



## Purdue Agricultural Centers Operating Policy

Applicable for the following locations:

Davis, Feldun, Pinney, Northeast, Southeast, Southern-Indiana, Southwest, and Throckmorton  
(including Throckmorton-Meigs Farm, Mary Rice Farm, Stuckman Farm, and Hostetler Farm)

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## Contents

Background .....	4
Mission of the Purdue Agricultural Centers:.....	5
Vision Statement.....	5
PAC Policies.....	6
I. Purpose: .....	6
II. Rationale: .....	6
III. Current Infrastructure (2014): .....	6
IV. Responsibilities and Roles.....	11
V. For the Investigator: How to Initiate and Maintain Field Research Studies.....	12
VI. Responsibilities of the PACs and Investigators .....	13
a. Communication .....	13
b. Tillage.....	13
c. Staking and Plot Layout .....	14
d. Fertilizer and Crop Protection Products .....	14
e. Seed and Greenhouse Transplants.....	14
f. Planting.....	14
g. Weed Control.....	15
h. Fungicides and Insecticides .....	15
i. Data/Sample Collection .....	15
j. Irrigation .....	15
k. Harvest.....	16
l. Woody Horticultural Crops (e.g. tree fruits, grapes, brambles).....	16
m. Organic Farming Research.....	16
VII. Disposition of Harvested Crops .....	17
VIII. PAC Facility Use and Assignment Policy .....	17
a. Assignment of Plot/Study Space to Investigators: .....	17
b. End of Experiment: .....	17
c. Revocation/Expiration of Assigned Space: .....	17
d. Assignment of Building Space.....	17
IX. Appendices.....	19
Appendix 1: PAC Field Day & Event Information .....	19
Appendix 2: Unmanned Aerial Vehicle Operations at the PACs.....	20

Appendix 3: Throckmorton/Meigs Horticulture Crops Capacities, Recommendations, and Responsibilities ..... 27

Appendix 4: Field Management of Organic Research Area at Throckmorton/Meigs..... 32

Appendix 5: Throckmorton/Meigs Agronomic Crop Responsibilities (Corn, Soybeans, Wheat, Biomass, Sorghum).. 35

Appendix 6: Feldun Capacities, Recommendations and Responsibility ..... 36

Appendix 7: Davis Capacities, Recommendations and Responsibility ..... 38

Appendix 8 Northeast Capacities, Recommendations and Responsibility ..... 39

Appendix 9: Pinney Capacities, Recommendations and Responsibility ..... 40

Appendix 10: Southeast Capacities, Recommendations and Responsibility ..... 42

Appendix 11: Southern Capacities, Recommendations and Responsibility ..... 45

Appendix 12: Southwest Horticulture Crops Capacities, Recommendations and Responsibility ..... 47

## Background

Within the College of Agriculture at Purdue University, operations and management expenses for applied research at the field level across the state are the responsibility of the Purdue Agricultural Centers (PACs). To enable the continuation of services that are efficient, effective, and of high quality for the diversity of the field and/or animal research at these locations, there is a need for a workable operating policy clearly defining roles and responsibilities.

The PACs operate within the constraints of a large number of unknowns including: seasonal labor, crop inputs, maintenance and replacement of equipment and infrastructure. The PAC administration is optimistic that the PACs can continue with facilitating high quality research in a manner that is fair, transparent, and provides the best opportunity for the acquisition of quality data from research on the land, pastures, or in confinement that is most suitable for the experimental question at hand.

Numerous experiments are carried out in the field, in greenhouses, high tunnels, or in barns/pastures at the PACs across the state. At these PACs, applied research is conducted to evaluate new pest, pathogen, and weed management strategies, production methods, as well as the development of new germplasm or crop varieties for fruit, grain, vegetable, and industrial crops. Also, the environmental impact of many of these research efforts are evaluated. Given limited increases in state line item budget appropriations over the past decade, the PACs must still find the means to continue facilitating high quality research given current staffing levels. At the same time, the expectations on Purdue University to be both an economic driver of Indiana's economy and a provider of solutions to global challenges in food security, energy, and adaptation to climate change and other areas remain exceptionally high.

Knowing such challenges, the PACs have and should continue to maintain focus on the following:

- Applied research and outreach educational opportunities have priority.
- Graduate student and post-doc research projects have priority.
- Funded research is both a priority and an expectation.
- On-site safety for PAC staff, faculty, staff, and student users and the public is a priority.
- Revenue through sale of rotational crops and a limited cost recovery structure is now required for the financial sustainability of the PACs.

**Mission of the Purdue Agricultural Centers:** To provide locations and expertise across Indiana for the development of research and ideas which will benefit producers and others involved in agriculture and land use issues.

**Vision Statement:** The PACs will be managed in a way that is most appropriate for the research being conducted and in the most cost effective, safe, and efficient manner that provides high quality data, information and knowledge to appropriate clientele. The PACs at Purdue University will strive to secure preeminence in the areas of applied research and outreach education. Furthermore, the PACs should continue to generate income from row crop and/or animal operations and will utilize all available land to provide for effective and sustainable crop rotations while recognizing that some research projects may require treatments that incorporate less environmentally, economically, or socially sustainable practices for comparative purposes. The PACs will be recognized across the College of Agriculture at Purdue University and beyond for providing high quality service that is accomplished in a timely, cost effective, and professional manner consistent with the mission of the college and policies of Purdue University.

## **PAC Policies**

### **I. Purpose:**

The PACs will develop policies outlining the services and responsibilities of PAC staff and those of investigators who conduct research at one or more of the eight PACs in addition to unstaffed locations (i.e. Mary Rice, Hostetler, Stuckman).

### **II. Rationale:**

In order for research conducted at PACs to be successful, it must be realized that this is a partnership between PAC staff and the investigator. It is imperative that there is some division of duties and responsibilities but most of all effective communication between the parties must be maintained throughout the course of field or animal studies.

The following policies describe the provided services that are managed by PACs and those that are the responsibility of the investigators.

### **III. Current Infrastructure (2018):**

The PACs provide management, land, labor, facilities, and infrastructure to support field-level crops and animal production research programs located at eight locations across Indiana.

(See Appendices 3-12 for details on individual locations)

#### **a. Davis Purdue Agricultural Center (DPAC)**

##### **Size and Topography**

- 703 acres in northwestern Randolph and southwestern Jay Counties, including 522 tillable acres and 100 managed forested acres (known as the Herbert Davis Forestry Farm)
- A variety of soil types but mostly fine-textured, heavy clay soils (Blount/Pewamo series) commonly found in east central Indiana - gently rolling, hard to manage, poorly drained, low organic matter

##### **Heritage**

- In 1926 forestry professor Burr N. Prentice painstakingly numbered, mapped, described, and tagged every tree at this location. His work, and the work of Purdue foresters after him, have made the Davis-Purdue Research Forest the largest and oldest mapped forest in North America, resulting in its designation as a Registered Natural Landmark.

##### **Resources**

- Mapped timber stand
- Constructed wetland used for educational programs for landowners and K-12 educational groups
- 30+ acre field with drainage tile designed specifically for managing the seasonal water table
- GPS technology in use since the 1990s
- Equipment and resources conducive to field-scale work, rather than small-plot research

##### **Current Research**

- Researchers at DPAC study soil fertility, crop diseases, weed control, insect problems, site-specific agriculture, controlled drainage and drainage water analysis, old-growth timber stands/wildlife interactions, and variable-rate fertilizer applications in corn, soybeans, and winter wheat.
- The Purdue Agriculture departments involved in research at DPAC include Agronomy, Agricultural & Biological Engineering, Agricultural Economics, Forestry & Natural Resources, and Entomology.

**b. Feldun Purdue Agricultural Center (FPAC)**

**Size and Topography**

- More than 900 acres in Lawrence County near Bedford, including about 450 acres of pasture
- Limestone-derived soils characteristic of this part of south central Indiana
- Old limestone quarry and fragipan soil

**Heritage**

- Moses Fell Dunn, a highly regarded lawyer and member of the state legislature, gave 360 acres to Purdue University in 1914. The university used his gift to establish Indiana's first "experiment station" outside of Tippecanoe County.
- The Indiana Beef Evaluation Program's (IBEP) Bull Test Station at FPAC was started in November 1976 at the Pioneer Beef Cattle facility near the Town of Tipton and later moved to Purdue University's Lynnwood Purdue Agricultural Center (sold in 1988) near Carmel. It has been located at FPAC since 1989.

**Resources**

- The Indiana Beef Evaluation Program Bull Test Station, an important link between Purdue Agriculture and Indiana's beef cattle industry
- Concrete, gravity-fed water tanks downstream from pond
- Demonstration of watering systems, grazing techniques, and beef cow production practices
- New born calves annually

**Current Research**

- Research at FPAC focuses on commercial beef cattle breeding and management. Scientists in the Department of Animal Sciences use most of the pasture for a cattle herd that is part of a long-range genetics study. Other research has included studies of growth, yield, and cutting alternatives for upland central hardwoods and grazing research. Agronomic field studies with row crops are limited, with roughly 60 acres of soybeans and 90 acres of corn.
- In addition to scientists from the Department of Animal Sciences, researchers from the Departments of Agronomy, Forestry & Natural Resources, and Entomology conduct research at FPAC.

**c. Northeast Purdue Agricultural Center (NEPAC)**

**Size and Topography**

- Three parcels totaling about 444 acres, including 360 tillable acres in Whitley County between Fort Wayne and Columbia City.
- Rolling and level topography typical of northeastern Indiana, unlike any other part of the state.
- Soils are the Morley-Glynwood and the Morley-Rawson Associations, which consist of loam, sandy loam, and clay loam soils.

**Heritage**

- NEPAC is the newest Purdue Agricultural Center. Recognizing the agricultural importance of the northeast part of the state as well as its unique characteristics, Purdue University acquired three tracts of land for a long-awaited research center. The first tract, given in trust by Denzil Schrader in 1989, is 170 acres. When Schrader convinced his neighbor Merle Kyler of the need for such a center, Kyler also gave part of his land in trust. The 85-acre Kyler Farm lies two miles to the west of the main headquarters. The third piece was a 185-acre parcel one mile north of the Kyler Farm that Purdue purchased at public auction from the estate of Harvey Lawrence, a Whitley County agriculturalist.

**Resources**

- Diagnostic Training Center (DTC), site of annual training for Commercial Pesticide Applicators, Certified Crop Advisors (CCAs), and producers
- A pond near the office and constructed wetlands about two miles west of the office used for pond and environmental management workshops
- Timber parcels jointly managed with the Department of Forestry & Natural Resources
- Precision agricultural equipment, GPS-RTK and AutoSteer technology
- Plots of corn, soybeans, wheat, and alfalfa used for tours, special training events, and annual field days

#### **Current Research**

- Agricultural research conducted at NEPAC transfers more readily to area ag centerers than that conducted on the flat black prairie soils of west central Indiana or the soils of other PACs. Farmers near NEPAC want to know how a particular practice or management system is going to work on their ag center. Research therefore has focused on row-crop production. Current research includes projects related to fertility; insect, weed, and disease control; corn, soybean, and canola production trials; alfalfa and canola variety trials; and tillage systems.
- Researchers in the Departments of Agronomy, Botany & Plant Pathology, Entomology, and Agricultural & Biological Engineering are currently conducting research at NEPAC.

#### **d. Pinney Purdue Agricultural Center (PPAC)**

##### **Size and Topography**

- 664 acres on the Porter-LaPorte County line, with about 560 tillable acres to serve the agricultural research needs of northwestern Indiana
- Three distinct soil types: Tracy sandy loam, which can be irrigated during dry periods for horticultural research; highly organic muck; and Sebewa loam used for corn and soybean studies
- Approximately 45 acres of woodland
- Ten acres in the USDA Conservation Reserve Program
- Pond
- Warm- and cool-season grasses native to the area

##### **Heritage**

- The original 486-acre location was a gift to Purdue University in 1919 from Myra Pinney Clark and her father, William Pinney. Over the years, Purdue University has acquired an additional 178 acres of adjacent ag centerland.

