



UNIVERSITY OF ILLINOIS EXTENSION

College of Agricultural, Consumer, and Environmental Sciences

Illinois Fruit and Vegetable News

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A newsletter for commercial growers of fruit and vegetable crops

"We are what we repeatedly do. Excellence, then, is not an act, but a habit." Aristotle

Address any questions or comments regarding this newsletter to the individual authors listed after each article or to its editor, Rick Weinzierl, 217-244-2126, weinzierl@illinois.edu. The *Illinois Fruit and Vegetable News* is available on the web at: <http://ipm.illinois.edu/ifvn/>. To receive email notification of new postings of this newsletter, call or write Rick Weinzierl at the number or email address above.

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Upcoming Programs

- **Small Farms & Local Foods Webinars, January 24 – March 29** ... a series of webinars on a variety of topics that relate to small farms and local foods will be held at University of Illinois Extension offices throughout the state. For a schedule, see <http://web.extension.illinois.edu/smallfarm/events.cfm> or contact Steve Cravens at scravens@illinois.edu or 309-342-5108, ext. 131. *Common Garden Pests* will be the topic for the March 13 (7pm) and the March 15 (1 pm) webinar.
- **GAPs - Good Agricultural Practices for Safer Fresh Produce, March 16, 2012**, 8:30 a.m. – 4:00 p.m. at U of I Extension's Sangamon County Office in Springfield. Preregistration is required by March 12. For more information and to register, see <http://web.extension.illinois.edu/units/event.cfm?UnitID=483&EventID=56933> or call 217-782-4617.
- **Meet the Buyers Event for Fruit and Vegetable Farmers, March 27, 2012**, at the Champaign County Farm Bureau Building, 800 N. Country Fair Drive, Champaign, IL. Programming from 8:30 a.m. to 5:00 p.m. will include presentations on MarketReady, GAPs, food hubs, and the Edible Economy Project, and buyers who will be present to talk directly with growers will include Schnuck's, Central Illinois Produce, Strawberry Fields, Common Ground, Feeding Illinois, Feeding America, Hendrick House, and University of Illinois Food Services. There is no charge for growers to attend but pre-registration is requested – call 217-352-5235.
- **Meet the Buyers Event for Fruit and Vegetable Farmers, April 4, 2012**, at John A. Logan Community College, 700 Logan College Drive, Carterville, IL. Programming from 8:30 a.m. to 5:00 p.m. will include presentations on MarketReady, GAPs, and food hubs, and produce buyers who will be present to meet directly with growers include a health food co-op and health food store, a restaurant, a foodservice distributor, university food services, food banks, and a grocery chain capable of taking direct store deliveries). There is no charge for growers to attend but pre-registration is requested – call the Williamson County Farm Bureau at 618-993-2609.
- **SW Illinois Orchard Twilight Meeting, April 12, 2012**. Joe Ringhausen Orchards, located 24748 Reddish Rd., Fieldon, IL. Program begins at 6:00 p.m. and will include discussions led by UI Extension on early season insect and disease management in fruit crops. For more information contact Andrew Holsinger at 217-532-3941 or aholsing@illinois.edu.
- **SW Illinois Orchard Twilight Meeting, May 24, 2012**. Eckert's Grafton Farm, 20995 Eckert Orchard Lane, Grafton, IL. Program begins at 6:00 p.m. For more information contact Andrew Holsinger at 217-532-3941 or aholsing@illinois.edu.

Notes from Chris Doll

The meteorological winter that just ended was the sixth warmest for the SW Illinois area, with the average daily temperature being 5.9 degrees above the normal. The winter low, we hope, was 13 degrees, which means that tender fruit buds are still alive. In the Back 40, apricots are showing the first pink on March 6, which is eight days earlier than in 2007. At the time of this writing, the temperatures are climbing toward the 70's for a couple of days, so phenological growth will move pretty quickly. Japanese plums are close behind the apricots, and some peach varieties are showing green tip as well as swollen buds. It looks like a year to test to optimism of fruit growers, with some stress already recorded because of hail and wind.

With the arrival of the month of March came the winds, which are supposed to be in the 40 mph area again today (March 6). Hopefully it will calm down in time for the majority of early season sprays to be applied. Rainfall remains short in this area, and corn growers are applying anhydrous with pretty good soil conditions. Early planting looks like a possibility for both tree fruits and small fruits.

