



**Annual Oilseed Producer's Meeting Minutes, February 15, 2011.
Berlin Chamber of Commerce, Berlin, Vermont.**

Heather – welcome, commentary on the growth of the meeting, welcomes Hans Kandel from ND State, a broadleaf crops agronomist- soybeans, field pea, canola, sunflowers

Dorn Cox, GreenStart, working on no-till technology for oilseeds, grain, has about 10 farmers working together in his cooperative, and is now able to provide the machinery (roller-crimper, no-till drills) provided through the non-profit. Had some no-till sunflowers, winter canola, pumpkins (possible oilseed) – good luck with soybeans in winter killed oats. Seed cleaner was able to separate volunteer winter rye seed from canola. Used drum cleaner, double screen, one of the Bueler ones (rotary screen). Bought a mosquito screen for canola seed, 'cause it's so small. No-till sunflowers, didn't work out too well – spring was wet and cold, no-tilled into roller-crimped vetch, no germ. Didn't end up reseeding. Cover crop matured about 3 weeks earlier than usual, but the soil was still cold, so germ wasn't so good. Going to work on monitoring soil temp in cover crop systems this year. In future is going to crimp the vetch, and then wait for the soil temp to get up before seeding. Possibly make another pass. Crimping does kill vetch, wait until you see a little bit of the seedpod (past flowering). Have to wait a little longer if crimping legumes. Going to put in 7 acres of flax this year as dairy rations. The non-profit is working with NRCS to monitor soil health, looking to develop a soil health data base throughout the state. Working on farm energy practices. Currently using biodiesel, not making it as of yet. On the docket. Educational and production focused, 50 gal/hr, mobile unit. Continuous batch process.

Roger Rainville, has pressed pumpkin and butternut squash seeds. 40% oil. There are varieties that are specifically devoted to producing oil. (These aren't the kind that he pressed.) Unknown whether they were roasted first. Ended up blowing the nozzle off the press because they were so hard to press. Has also pressed wild mustard (weeds) – 20% oil content.

Dorn – been using the Chinese press, a lot of meal seeps through the press, sucks up a lot of oil. Been challenging, the sunflower goes through easier. Using diesel motor to run the thing 13 hp, works great, but makes a lot of noise, wearing from a labor prospective. 6 ton Chinese Anyang press. (Roger Rainville has a similar one (\$3000? 6 tons a day), but runs it off of 3-phase, but has been using the German press, Kern Kraft (\$15,000), 1 ton a day.)

Roger - German Comet, double head press. In warm warmer weather makes 5-6 gal an hour, below freezing 3-3.5 gal/hr, same ton of seed going through the press. Extraction efficiency goes up if press is heated, if seed is heated. Some prefer to press cold seed. Jon Williamson, moisture content of the seed affects the efficiency. A little bit more moisture will reduce efficiency. So will dirty seed. Moisture is more of a determinant than temperature. Roger says that he didn't notice any difference using clean vs. dirty seed. It flows better using clean, but no oil difference. Seed can be too dry too – 6-8% moist better. Get up to 10-12%, and you reduce the efficiency. Bring cold seed indoors, you'll get condensation.

Jay Peterburgh, Organic Valley, interested in biofuels from fleet side and farm side. Have converted 4 fleet trucks to run on 100 veg oil. He works with farmers on renewable energy, wind, oilseed, etc. OV has a trailer with a Kern Kraft KK40 in it, mobile, educational, automated. Runs 24 hrs a day. Bins for

seed, settling tanks, BioPro 380 in it. Runs in the Midwest, 22 farms. Primary crop: sunflowers, winter canola, some camelina, some flax. Average acreage: 5-65 acres. Sometimes scheduling between the farms can be problematic. Charging \$1/gallon for processing (covers chemical costs). Designed to get people interested, not necessarily a service they plan on continuing to provide. Want to get the local food shed working. Working with the Mass Biofuel Coop. Have had issues with settling vs. filtering.

VSJF hired Chris to look at mobile unit. He looked at two different systems, his conclusions can be found on VSJF website.

Nick Meyer, Organic Valley dairy farm in Hardwick. Bought a BioPro 90 in 2005. Have been making biodiesel from used veg oil. Can't get enough used veg oil, ~50 gal/month. Growing sunflowers for 3 years. Short growing season in Hardwick. Can grow, harvest, dry, store, press, now. Want to press oil, sell, get used back and turn into biodiesel. Getting money for the food grade makes it make sense. Wants to buy a load of the 35 gal (lbs?) cubes, but has to buy a whole truck load. Tried a filter press, still trying to figure it out. Has a Kern Kraft KK40.