##### **Resources**

- Main building with meeting space for up to 50 and shop for equipment upgrades and repairs
- GPS-RTK technology
- Storage and drying facilities
- 30-foot by 48-foot greenhouse; two rolling high tunnels for organic research and conventional vegetables
- Linear move irrigation systems covering nearly 100 acres of tillable land
- Private Applicator Recertification Program (PARP) location
- Two weather stations, for the National Weather Service and for Purdue climatologists
- Fall woodland management workshop

##### **Current Research**

- Research capitalizes on resources unique to this part of the state—a sandier soil and abundant water supply. Irrigation is prevalent among vegetable producers. Research at PPAC focuses on agronomic, vegetable, and specialty crops.

- Researchers in the Departments of Horticulture & Landscape Architecture, Botany & Plant Pathology, Agronomy, Entomology, and Forestry & Natural Resources currently conduct research at PPAC.

**e. Southeast Purdue Agricultural Center (SEPAC)**

**Size and Topography**

- Largest of the PACs, with 2,430 acres located six miles east of North Vernon in Jennings County
- A timber base of approximately 1,600 acres
- A variety of soil types but primarily silt loam soils common in southeastern Indiana—hard to manage, poorly drained, low organic matter
- Highly erosive soils with no-till crop production practices used on most of the cropland

**Heritage**

- SEPAC was established in 1977, when the state of Indiana transferred 830 acres from the Department of Mental Health’s Muscatatuck State School to Purdue University. In 2005, the Department of Natural Resources transferred an additional 1,600 acres to Purdue. The center is distinctive in its history of conservation tillage, including no-till.

**Resources**

- 1,100-square-foot conference room for education and training
- Shop
- Soil drainage and water quality stations
- Modern field machinery
- Pesticide-handling facility
- Equipment storage buildings
- Grain bins
- Crop sample dryers
- Walk-in cooler
- Annual hunting permits and public access for hikers, bird-watchers, mushroom hunters, etc.
- Public tours highlighting crop production techniques and agriculture
- Purdue Extension Forester is based at SEPAC

**Current Research**

- SEPAC hosts practical agronomic and forestry research concentrated in pest management, nutrient management, variety performance, precision ag centering, soil conservation, soil drainage, water quality, forest management, and wildlife management.
- Researchers from the Departments of Agronomy, Botany and Plant Pathology, Entomology, Agricultural and Biological Engineering, and Forestry and Natural Resources conduct studies at SEPAC. Approximately 50 research projects involving more than 30 professors, graduate students, and technicians are ongoing at SEPAC at any one time.

**f. Southern Indiana Purdue Agricultural Center (SIPAC)**

**Size and Topography**

- The second-largest PAC, with 1,320 acres in Dubois County near the Patoka Reservoir
- Rolling ground (hilly), shallow soils, natural hard pan, not well drained, rocky outcroppings
- Difficult-to-manage sandstone and shale soils typical of southern Indiana
- Roughly 570 acres of open pastureland

**Heritage**

- SIPAC grew from a true grassroots effort by the people of southern Indiana in the late 1940s and early 1950s. Local agriculturalists felt their environment and soil differed so greatly from other research locations near West Lafayette, that their counties’ leadership raised funds to purchase the original

parcel of land as well as some additional acreage. They donated the land, which was roughly half wooded and half pasture, to Purdue University – the ag center was first known as the “Southern Indiana Forage Farm.” In 1965, this research site was renamed the “Southern Indiana Purdue Agricultural Center.”

#### **Resources**

- Conference space for 200 with high-speed Internet, kitchen facilities
- Beef herd (210) and goat herd (75 females)
- Different varieties of permanent pasture
- Fence and water systems
- Barns and traditional feedlot
- Haymaking capability
- Dennis H. Heeke Southern Indiana Disease Diagnostic Laboratory, which serves the poultry and livestock industries in southern Indiana
- Approximately 20 built ponds for erosion control and livestock
- Extension forester based at SIPAC

#### **Current Research**

- SIPAC is a forage-based operation (i.e. no row crops). Current research focuses on beef cattle and meat goat management, livestock grazing trials, forage and crop production, forest management, and aquaculture.
- Departments in the College of Agriculture currently conducting research at SIPAC include Agronomy, Agricultural Economics, Entomology, Animal Sciences, Forestry & Natural Resources

### **g. Southwest Purdue Agricultural Center (SWPAC)**

#### **Size and Topography**

- 220 acres in Knox County north of Vincennes; 150 tillable acres, with about 90 used for research purposes
- Sandier soils and climatic conditions suitable for melon and other horticultural and specialty crop production

#### **Heritage**

- SWPAC was established in 1979, when Purdue University purchased 175 acres from Hank DeBuisseret to replace a 78-acre sand horticulture ag center in Gibson County. Purdue relocated to this site in Knox County to take advantage of water availability for research and to build working relationships with Vincennes University and the USDA. The university purchased an additional 45 acres from Steve Klein in 1992. Melborn Lang, the only full-time employee to move with the ag center from Gibson County, was the first superintendent, retiring in 2008 after nearly 43 years of service to the university.

#### **Resources**

- Headquarters with meeting space
- Shop
- Greenhouses, three high tunnels, laboratories
- Horticultural coolers
- Capability of variety testing for seed companies as well as fungicide and insecticide work for agribusinesses
- Summer workforce to pick crops and collect data
- Onsite plant pathologist, horticulturist/vegetable specialist and agronomist
- Home to the Southwest Purdue Ag Program (SWPAP) and its onsite horticulturist/vegetable specialist and the Knox County Extension Office
- Vincennes University John Deere/Heavy Diesel Technology teaching facility

#### **Current Research**

- Although SWPAC is the smallest ag center in the PAC system, it is one of the most active in research on fruits and vegetables— crops primarily grown in southwestern Indiana. Projects focus on increasing horticultural and agronomic crop yields and quality while decreasing input expenditures, including

pesticides. Research includes row crop studies, weed and disease control in melons, growth and management of wine grapes, new specialty crop varieties, and organic vegetable production.

- Departments in Purdue Agriculture that currently conduct research at SWPAC include Horticulture & Landscape Architecture, Forestry & Natural Resources, Agronomy, Entomology, and Botany & Plant Pathology.

#### **h. Throckmorton Purdue Agricultural Center (TPAC)**

##### **Size and Topography**

- More than 830 managed acres five miles south of Lafayette along Highway U.S. 231 in Tippecanoe County - 567 tillable acres.
- Rolling silt loam soils at the original ag center and some variation across the Meigs Farm addition.
- Two active manmade wetlands.
- 20 acres of timber used for forestry research.

##### **Heritage**

- Dr. George Throckmorton gave the ag center to Purdue Agriculture in 1935 in memory of his father Edmund. It was deemed the “Edmund Throckmorton Farm Memorial” as a tribute to this pioneer leader of Tippecanoe County. In the late 1990s, horticultural and specialty crop research was relocated from the old Horticultural (“Hort”) and O’Neill Memorial Farms to the Meigs Farm, which is part of TPAC. The center today encompasses four separate pieces – the original Throckmorton Farm Tract, Meigs North, Meigs South, and Meigs East Tracts.

##### **Resources**

- Seven high tunnels in operation.
- Crops processing facility with two walk-in coolers for produce and plant materials.
- At the Meigs Farm, 145 acres set up for drip and overhead irrigation, and the site has been extensively tiled for optimum drainage.
- Five full-time employees, including a horticulture crops manager and specialty crops specialist.
- Seasonal labor.
- Twilight tours, topic-specific workshops, biannual pruning workshop.

##### **Current Research**

- TPAC is unique in its close proximity to campus. It is home to almost one-third of PAC-managed agricultural research projects, with current work involving 30 different crops. Research focuses on weed management, insect management, soil fertility, agronomic crop production, ornamentals, fruit and vegetable production, biological controls, systems engineering, hardwood production, woodland and habitat management, and resistance management of weeds and insects. New areas of interest include organic and high tunnel vegetable production.
- Researchers from the Departments of Agricultural & Biological Engineering, Agricultural Economics, Agronomy, Botany & Plant Pathology, Entomology, Forestry & Natural Resources, and Horticulture & Landscape Architecture are currently working at TPAC and/or the Meigs Farm.

#### **IV. Responsibilities and Roles**

A. Basic Services are those services provided by PAC staff that is non-project specific. Basic services provided by the PACs may include field operations to establish (e.g. tillage, plant), maintain, harvest research plots independent of experimental protocols. Many basic services are provided free of charge to investigators provided that there is a sufficient budget to cover operating expenses and/or sufficient income from the crops produced. Note: services provided by PAC staff at may differ due proximity to campus, infrastructure, available labor, facilities, and expertise. (See Appendices 3-20 for more details)

PAC staff will:

1. Select the most appropriate land for each field or animal study in order to achieve the experimental parameters of the study in question. Land will be chosen based on parameters of experiments, appropriate crop

rotations, field history, soil characteristics, etc. PAC Staff will also assign projects to fields in a way that maximizes the efficiency of field and plot operations while maintaining the overall land management goals outlined in the vision.

2. Perform field operations such as tillage, application of lime, fertilizers, compost or other soil amendments, standard weed, insect and disease control, irrigation, and harvest in accordance with experimental protocols and objectives.
3. Plant crops in non-utilized portions of fields that will be used to generate needed income, provided such crops fit the target area and do not interfere with ongoing research projects or degrade natural resources (e.g. avoid planting in buffer zones or riparian corridors) disrupt preferred crop rotations, or compromise the system (e.g. organic, conventional, orchard plots) in which these fields reside.
4. Operate and maintain equipment, maintain grounds and manage infrastructure associated with the PACs to support the defined research and outreach mission.
5. Maintain and make available historical and current records of all field operations for a given land area such as personnel, equipment, land, crop, cropping inputs and outputs. Particular attention will be given to regulatory projects and designated organic production parcels so that research given these designations may continue.
6. Explore and adopt, when practical, new technologies for research site management, data collection and build reliable databases for future decision making.

B. Project-related expenses that are specific to meeting the experimental research objectives and are the financial responsibility of the investigator. Project related expenses include, but are not limited to, project specific supplies, treatment materials, specialty chemical and equipment that are not readily available, labor for detailed data and sample collection, as well as labor for services beyond basic services.

C. "Investigator" refers to a faculty or staff member, research scientist, Purdue Extension faculty or county staff member, or USDA-ARS scientists who provides leadership to a research or demonstration project. This term also refers to graduate students and technicians who are associated with investigator-led projects.

D. "Cooperator" refers to any other person, company representative, etc. cooperating with an investigator on research project(s) who is not an employee of Purdue University.

E. "Grant funds" are monies provided by private and public sector sponsors to an investigator or client to support the costs associated with conducting research under a contract.

F. "Protocol" is a document that describes the materials and methods to be followed in conducting field research. A protocol describes methods for application of treatments, collection of data, samples or other specific experimental-demonstration practices and may also specify the steps required to establish and maintain the experimental conditions.

## **V. For the Investigator: How to Initiate and Maintain Field Research Studies**

Current PAC staffing levels, infrastructure, and equipment make it necessary to plan months ahead and communicate protocols in order to be ready to prepare field areas. Since some field work can be done months prior to planting, anticipating rotational schemes, as well as the type of production systems to be used (no-till, organic, conventional, etc.), will enable better use of personnel and minimize large spikes in labor needs or equipment scheduling conflicts.

A. ALL INVESTIGATORS must complete a Project Request Form to provide basic requirements of the projected field studies to PACs through the PAC web site. Link: <https://ag.purdue.edu/arp/pac/Pages/researchers.aspx>.