And then it will be time for the age-old question about the rainfastness of the applied pesticides. Michigan State researchers have done some research on some of the common insecticides for codling moth, and the results of their studies are on pages 264 and 265 of the Michigan Fruit Management Guide for 2012. One chart for an inch of rain indicates that Asana and Assail have insufficient residue left one day after one inch of rain, and Calypso and Proclaim join them one day after a two-inch rain. All of the other insecticides that were tested (Guthion, Imidan, Delegate, Altacor and Belt), had insufficient residue left at 7 days after a 2-inch rain. (Similar charts and some explanations by John Wise are available online at http://news.msue.msu.edu/news/article/rainfast_characteristics_of_insecticides.)

A common question asked by tree fruit growers is why dwarf rootstocks for peaches are not as common as they are for apples. For one, the need for tree size control on peach is not as critical as on apple. The push for breeding, selection and testing on apple stock began years ago (I even had a project measuring fruit size, shape, and weight of Delicious apples from numerous rootstocks some 60 years ago). There are some breeding projects in the *Prunus* genus, and also NC 140 regional research projects that give optimism for the future. At the International Fruit Tree Association meeting in 2011, Dr. Greg Reigard from Clemson University gave a summary of peach rootstock research and some of the problems that need to be overcome in rootstock selection. Among these are the fact that peach seedling rootstocks inherently lacked traits such as scion dwarfing, tolerance to soil waterlogging, drought, calcareous soils, nematodes, crown gall, fungus problems, and orchard replant problems. In addition to these, rootstock suckering can be a major constraint in some selections, as well as the effects on fruit size, yield, and quality. With all the research now underway, I am optimistic that development of some new peach rootstocks will be successful, as will efforts with sweet cherries.

Chris Doll

For Fruit and Vegetable Growers

High Tunnels

An excellent publication on high tunnels, the *Iowa High Tunnel Fruit and Vegetable Production Manual*, is available online at <http://www.extension.iastate.edu/Publications/PM2098.pdf>. It includes chapters on site selection, soil management and fertility, types of tunnels, construction, mulches, drip irrigation, bed arrangement and plant spacing, pest management, and business planning and marketing. It also includes worksheets on fertilization, row design, and business planning and marketing.

Azera Insecticide Registered for Use in Organic Production

The US EPA recently approved registration of Azera insecticide (not to be confused with Hyundai's Azera car line) produced by McLaughlin Gormley King. It contains two active ingredients – azadirachtin (neem) and pyrethrin. It's labeled for use on most fruit and vegetable crops for the control of a range of pests, including aphids, whiteflies, leafminers, Colorado potato beetle, cucumber beetle, thrips, stink bugs, and caterpillars. It is approved for use on organic crops by the National Organic Program and the Organic Materials Review Institute. Organic growers should

consider this product to be the equivalent of a tank-mix of previously available OMRI-approved neem and pyrethrin products. It's likely to be particularly useful for control of Japanese beetles.

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Fruit Production and Pest Management

Prebloom Emulsifiable Oil Applications

Application of a superior oil or a horticultural oil (highly refined oils with an emulsifier so that they mix with water) is recommended in nearly all Midwestern apple and peach orchards during the “delayed dormant” period between green tip and bloom. Labels generally call for application of 2 gallons of oil per 100 gallons of water (2 percent by volume) in sufficient water for thorough coverage of all trunks, branches, and twigs at or shortly after green tip. As growth approaches pink stage, labels for some products call for reduction of rates to ½ or 1 percent by volume, though many growers use the 2-percent concentration all the way through pink without harm to plants. Prebloom application of emulsifiable oils leaves a thin film of oil that suffocates eggs of European red mite and rosy apple aphid and immature overwintering San Jose scales on branches and twigs. This is an inexpensive way to prevent or reduce problems with these pests later in the season, and oil applications at this time have little or no negative impact on beneficial species. All distributors of pesticides for use in fruit production carry one or more brand names of these oils, and they may be broadly called dormant oils, superior oils, emulsifiable oils, or horticultural oils. Most are approved for use in certified organic production. Use an oil spray only when the temperature is above 40 F and will remain above freezing for the next twenty-four to forty-eight hours.