UVM Extension, has applied for SARE grant to see what the processing steps are for food-grade oil. A lot of the steps are proprietary. Money will be used to help us figure out the processing (degumming, etc.) that needs to happen before you can sell it to a restaurant. Chris Callahan: variety selection plays a role in making it palatable for a restaurant, so do some of the processing specs (temp of pressing, etc.) Most of the solutions seem industrial (chemical, energy intense). John – 30% of the oil goes out with the food. When you get the oil back, it's inferior, lots of contaminants. Doesn't produce as high a quality product. Glycerin is higher. Don't get back 1:1 what you give a restaurant.

Nick: leave sunflowers in 2 years, rotate in peas and oats for baleage, and then seed down with grass mix (red clover, orchard, timothy grass). Get seed in late May, get harvest in by October. Use Teton, Defender Plus, 306 (slower maturity than Def. Plus, but just as much seed). Do about 10 acres. Wants to double that in the next few years. Had a lot of bird damage this year: 30-40%. Also hit by deer at the edges of the field. Bird machine was good enough for 3-5 acres. (Bird distress calls). Squawk box put in the middle of the field, near the tree line. <\$400. Roger said he got one for ~\$250. Nick, put the squawk box out in mid-August, maybe not early enough. Alan Baker: maybe put out before the seeds start to form. Heather: make sure you remember to change the battery. Jon Williamson: had neighbors complaining about bird cannons, squawk boxes. None of them work for him.

Blue River Organics came out with a new variety. ~75 RM. Variety: Sierra. Organic producers have a hard time getting seeds. Seeds 2000 doesn't have Teton anymore.

Pressing moldy seed – brings fatty acids up, can't use it. Mass guys need to nail down the drying mechanisms. Don't have anything.

Consensus: Aerators – cheap (\$140-250), work. 8" tube, stick it in a 1 ton tote bag, does great. Can bring 14-16% down to acceptable levels in 3 days.

Mass mobile unit – doesn't get moved a whole lot, maybe twice a year. Operates on a 30 mile radius, 5 farms. Wicked heavy, hard to tow. Need to have a water supply (garden hose). Need 220 setup. (Have generator that runs off of the made biodiesel, doesn't work in the winter of course.)

Paul Boivin, condensation = molding. Use an aerator to get moist down, but then monitor it. Watch big changes of weather. When it goes from cold to warm, will condensate, enough to make it mold. Has 20 ton Chinese press. Not set up yet. Growing KB36 (non-GMO, open-pollinated canola), selling for seed. Very hard (impossible?) to get non-GMO canola seed.

John Williamson, processing for 5 farms, lots of additional inquiries. Goal: 1000 acres, probably take another 5 years. Run B100 on their farm, in 5 machines. Capacity of biodiesel reactor: can do 1500L batches, 3 a day. Use solar energy to heat, so can do about one a day. Taby press can run at 3 gal/hr, but he's only been getting around 2 – 2.5 gal/hr. Methanol recovery – some success using solar energy. Been dabbling with sugar crops so can produce own methanol. Mainly looking at sweet sorghum. He put in 24 acres of different oil crop. The neighboring farms added another 25-30 acres. Has better combine now? Crop rotation difficult to figure out. What follows what? His farm, organic, other farms that he works with are conventional. Never considered corn for methanol, want direct. Fertilizer: for organic – cow manure. Grows cover crops, rye on everything. Plowed down. Off-farm, been using conventional fertilizer, herbicides. Soils samples taken over all the fields, and are going to be more meticulous in figuring out crop needs. Hans says that there is some Cranby(?) out of ND. Close to canola potential in terms of oil yields. Cranby has potential for industrial oil. Seed is about the same size as canola.

Larry Scott, Newbury, VT. Been growing oil crops for 5-6 years. Had 38 acres of sunflowers, were looking great, until flooded in early October. 9' of water over field. Couldn't harvest. Tried to harvest in December, still too wet. Going to try to harvest it once the snow melts a bit, before floods in the spring. Larry's goal: uses between 5,000-6,000 gallons a year in trucks, tractors, house. Has Taby, same as John. Wants to be able to provide all of his farm's fuel needs.

Hank Wagner, from Wagner Farms, grows sunflowers, canola (both winter and spring), ~200 total acres for oilseed. Been doing 4-5 years. Have own press, biodiesel reactor (homemade). Use 18 ton Chinese press, not too impressed with it. Sell seed meal to local farmers. Fuel for on farm use. Have beef, sawmill, land clearing business, use 100,000 gallons/year. First year, made 20,000 gallons. Been getting used oil from restaurants. Seed meal as feed: if they're having problems with the press, it will produce an inconsistent meal, which makes it hard to mix into a feed ration. Definitely value in using seed meal as feedstock, supplementing seed meal for grain, using it for protein. Can be too much fat in seed meal, lines the cows stomach, not good for them. Some fat depression in milk, a little bit is a lot... No decline in milk production because ration was balanced. Seed meal could be 30-40% protein, ~\$200/ton of seed meal. Meal for chicken feed? Have to mix in some other stuff, chickens don't like straight seed meal. Meal can mold too. Using seed meal for organic fertilizer ~\$300/ton.