Generalized parameters for field requests include land prep protocol, approximate size and dimensions (acres), cropping practices to assist ag center superintendents in planning, assigning space, procurement of general supplies, etc.

The goal is that prior to the growing season, the vast majority of field research plans are made known to PAC staff so they can more readily accommodate the last minute details, new grant monies, and other unforeseen changes that are normal occurrences during the growing season.

The project request form is not intended to function as a means to determine approval or denial of a request. Rather, the form functions to describe “what needs to happen” and then the process becomes “how we get it done.”

B. PAC staff will review and make recommendations for requests of long-term field assignments of five years or longer in duration, those likely to have a lasting impact on the land or other natural resources, as well as those whose expected costs far exceed the project funding and/or expected capacity of the particular PAC(s).

C. On an annual basis, investigators shall submit project requests to the PAC(s) on or before the following dates for field plot space and assistance. For multiyear projects, there will be provisions to facilitate this as well as modifications. PAC staff understand that these investigator requests are best guess estimates of the potential research to be done. The sooner information is provided, the better the chances of successful implementation. The target dates are those needed by PAC staff to plan for the research and line up labor, equipment, and supplies. This information can be updated and refined throughout the 3 to 4 month planning season prior to planting, with decreasing likelihood of being able to incorporate the changes.

<u>Planting Date</u>	<u>Target Date</u>
Spring- <i>for continuing projects</i>	February 15
Spring – <i>new projects</i>	March 1
Late summer/fall	May 30

D. Each PAC will maintain records for all land assignments for all purposes and all land management actions performed.

E. Investigators will maintain records of all experimental treatments used on all land assigned to them.

## **VI. Responsibilities of the PACs and Investigators**

### **a. Communication**

PACs: Once a field request is submitted and space is assigned, an email will be sent to the investigator confirming receipt of request. Included will be a map of the assigned space. Priority in space assignments will be given to those investigators who attend PAC day on campus meeting(s).

### **b. Tillage**

PACs: The PACs will provide general tillage operations to provide an acceptable seed bed to establish crop test plots.

Investigator: Project specific equipment that is not in the PAC inventory must be provided by investigator, or investigator must cover expense of renting or retrieving such equipment.

### **c. Staking and Plot Layout**

PACs: The PACs will maintain field boundaries and assist in measuring the location of research plots within fields to establish boundaries for space assignments. PAC staff will provide field markers as needed to mark corner boundaries and document these boundaries in the PAC ag center database.

Investigator: Investigators are responsible for providing flags, wooden garden stakes or other identification markers for individual treatments. They shall reimburse or replace inventory of markers used from individual PAC inventory when used. Investigators should use fiberglass flags rather than wire since there have been problems with broken wire flags puncturing tires. If subplots require operations performed by PAC staff, it is recommended to use flags on subplot corners.

### **d. Fertilizer and Crop Protection Products**

PACs: The PACs will maintain appropriate soil fertility conditions for crop rotation crops (i.e.: N, P, K, soil pH). They will provide applications of fertilizer and crop protection products (herbicides, insecticides, fungicides, etc.), and maintain optimal soil fertility. In keeping with the principles of integrated crop management, purchased inputs will be minimized and used in the most economically efficient and environmentally beneficial way. Unless, otherwise specified by the investigator's protocol, PAC staff will apply products according to labeled rates utilizing Purdue Extension recommendations and/or their experience with a particular field, area of the PAC, or the availability of VRT-generated maps.

Investigator: Materials which are treatment-specific are the investigator's responsibility to provide and dispose of excess materials. Investigator is responsible for providing organic matter inputs such as manure, compost, or legume cover crops across the entire area of an experiment depending on the research needs (organic vs. conventional production systems) and specialized application equipment if not available from the PACs equipment inventory, or cover costs for modifying existing equipment to meet experimental objectives or renting equipment.

### **e. Seed and Greenhouse Transplants**

PACs: The PACs will provide seed for rotational crops, using hybrids and varieties of their choice - the PAC superintendent may coordinate procurement of needed agronomic crop seed that is commercially available.

Investigator: Investigators are responsible for providing specific seed varieties, transplants, nursery stock, and other plant material for research experiments. Maintenance and care of transplants in greenhouse, hardening shelters, and excess transplants are the responsibility of the investigator.

### **f. Planting**

PACs: The PACs will assist in the planting of experimental plots where specialized equipment that is under their management is utilized. For some studies, this will include incorporation of drive rows within the plot area. PAC staff will inform investigators on potential dates for planting dependent on weather and field preparation.

Investigators: Investigators are responsible for providing necessary staff, plot map, seed/transplants and supplies to assist with the planting. Investigators should be in communication with PAC staff prior to planting for target dates for optimal planting of experiment.

### **g. Weed Control**

PACs: The PACs will provide uniform weed control across an experiment that follows requirements of a particular crop and production system. Mechanical cultivation may be provided for specialty crops where it is customary practice and/or where chemical controls are not available, registered, or effective. PAC staff shall make every effort to maintain weed-free research plots, unless otherwise noted, across all production systems provided sufficient budget is available to hire seasonal labor. PAC staff may assist in trimming ends of research plots to a common length through mechanical cultivation, herbicide application, mowing, harvesting alleys and the ends of plots with machinery or by planting cross rows depending on the experiment.

Investigator: Investigators are responsible for the application of experimental treatments. Investigators shall provide all experimental materials, supplies and equipment to apply experimental treatments unless previously arranged with PAC staff.

### **h. Fungicides and Insecticides**

PACs: PACs staff will provide and apply fungicides and insecticides (and other crop protection products as needed) to control pathogens and pests uniformly across experiments according to labeled rates, established economic thresholds, forecasting models, and experimental protocols. PAC staff will scout crops for insects or diseases, but not on individual treatments and/or field studies.

Investigator: Investigators are responsible for the application of experimental treatments. Investigators shall provide all experimental materials, supplies and equipment to apply experimental treatments unless previously arranged with a PAC superintendent.

### **i. Data/Sample Collection**

PACs: In general, data collection is the responsibility of the investigator. Any requests for assistance from PAC staff with data or sample collection must be discussed when project requests are submitted.

Investigator: Investigators are responsible for collection of data and samples of data and/or samples for their projects.

### **j. Irrigation**

PACs: PACs may set up irrigation equipment and apply irrigation water upon request provided irrigation equipment and water supply are available. Working with researchers and PAC administration, specific PACs will continue to maintain existing irrigation delivery capacity.

Investigators: Investigators shall provide materials and equipment to apply irrigation water for trickle, mist irrigation or fertigation systems for their projects, or to experimental units within projects. When irrigation equipment and water is not sufficient for all PAC land or fields, the distribution will be based on the priorities noted on page 4. Investigators shall provide staff guidance and assistance in removal and storage of trickle irrigation systems at the end of the harvest season.

Investments in irrigation equipment will be through a partnership between the PAC(s), the investigator and/or others that may benefit. Previous investments in wells and pipe were made by investigators and departments.

#### **k. Harvest**

PACs: Agronomic Crops: PACs will provide labor and equipment to assist with harvesting crops from research plots where GPS-controlled equipment is utilized to record yield (gross weight), moisture, and collect samples during the operation of agronomic crops harvest.

Horticultural Crops: PAC staff will assist with harvesting of horticultural crops when there is sufficient temporary labor to do so. At specific PAC locations, temporary employees may be hired in the late summer/fall to assist with harvest of fruits and vegetables. The Investigator hires, supervises, and manages their temporary harvest employees.

Investigators: Investigators and staff are responsible for collecting detailed harvest data, preparing detailed samples, making selections of breeding material and collecting seed or seed lots during harvest. Investigators shall advise managers of harvest schedule for coordination purposes.

For horticultural crops, investigators should budget for specialized harvest containers which are not in a particular PAC inventory. Disposal of samples not taken to campus will be coordinated with each PAC superintendent.

For biomass crops, investigators should budget for specialized harvest equipment and containers which are not in a particular PAC inventory. Disposal of samples not taken to campus will be coordinated with each PAC superintendent.

#### **l. Woody Horticultural Crops (e.g. tree fruits, grapes, brambles)**

Due to the long term nature of fruit crop experiments, requests for establishing new projects should be made prior to submitting funding proposal, to determine if the necessary land is available. Once these details have been agreed upon, study/plot plans are required to be submitted to the PAC office and particular PAC superintendent at least nine months in advance of expected planting date to allow sufficient time for site preparation. The PAC(s) invest significant resources to establish and maintain fruit crops to maturity. As a result, decisions on the removal of established plantings require careful consideration. These may include costs and returns of continued operations, whether the planting is needed by other investigators for grant funded research, whether land is needed to establish new fruit projects, etc. PAC staff will consult with the PAC Office on campus on such decisions. To provide the most opportunity for research, blocks of trees that are differing ages (nonbearing trees, and established bearing trees) are typically maintained. This allows for more opportunities for investigators to establish projects and increase their ability to attract graduate students and receive grants. However, who or how these non-assigned blocks would be funded and maintained shall be reviewed annually. PACs: PACs will assist in the establishment and maintenance of research orchards, vineyards, brambles, etc. The costs of specialized operations which require significant labor to implement must be supported financially by the investigator.

Investigators: Investigators are responsible for establishment costs including nursery stock, trellis, additional drainage, irrigation, etc. Investigators are responsible for costs to implement pruning, training, data and sample collection, and specialized crop management practices.

#### **m. Organic Crop Production Research**

Due to the regulatory constraints imposed by the National Organic Program (NOP) rules and approved certifiers, additional efforts are required to maintain research on certified organic land.

PACs: In order to maintain certified organic land, the PAC superintendent(s) will ensure that all PAC operations on certified and transitioning land are conducted in accordance with the NOP rules. This includes the proper management and cleaning of equipment, and maintaining daily logs of operations conducted on organic land.

Investigators: The investigators will be responsible for the annual certification of fields designated for organic crop production research. They will collect and maintain the necessary records required for the certification of organic land and have a representative present during inspections. The investigator will be responsible for ensuring that all inputs

purchased and used on organic research land are approved by the local certifier before application. Investigators will also be responsible for keeping and uploading records related to input purchases as required by the local certifier and NOP rules.

## **VII. Disposition of Harvested Crops**

The PACs will be responsible for sale and marketing of crops. Income from sale of crops will be deposited into income-expense accounts of the particular PAC to cover operating expenses. Crops not fit for human consumption due to the application of experimental materials shall be incorporated into the soil or destroyed. Crops that could legally be consumed but are determined to be unmarketable due to substandard quality shall be donated if feasible, incorporated into the soil, or destroyed if donation is not feasible.

Donations of research crops to charitable organizations such as food banks, homeless shelters, or other emergency food supplies will be coordinated by the PAC superintendent and the Investigator, if any, responsible for their production.

## **VIII. PAC Facility Use and Assignment Policy**

### **a. Assignment of Plot/Study Space to Investigators:**

PACs: For all studies, the best land to achieve the experimental parameters of the study will be chosen based on the design of experiments, appropriate crop rotations, field history, soil characteristics, etc. PAC staff will strive to enhance efficiency of operations by assigning projects to fields such that similar types of projects and/or crops are in proximity to one another.

Investigators: It is imperative that investigators provide as much detail as possible on the type of experiment, length of time the experiment will be conducted, potential resources, labor issues, plans for planting, data collection and harvest, crop destruct, or marketability to allow for the best decision possible in placement of the study.

### **b. End of Experiment:**

Investigators: It is the investigator's responsibility to inform the appropriate PAC superintendent of the anticipated completion date of the project at the beginning of the project. Investigators are responsible for removal of data and sample collection devices and restoration of the site if substantially altered from its original state, including but not limited to the removal of flags, large stakes, data collection devices, bug traps. These should be outlined more specifically.