Plum Curculio and Stink Bug/ Plant Bug Control at Petal Fall



Left to right: Plum curculio adult, egg-laying scars on small apples; expanded scars later in the season. (Photos from Michigan State University; <http://www.ipm.msu.edu/fruitpests/plumcurculio.htm>.)



Left to right: Brown stink bug adult (N. Carolina State University); catfacing damage to peach caused by stink bug feeding (W. Virginia University); tarnished plant bug adult; tarnished plant bug injury to apples (both from Washington State University).

If the weather in the next week or two develops as predicted, it's not too soon to provide reminders about petal fall sprays of insecticides in apples and peaches so that plans are in place when we reach that stage (let's hope that's not too soon).

The most common targets of insecticides applied immediately after petal fall in apples and peaches are the plum curculio, stink bugs, and plant bugs. Other potential targets of petal fall sprays include rosy apple aphid, redbanded leafroller, and spotted tentiform leafminer in apples, and oriental fruit moth in peaches. For a list of insecticides labeled for use against these less common insects (at least for most Illinois growers) at petal fall, see pages 12 (apples) and 34 (peaches) of the [2012 Midwest Tree Fruit Spray Guide](#). Targeting specific insecticides against the less frequent pests (at this time) is NOT necessary in most orchards, so base the insecticide in petal fall sprays on the need to control plum curculio and plant bugs and stink bugs.

In apples, petal fall sprays effective against plum curculio include Imidan, Guthion, Avaunt, and several pyrethroids. For growers with woody areas near and around orchards, the need for plum curculio control is best predicted by observations of damage last year. Where orchards are surrounded by agronomic crops, it is less likely that curculio will be necessary, and the need for sprays can be based scouting for initial signs of egg-laying (but be ready to treat very soon after initial damage is observed). This year (2012) is the final year that Guthion may be used on apples, and only one application is allowed, so growers should be using up the last of any supplies. Using pyrethroids in apples at this time is discouraged because they kill predaceous mites and “release” populations of European red mite. Imidan and Guthion are organophosphates, so if buyers demand that no organophosphates be used, Avaunt is a good alternative for plum curculio control. Pyrethroids are the most effective choices for combined control of plum curculio, stink bugs, and plant bugs in peaches at petal fall; see the list of registered pyrethroids on page 34 of the 2012 Spray Guide. The best petal-fall option for control of these insects in organic production is to combine repeated applications of Surround plus a pyrethrin (such as Pyganic).

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Vegetable Production and Pest Management

Seed and Root Maggots

Early plantings of several vegetable crops are especially susceptible to damage by seedcorn maggot, cabbage maggot, or onion maggot. All of these species overwinter in the pupal stage, and adults of a first generation emerge in the spring. Flies prefer to lay eggs in fields where organic matter is high (recently incorporated manure or cover crops), and damage is greatest in cold, wet soils where plant growth is slowed.

Seedcorn maggots most commonly feed on the seeds and seedlings of corn, beans, peas, and cucurbits; they also may be found along with onion maggot or cabbage maggot infesting onions and plants in the cabbage family (Brassicaceae). Flies typically emerge in April and May, and females prefer to lay eggs in fields with abundant decaying organic matter (where manure or a cover crop was recently incorporated). Peak emergence of flies occurs at 200 degree-days above a base of 39F (with accumulations beginning when ground has thawed); damage to seeds or seedlings is greatest over the 10 days after this peak. Larvae feed on decaying plant material in soils but also tunnel into seeds (and sometimes transplants) and reduce successful germination and stand establishment. Losses to seedcorn maggot can be reduced by incorporating manure or cover crops at least 3 weeks before planting or transplanting, preparing a well-tilled seedbed, and waiting until soil temperatures have warmed so that germination and early plant growth are rapid. Seeds of sweet corn, snap beans, and peas can be treated with a diazinon or diazinon+lindane seed treatment to prevent seedcorn maggot damage; soil insecticides used for corn rootworm control in sweet corn also kill seedcorn maggots. Neonicotinoids used in seed treatments on cucurbits or in-furrow applications to soil when cucurbits are planted or transplanted are not effective for seedcorn maggot control. Where damage results in reduced stands, replanting or resetting transplants can be done 4-5 days later without likelihood of damage to the new seeds or transplants.

