research Unit has seen a fifty percent increase in their budget. This is due to their being a Long Term Agro-Ecosystem Research (LTAR) for the Upper Chesapeake Bay drainage basin and the Northern Crescent Farm Resource Region (encompasses the northern Great Lakes States to northeastern MN, the Susquehanna River basin, Delaware River Basin, and the Hudson Valley, and New England). LTAR will conduct comprehensive research that supports the development of agricultural management practices and systems that improve ecological integrity and heath. LTAR will provide a framework for assessing agricultural economics and sus-

tainability at the scales relevant to producers, agribusiness, policy makers, and society as a whole. LTAR will coordinate the assessment of agricultural production, sustainability and resilience across multiple scales. LTAR will coordinate the development of improved varieties, crops, management practices and systems that are resilient to anticipated variations in climate. LTAR will coordinate research that links production practices, climate variability and land use change on water resources across broad spatial and temporal scales. To this last end, Dr. C. Alan Rotz is involved in Climate Change work as a modeler. The Research Unit is a part of the Northeast Climate Hub. Dr. Howard Skinner is a co-leader in that effort. They are looking at agriculture vulnerability to climate change.

Dr. Geoff Brink, Research Agronomist at the Dairy Forage Research Center (DFRC), Madison, WI, reported on their work there. A dairy initiative at the DFRC is research to maximize nitrogen and phosphorus utilization (and minimize loss) as a major goal. Some confinement dairy farms are facing lawsuits due to their alleged pollution of groundwater. An example of their products is a fact sheet, *Snap-shot assessment of nutrient use efficiency on confinement dairy farms*. Dr. Brink has published several research papers on pasture management that have added greatly to our knowledge on how to manage short duration rotational stocking of livestock and some of the ecosystem services that those pastures provide, such as protecting water quality from nitrogen, phosphorus, and sediment runoff.

Diane Van Hekken, Research Chemist at the Dairy and Functional Foods Research Unit, Eastern Regional Research Center, Wyndmoor, PA, reported on their work. They are embarking on their next five year program. They will be looking closely at biologically active compounds in milk and how they are affected by processing procedures, such as pasteurization. They will also study the effect of processing milk has on its bioactive compounds in fresh high-moisture cheeses. They will be installing a simulator this year that emulates how people digest milk products. They will be studying mature adults' ability to digest milk products first.

USDA-National Institute of Agriculture and Food (NIFA)

Dr. Jim Dobrowolski spoke in person this year. He is the Program Leader for Water, Wildlife, Pasture, and Range at NIFA. His formal presentation was *Beyond NIFA's Integrated Programs: Requiring Stakeholder Co-production As An Incentive To Link Science With Management*. He observed that "Practitioners who look for 'actionable' knowledge seldom refer to academic research." Therefore NIFA is encouraging integrated programs in their funding grants to get research, education, and extension functions together to solve a problem area or issue. Research, extension, and education components complement one another and are truly necessary for the ultimate success of a project to solve an issue with answers and action. Research should fill knowledge gaps that are critical to the development of practices and programs that will address the problem properly and really solve it. Education should strengthen institutional capacity and curricula and train the next generation of scientists, educators, practitioners, and citizens in the techniques that truly solve a problem. Extension should lead to measurable documented changes in learning, actions, or conditions in an identified audience or stakeholder group, such as pasture-based farmers. Integrated projects have these important characteristics: Stakeholder Driven (just how much)?, Problem Focused, and Outcome Oriented.



Dr. Dobrowolski went on to explain what co-production means:

- Co-production means delivering public services with people rather than to them;
- It implies an equal relationship between professionals, the people using the services, their families and their neighbors;
- When public services are delivered in this way, the services themselves and the people who use them, become far more effective agents of change.