PACs: PACs will return the land involved in completed projects to conventional or organic rotation or assign it to another project. For perennial crops, the PAC office and particular superintendent will assess the long term viability of maintaining the crop based on potential for future research by Purdue staff or USDA-ARS investigators, and if the plot could be maintained in a cost-neutral plan.

### **c. Revocation/Expiration of Assigned Space:**

PACs: PAC superintendents will inform the PAC Office of concerns related to overall field utilization. Field plots/studies that have not been maintained as outlined in the Project Request Form show clear signs of neglect, and mismanagement, or those activities that will have a long-term negative impact on the land will be reviewed first by the PAC Office and, if deemed necessary, brought to the attention of campus-based PAC administration.

Investigators: Unexpected issues arising from the loss of staff, loss of funding and personal life issues, not to mention weather events, can impact the success of field studies. It is imperative that investigators work issues out with PAC superintendent/PAC Office to avoid any long-term negative consequences on the PACs and neighboring experiments.

### **d. Assignment of Building Space**

Certain spaces in ag center buildings were previously assigned to investigators to support specific programs. It is the intent that programs be able to continue to occupy space related with ag center research activities. The PACs will

manage areas used for short-term and long term storage and collaborate with investigators on the most efficient use of these areas. If programs which occupy assigned space discontinue, then space will revert to the PACs. Investigators should make requests for long term use of building space to the PACs. With limited space available, these requests will be reviewed as they arise. An investigator/research program will be responsible for construction costs, maintenance and utilities related to new buildings and/or site modifications funded in part or wholly by a research program.

## IX. Appendices

### Appendix 1: PAC Field Day & Event Information

#### Field Day & Event Organization & Planning

As noted previously, educational outreach activities (e.g. field days, events, workshops, tours, etc.) are a priority at all eight PACs and departmental research locations and forestry properties in the College of Agriculture at Purdue University. PAC superintendents, staff, and PAC administration will work closely with field Extension staff and others to effectively plan and implement successful events. PAC superintendents need be involved with any event planning and decision making when such events are to be held at their particular PAC. PAC superintendents will provide guidance and leadership with event issues including but not limited to: usage of meeting room(s) or areas, tour routes, people mover usage, etc. For larger events like annual field days, it is imperative that area Extension staff for a particular PAC meet, organize, plan, and promote in a timely fashion that leads to effective event programming.

#### Guidelines for Use of People Movers/Trams at all PAC and Woodland Events in the College of Agriculture

The guidelines noted below must be adhered to when transporting event attendees at the PACs. These guidelines were developed by a college-level PAC safety committee and approved by the Director of Agricultural Research at Purdue University (ARP)/Associate Dean of Agriculture in April of 2009.

- Only commercially available people movers will be used to transport groups of people at PAC events.
- The tractor/vehicle operator must be a Purdue employee who is familiar with the equipment he/she is operating – this includes the people mover and the hitching mechanisms involved.
- PAC/Woodland staff shall review travel routes prior to event. Routes taken should be void of sharp turns, inclines, unnecessary backing, and other potential hazards.
- A Purdue employee (e.g. PAC or Extension staff member) shall review transport safety information with attendees on a people mover prior to departure. If at all possible, a Purdue staff member shall remain on a people mover to monitor safety and answer any questions or concerns during transport.
- PAC staff must take the lead to ensure the safe loading/unloading attendees in addition to the balanced seating and total number of persons per mover.
- Direct communication must be established between the tractor/vehicle operator and a person of authority on the people mover during transport. Warning light indicators in the tractor/vehicle and/or two-way radio contact are examples of such communication.
- Loaded people movers shall not be transported at speeds in excess of 8 miles per hour.
- Loaded people movers in transport at PAC/Woodland events shall be restricted only to crossing public roads. Limited public road travel is a necessity at several PACs – when such transport is required, a lead university escort vehicle with appropriate flashing lighting will be required. There must be direct communication between the operator of the escort vehicle and the operator who is pulling the people mover.
- Annual training by PAC Office staff and others with pertinent expertise will be undertaken and involve all PAC staff and others involved in the transportation of individuals. As needed, PAC Administration will update Cooperative Extension field staff and others in the College of Agriculture who are also involved in events and activities at the PACs/Woodlands.

## Appendix 2: Unmanned Aerial Vehicle Operations at the PACs

The primary use of unmanned aerial vehicles (UAVs) at the PACs and supporting locations (Mary Rice and Hostetler) is for agricultural research and education, but other students, faculty, staff, and outside entities can use PAC space with permission from PAC superintendents and, if needed, the Office of the Purdue Agricultural Centers.

The purpose of this policy is to specify the rules for UAV operation and the procedures for obtaining permission to fly at one or more PACs.

- Rules
- Procedure for Permission to Fly
- UAV Vehicle Safety Data
- Flight Operations Procedure
- Accident Report Form
- Summary of FAA Part 107 Rule (see Appendix 1)

### Rules - Per August 29, 2016 FAA Part 107 Update

- Maximum weight: <55 lbs.
- Maximum altitude: 400 ft. above ground level
- Maximum speed: 100 mph (87 knots)
- All flight activity over one of more PACs must have approval from PAC superintendent(s)
- Daylight Operations only
- An experienced and certified\* Pilot in Command (PIC) and at least one visual observer (VO) are required for all flights – the need for a VO does exceed FAA requirements
- UAV must yield to any and all manned aircraft
- Aircraft always within line of sight of the PIC and VO
- If used, a safe spectator area must be designated
- Cannot not fly over or close to PAC staff, university personnel, or others
- Entry over another’s field study must be done with permission (PAC superintendent and, when applicable, researcher)
- Emergency Procedures
  - Call 911 for police, fire, or rescue response
  - Immediately contact the PAC superintendent
- In the event of a crash, the recovery protocols are:
  - Outside PAC Boundaries
    - Obtain owner’s permission before trespassing on their property
  - Within PAC boundaries
    - If it is inside another study area, obtain PAC superintendent permission before recovering
    - If it is within the designated flight area(s), recover all pieces and debris
  - Lost within high corn or other vegetation.
    - Mark the area of the crash and contact the PAC superintendent
  - In all cases, file an accident report with the PAC superintendent
- In the event of “loss of Link” for a manual controlled UAV, it must go to “fail safe” mode and circle over PAC property until the link is recovered or power runs out.
- In the event of a “fly away” of an UAV under autopilot control:

1. Take manual control through the radio control transmitter
2. Take manual control through Ground Station Control
3. Initiate loss of link strategy by circling over PAC property until the link is recovered or power runs out

\* - See FAA Rule – Part 107 for Pilot in Command certification and responsibilities

## PAC UAV Vehicle Safety Data

Name: \_\_\_\_\_ Phone \_\_\_\_\_ Email: \_\_\_\_\_

Purpose of UAV operation

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Name of PIC; (Pilot-in-Control)& cell #	
UAV MANUFACTURER & MODEL	
UAV CONTROLLER MANUFACTURER & MODEL	
FLIGHT DURATION	
GROSS TAKEOFF WEIGHT	
Wing Span	
ENGINE TYPE CHOICES: 1) Electric, 2) Air/Fuel Combustion	
FUEL VOLUME	
IF USING FUEL, FUEL TYPE: 1) Gas/Oil mix, 2) Gas, 3) Propane, 3) Kerosene	
POWER SYSTEMS (any that apply & indicate voltages): 1) Ni-Cad, 2) Lithium, 3) Nickel-Metal Hydride	
MANUAL CONTROL OPERATING FREQUENCY	
HOW CONTROLLED? (radio operated control or autonomous flight)	
AUTOPILOT OPERATING FREQUENCY	
VIDEO DOWNLINK FREQUENCY	
OTHER DOWNLINK FREQUENCIES	
MISSION PROFILE 1) Max operating altitude (ft.) (400 ft. is the max) 2) Max operating range (ft.)	
A/C MAX SPEED	
OPERATOR TRAINED? (yes, no, or trainee)	
UAV FLIGHT HISTORY	
PILOT FLIGHT HISTORY	
OTHER ITEMS	

Note: Include a picture of the aircraft.

## PAC UAV Flight Operations Procedure

Before flying, complete form below and present to PAC superintendent. Check with PAC superintendent and other on-site faculty/staff to ensure that flying activity will not conflict with other UAV operations in the flight area.

DATE \_\_\_\_\_

Name: \_\_\_\_\_ Phone \_\_\_\_\_ Email: \_\_\_\_\_

Purpose of this UAV flight operation

\_\_\_\_\_  
\_\_\_\_\_

Do you have permission to fly at the \_\_\_\_\_ - PAC

Over what regions within the PAC will you be flying \_\_\_\_\_

\_\_\_\_\_

What is your estimated start time \_\_\_\_\_ finish time \_\_\_\_\_

Pilot In Command \_\_\_\_\_ Cell # \_\_\_\_\_

Visual Observer \_\_\_\_\_ Cell # \_\_\_\_\_

# Accident Report

## PAC UAV Operation

Pilot In Command: \_\_\_\_\_ Phone \_\_\_\_\_ Email: \_\_\_\_\_

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Location: \_\_\_\_\_

Weather conditions:

\_\_\_\_\_

Equipment: \_\_\_\_\_

Personnel on site, and duties during flight:

\_\_\_\_\_

\_\_\_\_\_

Description of accident:

Cause of accident:

Remedial actions to prevent future accident:

Date: \_\_\_\_\_ Signature: \_\_\_\_\_

# FAA News



Federal Aviation Administration, Washington, DC 20591

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June 21, 2016

## **SUMMARY OF SMALL UNMANNED AIRCRAFT RULE (PART 107)**

**UAV pilots flying at the Purdue Ag Centers are encouraged to stay current with FAA updates regarding UAV operations.**

**[https://www.faa.gov/news/fact\\_sheets/news\\_story.cfm?newsId=20516](https://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=20516)**

### **Appendix 3: Throckmorton/Meigs Horticulture Crops Capacities, Recommendations, and Responsibilities**

These apply to all horticulture crops grown at Meigs and crop production operations

Total conventional plot area is limited to approx. 17 acres each growing season to allow for sufficient crop rotation

Plot locations will be assigned by the superintendent according to available space, and plot needs with preference given to those who attend TPAC/Meigs day on campus

Land request form is required before space allocations can be made

Multi-year studies require a land request form annually

Suggested minimum row length if using plastic mulch and irrigation is 50+ feet, this allows for more efficient equipment operation and bed formation

#### **PAC RESPONSIBILITY**

- Applications and Equipment Operation
  - Tillage, bed formation, planting, non-treatment spraying, cultivation, non-treatment fertilizer application, final plot clean up (mowing and plastic/irrigation removal)
- General crop scouting
- Non-treatment Irrigation management
- Plot border management (mowing, spraying, tillage)
- Equipment service and maintenance will be performed by ag center staff (time, parts, and materials will be billed to investigator for investigator-owned equipment)
- Ag center developed fertilization and pest management practices of vegetable crops will be based on Extensions Specialist and *Midwest Vegetable Production Guide for Commercial Growers* Purdue Extension ID-56 recommendations.
- Ag center developed pest management practices of fruit crops will be based on Extensions Specialist, *Midwest Small fruit and Grape Spray Guide* Purdue Extension ID-169, and *Midwest Tree Fruit Spray Guide* Purdue Extension ID -168.
- Soil test will be performed fall prior to vegetable plot establishment using a ½ acre soil type grid
- Soil pH will be managed at 6.5 level based on fall soil testing
- Vegetable plot fertilization will occur using 2 practices one base on soil test results, second based on crop grown
  - Broadcast application using variable rates to maintain uniform P and K levels sufficient for soybean production per A & L Great Lakes Laboratories, Inc. recommendations.
  - Band application of N, P, and K fertilizer in plot areas according to ID-56 recommendations for crop grown
- Maintain perimeter fence
  - Gates will be closed at 5 p.m. each work day during the growing season.
- Maintain adequate supply of hand tools (hoes, shovels, rakes, etc.)
- Maintain field operation records of task performed by ag center staff
- Maintain ag center applied pesticide application records and notification as required by WPS