Alan Baker, works with John Williamson and Andrew Knafel. Doing soil samples, insect monitoring. Did some weed counts, etc. Different types of issues for weeds, soil types, buildup of insect problems. Rotation to escape insect pressure: fields too close together, doesn't know if it was worth it. Lots of hedgerow effects, affect banded sunflower moth prevalence, deer, birds, hedgehogs, have somewhere to go. The more upright the head as it matures, the more bird damage. Heads that bow down, fold in, less bird damage. (Head position affected by genetics.)

Hans Kandel, North Dakota State University Extension Agronomist Presentation

Sunflower rotation, following wheat (or corn), 1700 lbs/ac, following sunflower: 1450 lbs/ac. Builds up disease, *Sclerotinia* in particular. Broadleaf after broadleaf, results in disease. So even working in soybeans into a corn, wheat, sunflower could cause problems. Aim for 3 years between crops that are *Sclerotinia* prone crops.

In ND, they use sunflowers to scavenge N that is lower down in the soil profile because has long roots. Putting them in a field that has had a lot of manure, run the risk of excess growth, lodging. Sunflower has a little bit of a tap root, stronger than small grains. Won't go through a really compacted plow pan (alfalfa, tillage radishes more capable).

Short stature hybrids: only 3.5-4' tall. Smaller plants don't reach canopy closure as quickly as the taller ones, might have to adjust row spacing, populations a bit. Dry down can be slower because the heads are bigger. Stalks are slightly more robust.

Confirms Alan's suspicions for head placement and bird predation. There is a lot of variability in the field in terms of head position.

5 lbs N/100 lbs of yield. (1800 lbs yield = 90 lbs N, 2000 lbs yield = 100 lbs N). Need to consider how much N is in the soil, particularly deep in the profile. 2 foot soil samples are optimal, since sunflowers can access that far down. Plant rotations to breakup plow pan so the sunflower can access it.

Sunflowers do pretty well in clay.

Different planting dates will spread the risk of crop loss due to insects, birds.

Sunflowers very responsive to heat units. Very good calculation of crop maturity.

Plant population: oilseed types: 18,000 – 22,000 plants/acre. Confection types 15,000-18,000 plants/acre. (on 30" row spacing)

Solid seeded 24-28000 plants/acre for oilseeds.

In Northeast, we get more moisture, so we've had better success with higher populations.

With 30" rows, North-South probably better planting direction, heads hang between rows (because they face East), harder for birds to feed, less damage and shattering during storms.

Optimal plant row spacing is narrower (~20"), places plants more evenly in the field, particularly since sunflowers are prone to skips and doubles when planting. Narrow rows means less of a penalty for skips and doubles. In soybeans, people have gone back to 30" rows because want to promote airflow to avoid *Sclerotinia*, but then late canopy closer, more weeds. Similar for sunflowers...

Narrower rows give smaller heads, which means at harvest, the heads dry down quicker. Perhaps a good way to avoid bird migration.

Problems with regular sunflower stands all over the country. Causes: improper seed placement, planter malfunction, wrong sized seed for planter, downy mildew, deer. Right depth, right planter plates,

making sure the distance between the plants is right, is the way to get a good stand. Increased speed = decreased precision. Dig up some seeds at planting time as a self-check.

Strip till – makes a narrow strip that is worked up, warms up the soil in that small space. Not completely no-till.

First hours of the seed being in the ground and absorbing moisture, if it is cold, will greatly affect germination. Fungicide treatment helps, but better to have warmer soil.

Don't plant hairy vetch at the same time as sunflower, will grow up and smother the head. Better to plant at V4, won't give up too much yield, will make 1500 kg/ha of biomass. The legume will use the sunlight after harvest to continue securing biomass, fixing N, prevent erosion. Could use legume to be grazed (cows will also eat down sunflower heads, reduce volunteer sunflowers next season), or plow down as green manure. Plant sunflower, do some cultivation, then spread seed, then cultivate some more. ~8 lbs/ac of vetch.

Sunflower bud moth. Causes holes in the sunflower head.

Weed control. Cultivation in between rows. Time of weed control critical – best to hit it early. With a 3 year weed average, looking at weed-free (1770 kg/ha yield), cultivated (1550 kg/ha), weedy (828 kg/ha). Sunflowers are pretty competitive against weeds, particularly after the V8 stage. Sunflowers don't have to compete for moisture or nutrients in the Northeast like they do out West, have deep roots.