NIFA has tailored the Agriculture and Food Research Initiative (AFRI) Coordinated Agricultural Projects (CAPS) to use the co-production concept of requiring a management plan and having project teams with stakeholder advisory boards (true co-production?) or involving stakeholders in planning and executing research, education, and extension functions. Another NIFA program, the National Water Quality Program, required an evaluation plan from the beginning. Without an evaluation plan, the project is not reviewed—a model for forcing the issue toward Co-P? It certainly brings into focus that results must occur as an outcome of research, education, and extension. We need to know what we want to achieve and why. What rangeland/pasture issues are you trying to address that will deliver to management (methodology that, and the people who will, actually be instrumental in solving the issue)? How will a project help address the issue? How will you evaluate the impact of your project? Ask yourself "So What?" Co-production as a part of impact is the quantifiable difference a project makes in the quality of life for clients, citizens, or stakeholders. In other words, what will be different as a result of your project? Did management change the situation for the better? What are the project activities that will lead to the desired impact(s)? Do they include research? Do they include extension? Do they include education? Do they include building relationships? Develop a strategic response:

- Research: What are the knowledge gaps?
- Education: How will you train the next generation?
- Extension: How will you reach those who need the information?
- Co-P: How will this work relate to management?

Dr. Dobrowolski then moved on to show how convergence of disciplines was also an essential part in getting a funding grant approved. Applying the concepts of convergence:

- How they apply to rangeland and grassland issues;
- How they apply to NIFA's funding portfolio.

Convergence is the merging of technologies, processing disciplines, or devices into a unified whole that creates a host of new pathways and opportunities. Citing Sharp et al (2011), "It involves the coming

together of different fields of study—particularly engineering, physical sciences, and life sciences through collaboration among research groups and the integration of approaches that were originally viewed as distinct and potentially contradictory." Citing Wickson et al. (2006), Dr. Dobrowolski defined transdisciplinary: Engaging with different ways of knowing the world, generating new knowledge, and helping stakeholders understand and incorporate the results or lessons learned by the research. This is the result of convergence.

He went on to say that NIFA's role is to:

- Support transdisciplinary approaches
- Fund rangeland and grassland science, education and outreach innovations in the realm of convergence
 - ✓ Disciplines of soils, hydrology, biology, chemistry, nanotechnology, robotics, engineering, computational science, teaching, social sciences, others
- Identify opportunities for convergence
 - ✓ Science to address societal challenges
 - ✓ Structures to facilitate transdisciplinary interactions
- Evaluate if convergence is occurring
 - ✓ Supporting culture, environment, structures, opportunities

As an example of applying convergence, he cited the Cropland Watershed CEAP Synthesis: Transforming Knowledge for Evaluating Impacts of Conservation Practices on Water Quality, Improving Management of Ag Landscapes (NC State and 15 other institutions):

- Over 150 years of watershed and water quality (WQ) experience, with specialties in WQ monitoring, agronomy, soil science, biological and ag engineering, rural sociology, economics, statistics, and modeling.
- Assess and plan conservation practices at the watershed scale for better WQ outcomes; identify pollutants of concern and sources before selecting practices; prioritize practices in critical areas; select and apply practices effective for pollutants of concern; adoptable and maintained; keep track of practices for assessment, treatment needs; and establish monitoring protocols specifically for WQ changes from practices.

How will we know if convergence is working? Network of NIFA-funded rangeland and grassland science researchers today and ????? (Editor's note: This may be more a matter of funding dollars available for applicants. Many more applicants than money to go around causing feast and famine for each applicant depending on their ability to write impressive proposals.)

Challenges and opportunities for NIFA's rangeland and grassland programming:

- Challenge: Maintain balance between fostering transdisciplinary research and maintaining robust disciplinary research.
 - ✓ Opportunity: Include a convergence option in AFRI Foundational BENRE Program
- Challenge: Provide opportunities to interact formally and informally.
 - ✓ Opportunity: Focus annual project director meetings and special symposia on convergence, encourage teams of researchers.
- Challenge: Identify rangeland and grassland as potential areas for convergence cultivation and evaluation.
 - ✓ Opportunity: Fully develop data management tools to help elucidate where rangeland and

grassland activities across government converge to have the greatest impacts on societal challenges.

NIFA is working to make rangeland and grassland studies one of the defining issues:

"I know many of the issues on rangelands and grasslands....just their prominence as a land type in the U.S. and the world helps to ensure their place as an important part of NIFA's portfolio."—Sonny Ramaswamy, NIFA Director.