#### **INVESTIGATOR RESPONSIBILITY**

- Account numbers must be provided to ag center staff prior to any work being done or supplies ordered by ag center staff
- Plot maps and specific management practices

- Necessary marking of sub plots
- Provide funding for pesticides used in plots
  - Active and non-active research plots
- Transplanting labor (2+ people)
  - Funding or people
- Treatment supplies, application labor, and management
- Specialized Equipment (sensors, traps, plot harvesters, etc.)
- Staking and tying supplies and labor of crops if needed
- Initial plot clean up (pulling stakes, post, flags, twine, pulling plastic and tape if needed, etc.)
- Sample and data collection/analysis
- Provide seed and growing media if the ag center is producing project transplants
- PI responsible for closing fence gates after hours, weekends and in the off season
- Hand weeding of plots
- Return and clean hand tools to the designated area
  - Organic designated tools are stored in Organic designated building
  - Non-Organic designated tools are stored in the other Meigs buildings
- Provide ag center staff with all regulation guidelines associated with crops grown
- Inform ag center staff of field operations performed by PI
- Inform ag center staff of pesticide applications performed by PI (ag center staff will forward information and notify other ag center users as required by WPS)

#### ***Fruit Tree/Grape Capacities, Recommendations, and Responsibilities***

In addition to the Meigs capacities, recommendations, and responsibilities, these listed below also apply to fruit tree and grape plantings at the Meigs Farm location

Tree fruit planting area is limited to Fields G1, H1, and east half of C1 (approx. 20 acres total) to allow for rotation of vegetable crop plots

Grape planting area is limited to field G2 (approx. 8 acres)

#### **PAC RESPONSIBILITY**

- Manage irrigation on plots less than 3 years old
- Manage rodent control
- Oversee pruning of fruit trees as agreed upon with PI
- Oversee bulk tree fruit harvest during normal business hours

#### **PI RESPONSIBILITY**

- Account numbers must be provided to ag center staff prior to any work being done or supplies ordered by ag center staff
- Provide funding for tree stakes
- Provide additional labor for planting (2+ people for plots < 100 trees, 4+ people for plots 101-250 trees, 6+ people for plots > 250 trees)
  - Funding or people
- Provide additional labor for pruning (4-6 people during Feb-Apr, 1-2 people during summer)
  - Funding or people
- Oversee bulk tree fruit harvest after hours and weekends

### ***Organic Vegetable Capacities, Recommendations, and Responsibilities***

In addition to the Meigs capacities, recommendations, and responsibilities, these listed below also apply to organic vegetable plantings at the Meigs ag center location

Organic area is limited to Fields B2 (approx. 8 acres) and O (approx. 10 acres). Plot area within this varies with the amount and type of research being performed each year. Generally See Field Management for B2 and Field O Guideline for more details

#### **PAC RESPONSIBILITY**

- Maintain equipment and field operations record as required by NOP Standards
- Maintain ag center purchased input records, labels, search records as required by NOP Standards
- Maintain crop rotation as described in the Field Management for B2 and Field O Guideline

#### **PI RESPONSIBILITY**

- Account numbers must be provided to ag center staff prior to any work being done or supplies ordered by ag center staff
- Maintain investigator-purchased input records, labels, search records as required by NOP Standards
- Maintain clean organized working area in Organic Barn as determined by ag center staff

### ***High Tunnel Recommendations and Responsibilities***

In addition to the Meigs capacities, recommendations, and responsibilities, these listed below also apply to studies conducted in high tunnels, low tunnels, or other 'protection' or 'season extension' structures

Current high tunnel assignment is performed by ag center staff with preference given to investigators involved with purchase and funding of structures

#### **PAC RESPONSIBILITY**

- Perform necessary maintenance and repair
- Irrigation infrastructure
- Initial plot preparation (tillage, tomato trellis, bed preparation)
- Final plot clean up (trellis post and wire removal, tillage)
- Maintain 24 hour/day water supply and access

#### **INVESTIGATOR RESPONSIBILITY**

- Account numbers must be provided to ag center staff prior to any work being done or supplies ordered by ag center staff
- Provide funding for necessary maintenance and repair supplies and labor
  - Current occupant of tunnel will be billed for repair and maintenance supplies of individual tunnels
- Environment control (ventilation, temperature) management and application
- Provide funding for fertigation equipment
- Irrigation and fertigation management and application
- Final plot preparation (planting, staking)

- Initial plot clean up (removal of plant material, plastic mulch, irrigation tape, twine)
- Provide additional labor for major repairs (recovering) as requested by superintendent

### ***Greenhouse Operations and Responsibilities for Meigs/TPAC***

#### **PAC RESPONSIBILITY**

- Maintain adequate greenhouse facilities to produce healthy transplants for field production
- Provide necessary plug trays, fertilizer
- Maintain pest control, watering, and fertigation practices
- Seed crops in a timely manner in accordance with project needs

#### **Conventional Transplant Production Methods**

- Greenhouse temperature 75° F
- 72 round plug trays
- Growing Media (subject to change)
  - Sungro Redi-Earth Professional Plug and Seed Mix
  - 55-65% Canadian Sphagnum peat moss, vermiculite, dolomite lime
- Watered as needed with fertigation water
  - 20-20-20 at 200 ppm

#### **Organic Transplant Production Methods**

- Greenhouse temperature 75° F
- 72 round plug trays
- Growing Media
  - Sunshine Natural and Organic No2 N&O (subject to change)
  - 75-85% Canadian Sphagnum peat moss, perlite, dolomite lime
  - or
  - Lambert 100% Organic Potting Mix
- Watered as needed
- Fertilize weekly
- Organic BioLink 3-3-3
  - 2 Tbsp. per gallon

#### **Organic Isolation Procedures**

- Plants are separated by space on a separate bench, across the aisle or if quantity allows in an adjacent greenhouse.
- Tray tags are marked as "ORGANIC".
- Water is delivered by a dedicated hose and hydrant, organic hose is blue, conventional hose is black
- Organic fertilizer is contained in separate bucket with a sealed lid
- Potting benches are sweep clean when changing from conventional to organic potting media.

Vehicles used to transport transplants to field are swept clean prior to transporting organic transplants

### **INVESTIGATOR RESPONSIBILITY**

- Account numbers must be provided to ag center staff prior to any work being done or supplies ordered by ag center staff
- Provide necessary seeds and media needed for seedling production
- Provide ag center staff with time line for production

### ***TPAC/Meigs Equipment Service and Repair***

#### **PAC RESPONSIBILITY**

- Perform necessary preventive maintenance, service, and repair equipment (ag center and PI owned)
  - Investigator will be billed for labor, parts, and materials
    - Labor will be billed on actual time used
- Provide parts, repairs, supplies and hardware used on ag center owned equipment
- Maintain adequate supply of general shop supplies (common fasteners, lubricants, cleaners, rags, safety supplies, necessary tools) needed for day to day operations.

### **INVESTIGATOR RESPONSIBILITY**

- Account numbers must be provided to ag center staff prior to any work being done or supplies ordered by ag center staff
- Provide necessary manuals, diagrams, and layouts requested by ag center staff
- Report any issues or breakdowns with equipment ASAP to ag center staff
- Inform ag center staff if equipment needs service or work

## Appendix 4: Field Management of Organic Research Area at Throckmorton/Meigs

The following management strategy developed for the Organic areas (Fields O and B2) at the Meigs Farm accomplishes several common goals; builds the soil fertility, reduces weed production, evens out plot cause variations, and limits the financial impact on total ag centering operations. The rotation builds soil fertility with the help of cover crops that either fix nitrogen or make other nutrients more available. Using fast growing, high biomass producing cover crops, different soil and vegetation management methods, weed growth and seed production will be reduced i.e. tillage, mowing. This rotation also tries to even out any previous research affects that might cause abnormal variation in soil properties with the use of grid soil sampling and applying soil amendments only to problem areas. All these goals are reached by limiting the negative financial impact on the ag center with the incorporation of wheat into the rotation.

This management strategy has very few nutrients leaving the system. Total nutrient removal with grain and straw removal is 82, 12, 82 lbs. Nitrogen (N), Phosphorus (P), and Potassium (K) per acre respectively, grain harvest removes 42, 8, 10 lbs. N, P, K per acre respectively. This is assuming a 40 bushel per acre grain yield and 1.5 ton per acre yield. Legumes in the rotation add 100+ lbs. of Nitrogen (N) annually and when manure is applied an additional 150+lbs. N 70+ lbs. P and 90+ lbs. K are added when manure is applied.

Grid soil sampling will be performed using ½ acre grids the fall prior to seeding wheat. Deficient areas will be identified and necessary applications of Rock Phosphate and Sulfate of Potash will be made to bring soil levels up to a uniform level according to A & L Great Lakes Laboratories, Inc. soil test results. Applications of manure obtained from the ASREC will be applied at 8-10 tons/acre over non-plot area if soil test results are medium or less on 50% or more of the sample points. Soil pH will be maintained at 6.5 based on soil samples used for fertility testing.

The rotation will be split with Field B2 beginning on Year 1 and Field O beginning on Year 2 of the Crop Rotation Cycle. This Rotation cycle will begin the fall of 2013. In the fall of 2012 the non-research areas in Field O will be moldboard plowed and left fallow over the winter. Alfalfa will be seeded in the spring of 2013 per Kevin Gibson's request/plans and then begin the Crop Rotation Cycle outlined below starting with wheat in the fall of 2013.

### **MANAGEMENT GOALS**

- Increase soil fertility
- Suppression of weed growth and productivity
- Remove any research caused plot variation

### **RESEARCH AREA PROTOCOL**

Research Areas can be obtained for either spring or fall planting seasons

Any area that is released from long term (greater than one year) research must be maintained in the crop rotation area management for at least two rotation cycles (4 years) before being eligible for research again.

Short term (1 year) research areas can be obtained after year 1 of rotation for fall seeded crops or year 2 of rotation for spring seeded crops. After research is concluded, these areas must be maintained in the crop rotation area management for at least one rotation cycle (2 years) before being eligible for research again.

An area released from research, will be deep tilled (deep chiseled or subsoil) and returned into the rotation cycle at the point of the surrounding area.

### **ROTATIONAL CROP MANAGEMENT**

Crop rotation areas will be rain fed, due to lack of man power and equipment  
Cover crop seeding rates will be determined from *Managing Cover Crops Profitably*.

## **CROP ROTATION CYCLE**

Yr. 1 Fall-planted Wheat, frost seeded red and sweet clover summer-seeded sorghum x sudangrass

Yr. 2 Fall-planted Hairy Vetch/Rye mowed prior to seed set followed by summer-seeded buckwheat

Yr. 3 Research or back to year 1

### Wheat

*(Moldboard plowed and disc prior to drilling, harvested and grain sold with other ag center wheat, straw can be baled if not weedy. Manure applied prior to final seed bed preparation if needed)*

Allows ag center to recoup a portion of cost

Easy to grow organically

Easy to market

### Red/Sweet clover

*\_(Frost seeded, mowed with rotary mower after wheat harvest as needed to prevent weed seed production)*

Easy to establish

Gives continuous cover growth after wheat harvest

Nitrogen fixation of 100+ lbs.