Assert (broadleaf herbicide) can cause cupping in sunflowers if it's applied at the wrong time.

Biggest issue affecting yields in the US sunflowers: diseases. Second: row spacing.

Sunflower roots emit a chemical that encourages the *Sclerotinia* black bodies to start to grow. Black bodies will sit dormant in the soil for 10 years, but not all will germinate every year. Spores will affect field peas, velvetleaf, soybeans, canola, weeds. Another way of germinating is that the surface black bodies will sprout mushrooms.

Soils with high organic matter = more biological life, which will attack the *Sclerotinia*. Doesn't take the place of good crop rotation, but taking care of the soil helps.

Sunflower stalk maggot – a few won't damage the stalk. Hard to control once it is already in the stem. Not so concerned about this pest, doesn't necessarily affect yield. Lodging not necessarily associated, more likely due to heavy heads causing the stalk to buckle, excess nutrients, wet soil.

Chris Callahan –Vermont Oilseed Cost Calculator & 2010 Economic Review

Wanted to understand the costs of oilseed production – crop costs, costs of processing (oil, meal, seed, fuel), greenhouse gas production

Developed Excel spreadsheet cost calculator. Provides typical numbers in case you don't know your costs. Will determine cost of seed, cost of meal, cost of gallon of biodiesel, cost of gallon of oil. Available on the VSJF, Callahan Engineering site, and UVM Extension websites.

Taking all the costs of production and figuring out how much it costs from field prep to harvest and drying. Includes field prep, planting, seed costs, cultivation, herbicides, fertilizer, harvesting costs, handling costs, hauling, drying costs, storage costs, pressing costs, biodiesel conversion. Adds in the price you get from meal for selling it for feed or fertilizer, etc.

Multiple users of equipment will spread capital costs across more product – drives cost down. Especially important in biodiesel production where the chemical costs (i.e. methanol) are a major contributing factor.

Currently VT oilseed farms are making fuel at a very reasonable cost, and many are operating at below capacity. An increase in production acreage, or pressing volume, would bring cost of fuel gallons even lower, since most significant costs are variable, and can be improved upon with economies of scale.

Definitely worth fiddling around with the calculator to find out which scenario would be the most productive for each farm.

VSJF – will be putting out \$150,000 in grants for oilseed production. Will be going out to look at past grantees. Will be putting out some RFPs for looking at new projects, or for continuation of current projects. Will be able to fund projects through 2012, but this looks to be the last funding cycle due to the budget deficit and a moratorium on earmarks.

Eric Garza- PhD at UVM – Energy Return of VT Biodiesel

Energy return on biodiesel produced in VT. Energy return being a function of energy outputs (lower heating value of fuel) over energy inputs (fuels, embodied energy in equipment manufacture, human labor, etc.)

The conversion of used oil into biodiesel, one of the major costs is still the reagents. Puts a ceiling of 5:1 on energy return.

Energy of using fertilizer and pesticides affects energy surplus.

Philip Halteman, Heather Darby – UVM Extension

Lodging problems, due to over fertilization. Because sunflowers have such deep roots, we should be taking soil samples two feet down. Half again as much nitrogen can be in the second foot.

Research this year showed that 60 lbs was slightly advantageous over 0 lbs, but did not result in higher yields when compared to 90 lbs and 120 lbs. See research reports, available on UVM Extension website.

Results from seeding rate studies – haven't nailed down the best population yet, varies a lot from year to year. Best to have a harvest pop between 24000 and 30000. NOT the same thing as planting density.

Insect pests – Sunflower stem maggot

-Philip went around and split stalks all over the state, caught a lot of these maggots on traps. 90% of the stalks he split had maggots, most he found was 6 or 7. Philip also split lodged stalks, couldn't find any correlation between lodged stalks and maggots.

Banded sunflower moth – particularly around the edges of the fields. Can cause a LOT of damage. Red larvae, create webbing. Hard to see. Seeds will get holes in them as the maggots empty them out. UVM Extension found that ~30% of seeds were empty from harvest plots due to the maggots. Some of Extension's trials had a lot of maggot damage, some didn't. Will be looking at trying to find out how to manage cultural practices to avoid this maggot. They only have a 2-3 week window in which the adult lays eggs. Maybe can avoid? Extension noticed that later planted trial didn't have nearly as much maggot damage.

Sclerotinia Wilt – Head rot and Base rot. Can manifest in thready, white, skeletal looking head. Can also manifest in base, spread root to root all along a row.

Fields that followed sunflowers after sunflowers – significantly reduced yields and populations (almost half).

UVM Extension helps individuals and communities put research-based knowledge to work.

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