Potential Funding for Rangeland and Grassland Issues:

- AFRI Foundational
 - ✓ Invasive Weeds--herbicide resistance, ecology (\$5M)
 - ✓ Bioenergy, Natural Resources and Environment—N&P cycling; biodiversity and ecosystem services (\$9M)
 - ✓ Environment and NR Economics—economic impacts or implications of ag. and mgt. on the environment (\$5M)
- Climate Variability—Climate resilient land use for agriculture and forestry (\$5M) (Editor's note: Humid East pastures are resilient.)
- Alfalfa and Forage Research Program—improving alfalfa forage and seed yield; persistence; harvesting and storage systems; quality of alfalfa as animal feed; and breeding to address abiotic and biotic stresses on production and seed yield (\$1.3 M, FY 2014)
- Renewable Resources Extension Act (\$300,000)—Rangeland eXtension web presence.

USDA-Natural Resources Conservation Service (NRCS)

Mr. Sid Brantly, National Range and Grazing Land Ecologist, Washington, DC, gave the NRCS report. He started with an analogy saying that grazinglands specialists are in the patrol car and walking the beat. Across the Nation there are 375 full time grazinglands specialists and a 1000 more that spend 50% of their time roughly on grazinglands issues. These numbers are slowly shrinking. As witnessed by the East National Technology Support Center in Greensboro, NC, they have only one grazinglands position filled out of three on paper. The 1985 Farm Bill was the catalyst for the hiring of more grazinglands specialists. At the time of its passage, there were only 240 grazinglands positions, nearly all west of the Mississippi. However, the 2014 Farm Bill has a flat-lined budget and the Grassland Reserve Program has been folded into Agricultural Conservation Easement Program (ACEP). Since it has been folded into ACEP, it lost some of the funds it had been receiving as a stand-alone program. Meanwhile, the Conservation of Private Grazing Lands (CPGL) that was established in the 1985 Farm Bill and then authorized to spend \$60 million annually in the 1996 Farm Bill has languished. This authorization of funds for CPGL was never met with any appropriations in any fiscal year, but instead what money was used for grazing lands came out of the Conservation Operations Program that provides conservation technical assistance to landowners and operators on all landuses. Until recently, this was better than nothing until it became nothing specifically allocated and dedicated to grazing lands technical assistance. It is now up to the State Conservationist in each State whether or not they have people on staff to provide technical assistance on grazing lands. Conservation Operations appropriations have been dwindling year after year. This is where conservation technical assistance comes from so unless CPGL gets funded separately, the future is not bright for grazing lands technical assistance.

Ecological site description work continues on rangeland and forestland sites. Eighty-five people has received training on doing site descriptions. Training of NRCS people also continues on pastureland is-

sues. Susan Parry, PA-NRCS State Grassland Specialist, who is member of the NEPC Executive Committee, is an example.

Financial assistance programs, such as the Environmental Quality Incentive Program (EQIP), are funded well. Sixty percent of the EQIP funds goes to livestock farms and ranches. Pasture issues on these farms and ranches must be addressed to qualify for cost sharing. The Conservation Stewardship Program has cost sharing assistance for pasture management enhancements.

Just completed task force recommendations on how to determine pasture soil health.

Pastureland National Resources Inventory is still on-going. Training of NRCS people to gather the data from the randomly selected sampling points across the Nation begins in April. Most of the data needs to be collected in late Spring to mid-Summer.

A new financial and assistance program created by the 2014 Farm Bill is the Regional Conservation Partnership Program. This provides grants up to \$10 million to do innovative conservation measures in a partnership with NRCS. Organizations that can partner with NRCS are:

- City or township governments
- Private institutions of higher education
- Nonprofits having a 501(c)(3) status with the IRS, other than institutions of higher education
- State governments
- Public and State controlled institutions of higher education
- Special district governments
- Native American tribal governments (Federally recognized)
- County governments

This program is available in only eight designated critical areas in the US. Chesapeake Bay is one of the eight.

This concluded the Reports Session.