Potentially free P and K (Sweet clover)

### Summer seeded Sorghum x sudangrass

*(No-till drilled into standing clover the end of July; Mow 9-12" using flail mower as needed to prevent weed seed production)*

No-till into frost seeded clover

Quick growth and alleopathic properties suppresses weed growth

Capture N from clovers

Easy to terminate

Grows in high temp when clovers can struggle

High biomass producer

### Fall planted Hairy vetch/Rye mix

*(Disc clover Sorghum x sudangrass prior to drilling if weed populations are significant, otherwise no-till into flail mowed 0-1" height cover)*

High biomass production (Rye)

Weed suppression through vegetative growth and alleopathic properties (Rye)

High N fixation 150+ lbs. (Hairy vetch)

Easy to establish

Easy to terminate

Early spring growth

Commonly used with growers

### Summer seeded Buckwheat

*Drill into worked seeded bed if perennial weeds are problem, otherwise no-till into mowed hairy vetch/rye cover prior to seed production of either crop. After buckwheat sets seed, lightly disc to allow for reseeding and another cycle. If perennial weeds become problematic, Moldboard plow after first buckwheat crop and manage a stale seedbed until wheat planting)*

Weed Suppression through quick growth

Easy to terminate

Potentially frees P and K

Capture N from Hairy vetch

Fast decomposition

Short growth cycle

**Flail mowing procedure**

Mow at designated height allowing residue to be spread uniformly on the ground

**Rotary mowing procedure**

Mow using batwing mower at 3-4" in height letting residue fall where it may

## **Appendix 5: Throckmorton/Meigs Agronomic Crop Responsibilities (Corn, Soybeans, Wheat, Biomass, Sorghum)**

These apply to agronomic crop plots at the TPAC and Meigs locations

Plot locations will be assigned by ag center staff according to available space, and plot needs with preference given to those who attend TPAC/Meigs day on campus

Land request form is required before space allocations can be made

Multi-year studies require a land request form annually

### **PAC RESPONSIBILITY**

- Equipment Operation
  - Tillage, non-treatment spraying, cultivation, non-treatment fertilizer application, final plot clean up
- Non-treatment chemicals and fertilizers
- General crop scouting
- Plot border management (mowing, spraying, tillage)
- Equipment service and maintenance will be performed by ag center staff (time, parts, and materials will be billed to PI for PI owned equipment)
- Final plot clean up management

### **INVESTIGATOR RESPONSIBILITY**

- Account numbers must be provided to ag center staff prior to any work being done or supplies ordered by ag center staff
- Plot maps
- Necessary marking of sub plots
- Treatment supplies and application labor/management
- Specialized Equipment (sensors, traps, plot harvesters, etc.)
- Investigator-purchased equipment service and maintenance expense (labor, parts, supplies)
- Sample and data collection/analysis
- Initial plot clean up (pulling stakes, flags, etc.)
- Provide ag center staff with all regulation guidelines associated with crops grown

## Appendix 6: Feldun Capacities, Recommendations and Responsibility

**Calving Season** – By the calendar, late Feb-April 15. However, it normally starts with a few heifers calving early in mid-February and continuing through the end of April with a few straggler cows. Calving pastures are checked at least twice per day. Each morning newborn calves are tagged with a visual ‘dangle’ tag, an electronic ID tag, tattooed and bull calves are knife castrated. Data pertaining to calf and cow is recorded in an electronic handheld device. The second trip through the cow calving pastures in the afternoon is to check for cows having problems giving birth. Heifers are checked every 3 to 4 hours during the day and until about midnight each night to monitor for problems. If there are no signs of a heifer starting to calve at midnight, we’ll resume checking them at daybreak. During periods of poor weather conditions, calving pastures are monitored throughout the night to check for cows having problems and to look for newborn calves to prevent chilling.

**Branding/Spring working** -- Cows with calves are weighed, given a leptovaccination, poured with a dewormer and given 2 fly tags. Calves are weighed, given a blackleg and pinkeye vaccination, poured with a dewormer, given a fly tag and steers are implanted with a growth hormone. Cow/calf pairs are then sorted into their appropriate summer grazing group. Usually based on age and sire breed.

**Grazing Season** – Cows are split into 6 grazing groups based on cow sire breed or their production potential. The Oldham rental property generally has about 50 SimAngus based pairs. Simmental sired cows will be kept at FPAC in two groups of approximately 35-40 pairs. Angus sired cows will be kept in two groups of 25 or 45 head depending on the grazing paddock they are placed in. Cows that had calves in the last 20 to 30 days in the calving season are typically sent to the Mullis rental property as are cows that are not high producers. Replacement heifers make up the 7<sup>th</sup> grazing group. They are kept in one group regardless of breed type. In addition to pasture, heifers receive approximately 10-12 pounds of silage daily, solely for the purpose of insuring the IBEP bulls are receiving fresh silage daily. Cows and heifers are checked once daily, except the Mullis ag center which is generally checked every other day. Fences, water source, animal health is inspected at this time.

**Breeding Season** – May 20-July 10. Replacement heifers have been developed at SIPAC. At SIPAC they will be synchronized with lutalyse, cystorelin and CIDRS. They will then be time AI’d within 72 hours of CIDRs being removed. Heifers are then transported back to FPAC within 48 hours of being time AI’d. Cows follow the same protocol at FPAC, unless they had a calf less than 30 days prior to breeding season. Heifers and cows that show signs of standing heat are AI’d prior to 72 hours. Cows that stay at the Oldham rental property are natural bred only. Cows that have had a calf less than 30 days prior to breeding season are likely sent to the Mullis rental property and bred natural service as well. Bulls are turned into the breeding pasture within a week of heifers and cows being bred.

**Weaning/Pregnancy Check** – In late August, Dr. Mark Hilton brings 2 or 3 students from campus to pregnancy check our cows and heifers. At this time we administer 2 respiratory vaccinations and booster the blackleg shot given in the spring. Cows receive a respiratory vaccination. Three to four weeks after pregnancy checking, we booster the respiratory vaccinations, deworm all calves and deworm all cows that are bred and will not be culled for other issues such as disposition, poor structure etc.

**Wintering the Cow Herd** – As pasture growth ceases for the winter and just prior to calving season all groups are brought into their winter calving pastures, fed hay that meets their nutrient requirements as needed. Animal health is checked daily at which time fences, water supply and mineral supply are also checked.

Herd bulls are kept in 3-5 separate lots during the year. Herd bulls housed in the herd bull barn receive approximately 20 pounds of silage daily to supplement their grazing.

## **Appendix 7: Davis Capacities, Recommendations and Responsibility**

### **DPAC Equipment Service and Repair**

#### **PAC RESPONSIBILITY**

- Perform necessary preventive maintenance, service, and repair of equipment (PAC and PI owned). Investigator will be billed for labor, parts, and materials. Labor will be billed on actual time used.
- Provide parts, repairs, supplies and hardware used on PAC owned equipment
- Maintain adequate supply of general shop supplies (common fasteners, lubricants, cleaners, rags, safety supplies, necessary tools) needed for day to day operations.

#### **INVESTIGATOR RESPONSIBILITY**

- Account numbers must be provided to ag center staff prior to any work being done or supplies ordered by PAC staff
- Provide necessary manuals, diagrams, and layouts requested by PAC staff
- Report any issues or breakdowns with equipment ASAP to PAC staff
- Inform PAC staff if equipment needs service or work

### **DPAC Agronomic Crop Responsibilities (Corn, Soybeans, Wheat)**

Plot locations will be assigned by Davis-PAC staff according to available space, and plot needs with preference given to those who attend DPAC day on campus

Land request form is required before space allocations can be made

Multi-year studies require a land request form annually

#### **PAC RESPONSIBILITY**

- Equipment Operation
- Non-treatment chemicals and fertilizers along with Treatments if PAC equipment is utilized
- General crop scouting
- Plot border management (e.g. mowing, spraying, tillage)
- Equipment service and maintenance will be performed by PAC staff (time, parts, and materials will be billed to PI for PI owned equipment)
- Final plot clean up management

#### **INVESTIGATOR RESPONSIBILITY**

- Account numbers must be provided to ag center staff prior to any work being done or supplies ordered by PAC staff
- Plot maps
- Necessary marking of sub plots
- Treatment supplies and application labor/management
- Specialized Equipment (sensors, traps, plot harvesters, etc.)
- Investigator-purchased equipment service and maintenance expense (labor, parts, supplies)
- Sample and data collection/analysis
- Initial plot clean up (pulling stakes, flags, etc.)
- Provide ag center staff with all regulation guidelines associated with crops grown

## **Appendix 8: Northeast Capacities, Recommendations and Responsibility**

### **Northeast Capacities**

- 360 acres of crop land, 200 acres suitable for research.
- 19 fields at NEPAC have between 3 and 10 acres suitable for plot work (average 6 acres)
- 8 fields at NEPAC have between 10 and 18 acres suitable for plot work (average 13 acres)
- 2 fields at NEPAC have over 20 acres suitable for plot work (average 21 acres)
- Basic treatment application capability (seeding rates, N rates, pesticide application)
- Basic scouting ability (stand counts, maturity notes, common weed/insect/disease identification and infestation levels)

### **Northeast Agronomic Crop Responsibilities (Corn, Soybeans, Wheat, Biomass, Sorghum)**

- Plot locations will be assigned by ag center staff according to available space and plot needs
- Land request form is required before space allocations can be made
- Multi-year studies require a land request form annually

### **FARM RESPONSIBILITY**

- Equipment Operation
- Tillage, spraying, cultivation, fertilizer application, final plot clean up
- Non-treatment chemicals and fertilizers
- General crop scouting
- Plot border management (mowing, spraying, tillage)
- Equipment service and maintenance can be performed by ag center staff (parts and materials will be billed to PI for PI owned equipment)
- Final plot clean up management

### **INVESTIGATOR RESPONSIBILITY**

- Account numbers must be provided to ag center staff prior to any work being done or supplies ordered by ag center staff
- Plot maps
- Necessary marking of sub plots
- Treatment supplies and application labor/management
- Specialized Equipment (sensors, traps, plot harvesters, etc.)
- Investigator-purchased equipment service and maintenance expense (parts, supplies)
- Sample and data collection/analysis
- Initial plot clean up (pulling stakes, flags, etc.)
- Provide ag center staff with all regulation guidelines associated with crops grown

## **Appendix 9: Pinney Capacities, Recommendations and Responsibility**

### **CAPACITIES**

- 664 acres of crop land, 560 acres suitable for research
- 3 distinct soil types; Sebewa Loam, Tracy Sandy Loam, and Edwards Shallow Muck
- Corn soybean rotation with predominately conventional tillage with the exception of the Edwards Shallow Muck which is continuous no-till
- Irrigated acres by soil type: Nine 4 acre fields of Sebewa Loam, four 9 acre fields of Tracy Sandy Loam
- Un-irrigated by soil type breakdown: Two 50 acre fields of Muck, one 25 acre Tracy Sandy Loam, and 290 acres of Sebewa Loam ranging in size from 5 acres to 50 acres
- Fields dedicated to vegetables: three 3 acre fields on Tracy Sandy Loam
- Field spaces on Black Sandy soils at the Rice Farm are available by request only from the Director's Office
- 40 acres of Timberland with 10 acres in the CRP
- Basic treatment application capability (seeding rates, N rates, pesticide application)
- Basic scouting ability (stand counts, maturity notes, common weed/insect/disease identification and infestation levels)

### **RESPONSIBILITIES**

#### **GRAIN CROPS**

#### **PAC RESPONSIBILITIES**

- Assign research plot location in designated field upon completion of field request form
- Provide soil test results
- Operate various types of ag center machinery as needed
- Maintain ag center machinery in terms of service and calibration
- Provide fuel, seed, fertilizer, insecticide, and pesticides that are non-treatment or experiment related
- Manage irrigation rig systems and applications upon request
- Assist with plot scouting
- Plot clean up and appearance includes mowing field edges, tilling alleyways, and gleaning off harvestable grain after experiments are finished

#### **RESEARCH STAFF RESPONSIBILITIES**

- Attend Day on Campus to initiate field request process
- Provide account numbers as needed for inputs or repair parts
- Provide updated plot maps throughout the growing season
- Furnish needed inputs specific to the research plot needs; including seed, fertilizers, and pesticides
- Plot layout must conform to equipment provided by the PAC, otherwise needed equipment needs to be provided by the research project
- Hire, supervise, and manage any and all part time labor required by the experiment.
- Assist with scouting, sample and data collection/analysis
- Initial plot clean up (pulling stakes, flags, etc.)
- Provide ag center staff with all regulation guidelines associated with crops grown
- Supply all crews with needed supplies

## TIMBER & HORTICULTURAL CROPS

### PAC RESPONSIBILITIES

- Assign research plot location in designated field upon completion of field request form
- Provide soil test results
- Operate various types of ag center machinery as needed
- Maintain ag center machinery in terms of service and calibration
- Plot clean up and appearance includes mowing field edges, tilling alleyways, and gleaning off harvestable grain after experiments are finished
- Irrigation applications will be a joint effort between PAC and research staff

### RESEARCH STAFF RESPONSIBILITIES

- Attend Day on Campus to initiate field request process
- Provide account numbers as needed for inputs or repair parts, electrical usage on coolers, and liquid propane used for drying ovens, related to research experiments
- Provide updated plot maps throughout the growing season
- Furnish needed inputs specific to the research plot needs; including seed, fertilizers, irrigation supplies, plastic mulch, and pesticides
- Irrigation applications will be a joint effort between PAC and research staff
- Plot layout must conform to equipment provided by the PAC, otherwise needed equipment needs to be provided by the research project
- Hire, supervise, and manage any and all part time labor required by the experiment
- Sample and data collection/analysis
- Initial plot clean up (pulling stakes, flags, etc.)
- Provide ag center staff with all regulation guidelines associated with crops grown
- Supply all crews with needed daily supplies
- Perform any and all requirements associated with High Tunnel and Greenhouse work

## Appendix 10: Southeast Capacities, Recommendations and Responsibility

### SEPAC Agronomic Crops

#### CROP RESEARCH CAPABILITIES

- 800 acres of crop land in 59 fields averaging 13.5 acres in size
  - 22 fields with less than 5 acres
  - 17 fields with 6 to 15 acres
  - 8 fields with 16 to 25 acres
  - 12 fields with 26 to 51 acres
- Capability to conduct crop research in small replicated plots or large replicated strip trials
- Real Time Kinetics system of plot equipment used to provide sub-inch plot accuracy
- Primary agronomic crops grown at SEPAC are corn and soybeans
- Secondary agronomic crops grown at SEPAC are wheat, sorghum, and sunflowers
- Most agronomic crops are planted with no-till crop production practices as the majority of the ag center has 20 to 25 years of continuous no-till history

#### PAC RESPONSIBILITIES

- Provide plot location assignments according to available space, and plot needs with preference given to those who attend SEPAC day on campus meetings
- Setup, maintain and calibrate planters, sprayers, fertilizer applicators and combines
- Operate all tractors, sprayers, planting equipment, fertilizer application equipment, and harvesting equipment
- Provide fuel for all PAC owned equipment only
- Provide non-treatment seed, chemicals and fertilizers
- Provide general crop scouting
- Provide plot border management (mowing, spraying)
- Provide final plot clean up management
- Conduct soil sampling on a 4 year rotation and on 1/2 acre grid layout
- Maintain field operations logs in Farmworks software

#### RESEARCHER RESPONSIBILITIES

- Request field research space annually using PAC research request forms
- Provide account numbers to ag center staff prior to any work being done or supplies ordered by ag center staff
- Prepare and provide plot maps
- Handle necessary marking of sub plots
- Provide treatment supplies and application labor/management
- Provide and setup specialized equipment (sensors, traps, plot harvesters, etc.)
- Fund investigator-purchased equipment service and maintenance expense (labor, parts, supplies)
- Provide sample and data collection and analysis
- Provide initial plot clean up (pulling stakes, flags, etc.)
- Provide ag center staff with all regulation guidelines associated with crops grown

## SEPAC Forestry Crops

### FORESTRY RESEARCH CAPABILITIES

- 1519 acres of established hardwood forests
- 97 acres of hardwood plantations less than 20 years old
- 25 acres fenced deer exclusion areas for forestry research
- Research Request Forms are used annually to request research field space.
- Plot locations will be assigned by ag center staff according to available space, and plot needs with preference given to those who attend SEPAC day on campus meetings.
- Multi-year studies require a land request form annually

### PAC RESPONSIBILITIES

- Provide plot location assignments according to available space, and plot needs with preference given to those who attend SEPAC day on campus meetings
- Provide access roads to forested areas
- Provide general woodland pest scouting
- Provide plot border management (mowing, spraying)

### RESEARCHER RESPONSIBILITIES

- Request field research space annually using PAC research request forms
- Provide account numbers to ag center staff prior to any work being done or supplies ordered by ag center staff
- Provide plot maps
- Handle necessary marking of sub plots
- Provide treatment supplies and application labor/management
- Provide and install specialized equipment (sensors, traps, planters sprayers, etc.)
- Provide investigator-purchased equipment service and maintenance expense (labor, parts, supplies)
- Provide sample and data collection and analysis
- Conduct initial plot clean up (pulling stakes, flags, etc.)
- Provide ag center staff with all regulation guidelines associated with crops grown

## SEPAC Equipment Service and Repair

### SERVICE AND REPAIR CAPABILITIES

- 40' x48' heated shop with basic power tools, hand tool, wrenches and welding equipment for routine machinery maintenance.

### PAC RESPONSIBILITIES

- Service and maintain all PAC owned equipment in field ready condition
- Provide parts, repairs, supplies and hardware used on ag center owned equipment
- Maintain adequate supply of general shop supplies (common fasteners, lubricants, cleaners, rags, safety supplies, necessary tools) needed for day to day operations

### RESEARCHER RESPONSIBILITIES

- Report any issues or breakdowns with equipment ASAP to ag center staff
- Inform ag center staff if their equipment needs service or work
- Provide necessary manuals, diagrams, and layouts requested by ag center staff
- Provide account numbers to ag center staff prior to any work being done or supplies being ordered by ag center staff

## **Appendix 11: Southern Capacities, Recommendations and Responsibility**

### **LOCATION:**

SIPAC is located in the North East corner of Dubois County. It is approximately 180 miles south of main campus with a travel time of 3.5 to 4 hours

### **STAFF RESOURCES:**

One full time Superintendent and 2.5 FTE service staff

One full time Extension forester and 0.5 FTE service staff

### **LAND BASE:**

Permanent Pastures - Endophyte Infected Tall Fescue/Clover

289 acres in 25 different pastures

Low Endophyte Fall Fescue/Clover

89 acres in 5 different pastures

Novel Endophyte Tall Fescue/Clover

51 acres in 3 different pastures

Of these acres in permanent pasture 16 acres in 3 lots are permanently fenced to hold goats

Fields in annual forages – 68 acres in 5 different fields

Dry lot areas – 16 acres in 5 lots

Forested Areas – 590 acres in 31 “compartments”

### **PONDS:**

There are 20 ponds making a total of 18 surface acres of water. They range in size from about 0.5 acres to 3.0 acres

### **LIVESTOCK BASE:**

Beef Cow Herd – SIPAC maintains a herd of approximately 210 fall (September and October) calving crossbred commercial cows. All replacement female are raised from the herd.

Meat Goat herd – SIPAC maintains a herd of approximately 75 spring (May and June) kidding crossbred commercial does. All replacement females are raised from the herd.

Back-grounding – SIPAC does all the back-grounding and heifer development work for the calves born at the Feldun Purdue Agricultural Center. This consists of 220-250 calves each year. Heifers are typically housed at SIPAC from October to May. The steers are housed at SIPAC from October to mid-November.

Aquaculture – warm water fish can be housed May through October

### **FEED STORAGE:**

6 bulk bins with approximately 50 ton of storage

2 bulk commodity bays (flat storage) with approximately 75 ton of storage

200 ton of dry hay in large square bales can be stored inside. The rest of the hay is in outside storage

### **FEEDING FACILITIES**

Beef: Outside lots – 7 lots

13 e - 75' of bunk space, 13 w – 75' of bunk space, lower beef – 100' bunk space, middle beef – 50' of bunk space, upper beef – 70' of bunk space, Mound 1 - 45' of bunk space, Mound 2 – 45' of bunk space

Inside pens – 10 pens

Beef pens – 8 pens with 23’ of bunk space/pen (can be made to 16 pens in non-freezing weather)

Dairy Barn pens – 2 pens with 75’ of bunk space/pen

Goats: Outside lot – at old dairy includes winter water, 10’x16’ shelter, portable feed and hay bunks

Inside pens – at old dairy – 2 pens with winter water and portable feed and hay bunks

We have portable panels that we can make up to 36 individual feeding pens

Aquaculture: in 3.5 acre pond

Have whole pond and individual cage aeration

Can feed up to 6, 4’x4’x6’ cages in dock area

#### **ANIMAL HANDLING FACILITIES:**

Beef – SIPAC has 3 beef handling areas on the ag center. One the “beef barn”, one at the “old dairy” and one out in the grazing area on the north-west side of the ag center. All 3 facilities have sorting pens, crowd tubs, working alley, working chutes and scales.

Goats – SIPAC has 1 goat handling area located at the “old dairy.” It has sorting pens, crowd tub, working alley, turn table for trimming feet, scale and a head catch for herd work.

All scales are digital Tru-Test models that are checked for accuracy each May.

#### **TYPICAL PRODUCTION CYCLES AT SIPAC:**

Beef:

Calving – heifers will start calving around August 25 with the cows following about September 5

Breeding on heifers occurs around Nov 25 starting with AI and herd bulls going in about a week later

Breeding on Cows occurs around December 5 starting with a TAI program and bulls going in about a week later

Herd bulls are left in about 50 days

Weaning occurs between February 1 and March 1 depending on weather and forage supply

Cows go to grass round the first week of April and will graze until January 15 on an average year

Herd work is done in late January (pre weaning shots), February (weaning), March (pregnancy checking annual vaccinations), April (cows to grass), June (fly tags), November (heifer breeding), December (cow breeding)

Grazing – cows are grazed in 3 to 5 groups on an annual basis rotationally grazed being moved every 1 to 3 days

Goats:

Kidding – does will begin kidding around May 5 out on pasture

Breeding - Bucks are turned in around December 1 – they are in the herd 60 days

Weaning occurs about August 10 when kids are 90 days old

Herd work – Pregnancy check occurs in March, parasite control begins on a monthly basis in April using the FEMACH system on the does and deworming kids every 30 days beginning in June

Grazing – does are grazed in 1 to 2 groups on an annual basis rotationally grazed being moved every 1 to 3 days

#### **EXTRA COST THAT SHOULD BE COVERED BY PI OR PROJECT:**

If cows or goats need to be managed in more smaller groups than SIPAC standard operating system

If project requires animals to be feed when there is forage to graze that feed cost should be covered

If project requires animal handling other than normal production practices listed above

If project requires individual or small group feeding labor should be covered

## Appendix 12: Southwest Horticulture Crops Capacities, Recommendations and Responsibility

These apply to all horticulture crops grown at SWPAC and general ag center operations

Total conventional plot area is limited to approx. 15 acres each growing season to allow for sufficient crop rotation

Plot locations will be assigned by SWPAC superintendent according to available space, and plot needs with preference given to those who attend SWPAC Day-on-Campus

A Request for Research Form is required before space allocations can be made

Multi-year studies will require a land request form submitted annually

If pesticides are to be applied as crop rotation applications by PAC the suggested number of treatments should be in increments of 7 for muskmelon trials or trials with 6ft spacing between rows and 5 for watermelon trials or trials with 8ft row spacing. This will allow for adequate coverage.

### **PAC RESPONSIBILITY**

- Applications and Equipment Operation
  - Tillage, bed formation, planting, non-treatment spraying, cultivation, non-treatment fertilizer application, final plot clean up (mowing and plastic/t-tape & irrigation removal)
- Plot & plot border management (mowing, spraying, cultivation)
- Superintendent will manage PI funded students unless otherwise requested with task such as:
  - Plot set-up, maintenance, weed pulling, cultivation,
  - vine turning, driving stakes, tying vines, spraying
  - Laying plastic & t-tape & collecting harvest data
  - Plot clean up initial & final
- Ag center staff will assist with all duties pertaining to plot such as:
  - Plot set-up, maintenance, weed pulling, cultivation,
  - vine turning, driving stakes, tying vines, spraying
  - Laying plastic & t-tape & collecting harvest data
  - Plot clean up initial & final
- Irrigation management based as equivalent to 1 inch per week-unless otherwise instructed
- Fertilization and pest management practices of vegetable crops will be based on the *Midwest Vegetable Production Guide for Commercial Growers* Purdue Extension ID-56 and Extensions Specialist recommendations.
- Pest management practices of vegetable crops will be based on Extensions Specialist, *Midwest Small fruit and Grape Spray Guide* Purdue Extension ID-169, and *Midwest Tree Fruit Spray Guide* Purdue Extension ID -168.
- Soil test will be performed fall prior to vegetable plot establishment using a plot random soil type grid
- Soil pH will be managed at 6.5 level based on fall soil testing
  - Vegetable plot fertilization will be a broadcast application using rates to maintain uniform N, P and K levels sufficient for vegetable production according to ID-56 and Extension Specialist recommendations for crop grown
- General crop scouting
- Maintain wildlife control

- Maintain adequate supply of hand tools (hoes, shovels, rakes, etc.)
- Maintain field operation records of task performed by ag center staff
- Maintain ag center applied pesticide application records and notification as required by WPS
- Equipment service and maintenance will be performed by ag center staff (time, parts, and materials will be billed to investigator for investigator-owned equipment)

#### **INVESTIGATOR RESPONSIBILITY**

- Account numbers must be provided to ag center staff prior to any work being done or supplies ordered by ag center staff
- Provide funding for labor for assistance with plot setup, planting, plot maintenance, data collection, harvesting and plot clean-up
  - *Funding amount to be determined by Superintendent based on amount of labor intense research*
- Provide trays, seed and growing media if the ag center is producing project transplants
- Provide material or funding for specific or specialized pesticides used in plots
- Provide funding for plastic & t-tape plus any expenditures over and above normal management practices
- Provide plot maps and specific management practices
- Provide funding for stakes and tying supplies for crops if needed
- Necessary marking of sub plots & treatments
- Treatment supplies, application labor, and management
- Specialized equipment (sensors, traps, plot harvesters, etc.)
- Conduct sample and data collection/analysis with student labor assistance
- Provide ag center staff with all regulation guidelines associated with crops grown
- Scout plots and make fungicide & insecticide recommendations accordingly
- Communicate with the superintendent when PAC equipment is needed for use in plots
- Inform ag center staff of field operations performed by PI
- Inform ag center staff of pesticide applications performed by PI (ag center will forward information and notify other ag center users as required by WPS)
- Provide ag center staff with chemical label & MSDS sheets for any pesticides used on treatments
- Post information of pesticide applications made by PI at central location and in field in accordance with WPS
- Inform ag center staff in timely manner when data collection is finished

## ***Tree/Grape Capacities, Recommendations, and Responsibilities***

In addition to the SWPAC capacities, recommendations, and responsibilities, these listed below also apply to the tree and grape plantings at SWPAC

Tree planting area is limited to Fields 28, 29, 30 & 32 (approx. 10 acres total) to allow for rotation of vegetable & row crop plots

Grape planting area is limited to fields; V1, V2 & V3 (approx. 3 acres)

### **PAC RESPONSIBILITY**

- Manage irrigation on plots less than 3 years old unless otherwise instructed by PI
- Manage rodent control
- Pest management practices of fruit crops will be based on Extensions Specialist, *Midwest Small fruit and Grape Spray Guide* Purdue Extension ID-169, and *Midwest Tree Fruit Spray Guide* Purdue Extension ID -168.
- Assist with pruning of grapes as agreed upon with PI
- Manage spray applications & records
- Manage fruit harvest with PI assistance when needed
- Collect harvest samples and process PH levels, % brix & titration numbers

### **INVESTIGATOR RESPONSIBILITY**

- Account numbers must be provided to ag center staff prior to any work being done or supplies ordered by ag center staff
- Provide funding or supplies for trellising, post and or stakes
- Provide support for labor to prune, maintain vine growth, collect data, sample & harvest
  - *Funding amount to be determined by Superintendent based on amount of labor intense research*
- Provide materials or funding for pruning & tying supplies
- Provide material or funding to maintain harvest/sampling equipment

## ***Organic Vegetable Capacities, Recommendations, and Responsibilities***

In addition to the SWPAC capacities, recommendations, and responsibilities, these listed below also apply to organic plantings at SWPAC

Organic area is limited to Field 26 (approx. 1 acre) Plot area consist of 4-1/4 acre quadrants within this area and is determined with the amount and type of research performed each year.

### **PAC RESPONSIBILITY**

- Maintain equipment and field operations record as required by NOP Standards
- Provide invoices, labels and paperwork for any ag center purchased inputs as required by NOP Standards
- Maintain crop rotation as determined by PI
- Assist with planting, data collection & harvest
- Assist with plot clean up

### **INVESTIGATOR RESPONSIBILITY**

- Account numbers must be provided to ag center staff prior to any work being done or supplies ordered by ag center staff
- Maintain investigator-purchased input records, labels, search records as required by NOP Standards
- Determine & maintain cover crop rotation in plots not used for vegetables
- Maintain materials and all paperwork associated with Organic certification
- Provide ag center staff with OMRI approved fertilizer & pesticides for applications
- Provide ag center staff with chemical label & MSDS sheets for any pesticides used on treatments
- Post information of pesticide applications made by PI at central location at the ag center in accordance with WPS
- Assist with planting, maintaining, data collection, harvest & plot clean up
- Collect soil samples & provide soil fertility recommendations
- Collect annual water quality sample for certification

## ***High Tunnel Recommendations and Responsibilities***

In addition to the SWPAC capacities, recommendations, and responsibilities, these listed below also apply to studies conducted in high tunnels, low tunnels, or other 'protection' or 'season extension' structures

Current high tunnel assignment will be performed in accordance with SWPAP-based specialists with input from SWPAC superintendent.

### **PAC RESPONSIBILITY**

- Perform necessary maintenance and repair
- Initial plot preparation (tillage, bed preparation)
- Assist with Irrigation set up
- Maintain 24 hr. water supply and access
- Final plot clean up (tillage) and planting of cover crop

### **INVESTIGATOR RESPONSIBILITY**

- Account numbers must be provided to ag center staff prior to any work being done or supplies ordered by ag center staff
- Provide funding for necessary maintenance and repair supplies and labor
  - Current occupant of tunnel will be billed for repair and maintenance supplies of individual tunnels
- Environment control (ventilation, temperature) management and application
- Provide funding for fertigation equipment
- Irrigation and fertigation management and application
- Plastic and t-tape
- Final plot preparation (planting, staking)
- Initial plot clean up (removal of plant material, plastic mulch, irrigation tape, twine)
- Provide ag center staff with chemical label & MSDS sheets for any pesticides used on treatments
- Post information of pesticide applications made by PI at central location at the ag center in accordance with WPS
- Provide additional labor for major repairs (recovering) as requested by ag center superintendent

## ***Greenhouse Operations and Responsibilities for SWPAC***

### **PAC RESPONSIBILITY**

- Maintain adequate greenhouse facilities to produce healthy transplants for field production
  - Includes cleaning and sanitizing benches plus weed control
- Maintain disease & pest control
- Assist with seeding crops in a timely manner in accordance with project needs
- Maintain adequate water & temperatures for plant growth
- Maintain plants on weekends during growing season (March 1<sup>st</sup> – May 15<sup>th</sup>)
- Assist with setup & tear down of organic greenhouse

### **Organic Isolation Procedures**

- Plants are seeded in separate greenhouse used solely for organic production
- Plants are kept separated from conventional plants once removed from greenhouse
- Tray tags are marked as “ORGANIC”.
- Organic fertilizer, seed and media is contained in separate containers with a sealed lids
- Potting benches are swept clean and sanitized when changing from conventional to organic potting media
- Vehicles used to transport transplants to field are swept clean prior to transporting organic transplants

### **INVESTIGATOR RESPONSIBILITY**

- Account numbers must be provided to ag center staff prior to any work being done or supplies ordered by ag center staff
- Provide necessary seeds, media & trays needed for seedling production
- Take lead with timing of seeding
- Assist with cleanliness in & around structures
- Assist with weekend watering when needed
- Assist with maintenance when necessary

### **Pathology Greenhouse**

#### **PAC RESPONSIBILITY**

- Maintain adequate greenhouse facilities to produce transplants
- Assist with pest control
- Provide assistance with maintenance of greenhouse & swamp cooler

#### **INVESTIGATOR RESPONSIBILITY**

- Maintain adequate water & temperatures for plant growth
- Provide funding for 50% of propane usage
- Provide funding for maintenance expenses
- Winterization of swamp cooler system
- Maintain a clean & sanitary facility

## ***SWPAC Agronomic Crop Responsibilities (Corn, Soybeans, Wheat & Canola)***

These apply to agronomic crop plots at SWPAC

Plot locations will be assigned by SWPAC superintendent according to available space and plot needs with preference given to those who attend SWPAC Day-on-Campus

Land request form is required before space allocations can be made

Multi-year studies require a land request form annually

### **PAC RESPONSIBILITY**

- Equipment Operation
  - Tillage, non-treatment spraying, cultivation, non-treatment fertilizer application, final plot clean up
- Non-treatment chemicals and fertilizers
- General crop scouting and note taking (growth stages)
  - unless other arrangements have been made in advance
- Plot border management (mowing, spraying, tillage)
- Equipment service and maintenance will be performed by ag center staff (time, parts, and materials will be billed to PI for PI owned equipment)
- Final plot clean up management

### **INVESTIGATOR RESPONSIBILITY**

- Account numbers must be provided to ag center staff prior to any work being done or supplies ordered by ag center staff
- Plot maps
- Necessary marking of sub plots
- Treatment supplies and application labor/management
- Specialized Equipment (sensors, traps, plot harvesters, etc.)
- Investigator-purchased equipment service and maintenance expense (labor, parts, supplies)
- Sample and data collection/analysis
- Initial plot clean up (pulling stakes, flags, etc.)
- Provide ag center staff with all regulation guidelines associated with crops grown
- Provide chemical labels & MSDS sheets of products used on plots
- Post information of pesticide applications at central location on ag center in accordance with WPS
- Inform ag center staff about visits to ag center
- Inform ag center staff when finished with data collection and/or plots

## ***SWPAC Equipment Service and Repair***

### **PAC RESPONSIBILITY**

- Perform necessary preventive maintenance, service, and repair equipment (ag center and PI owned)
  - Investigator will be billed for labor, parts, and materials
- Provide parts, repairs, supplies and hardware used on ag center owned equipment
- Maintain adequate supply of general shop supplies (common fasteners, lubricants, cleaners, rags, safety supplies, necessary tools) needed for day to day operations.

### **INVESTIGATOR RESPONSIBILITY**

- Account numbers must be provided to ag center staff prior to any work being done or supplies ordered by ag center staff
- Provide necessary manuals, diagrams, and layouts requested by ag center
- Report any issues or breakdowns with equipment or infrastructure ASAP to ag center staff
- Inform ag center staff if equipment needs service or work