First generation cabbage maggot flies also emerge in April or May, and they too prefer to lay eggs in soils with high amounts of organic matter. Peak flight of first generation flies occurs at 300 degree-days (base 43F) after March 1. Larvae tunnel into the roots and stems of cabbage, broccoli, Brussels sprouts, cauliflower, radishes, turnips, and rutabagas. Early cabbage and turnips are especially susceptible to injury. Damage is reduced by delaying planting and by avoiding fields with high amounts of fresh organic matter. Soil application of Capture LFR, Lorsban, or Diazinon provides effective control of first generation maggots for cabbage, broccoli, Brussels sprouts, and cauliflower, but these insecticides are not labeled for short-season crops such as radishes and turnips.

The first generation of onion maggot flies emerges in May and lays eggs at the base of plants, where larvae tunnel into underground portions of plants. Subsequent generations in July and August-September also damage onions. Cultural control of onion maggot centers on removing and destroying cull onions and rotating this year's plantings as far as possible from last year's. As onions mature, they are less susceptible to onion maggot infestation unless they are damaged by cultivation equipment. Soil applications of Lorsban can be used to control onion maggot in dry bulb onions, and soil applications of Diazinon may be used to protect green onions or dry bulb onions.



Left: Seedcorn maggot larva and damage (from E.A. Heinrichs et al., *Maize Insect Pests in North America*, at ipmworld.umn.edu/chapters/maize.htm). Right: seedcorn maggot adult flies (photo by Jeff Hahn at www.extension.umn.edu/.../YGLN-June1502.html).



Left: Cabbage maggots on cabbage root. Right: onion maggot injury to green onions. (Photos from University of Minnesota).

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Biological Control Resources

The Great Lakes Vegetable Workers Group (GLVWG) met last week in Lansing, MI, and one topic of discussion was the development of two new resources on the biological control of insects. The GLVWG-sponsored project, led by Mary Gardiner of Ohio State University, produced two excellent references – a youtube video on **Identifying and Enhancing Natural Enemies in Vegetable Crops** (<http://www.youtube.com/watch?v=r1EYCevAgnY>), and **Natural Enemy Field Guide** (http://www.oardc.ohio-state.edu/ale/images/Natural_Enemies_1_page_handout.pdf), a 2-page fact sheet. Both may be useful to growers interested in identifying the “good” insects that help to control the harmful ones.

Grafting Tomatoes

Another topic of interest at the Great Lakes Vegetable Workers Group meeting was grafting tomatoes for resistance to soil-borne diseases. Two particularly useful online references on grafting are available at: <http://www.oardc.ohio-state.edu/graftingtomato/Grafting%20Tech%20Final%20-%20low%20res.pdf> and <http://oardc.osu.edu/graftingtomato/grafting-english.htm>.

Insecticide Modes of Action ... Neonicotinoids

Admire, Provado, Actara, Platinum, Cruiser, Assail, Calypso, Belay, Scorpion, and Venom (and others) are names of insecticides that are somewhat familiar to those involved in vegetable or fruit production. Most are used to control aphids, white flies, spider mites, and other sucking/rasping-sucking insect pests, as well as flea beetles; a few are more broadly toxic to other beetles and caterpillars. Some are especially useful in managing subterranean insect pests. The active ingredients in these products belong to a group of insecticides commonly termed “neonicotinoids” (IRAC Group 4). Like the organophosphates, carbamates, and pyrethroids covered in previous issues of this newsletter, they kill certain insects and insect relatives by disturbing the rather delicate nature of the nervous system – but they do so in a slightly different way.

A neuron (nerve cell) becomes electrically charged when it transmits information. The charge travels away from the cell body along an axon (“nerve fiber”) to its end, where it reaches a gap between that fiber and a receiving neuron or muscle cell. That gap is called a synapse or a synaptic cleft. If a signal or impulse is to reach the receptors of the next cell, it must somehow cross that gap. This is accomplished by transforming the electrical signal into a chemical signal called a neurotransmitter. One common neurotransmitter is acetylcholine. Acetylcholine rapidly diffuses across the synapse, attaches itself to molecules in the receptor cell’s membrane, and triggers a new electrical impulse in that cell. This happens because the shape of the receptor site changes when acetylcholine attaches, forming an opening in the membrane. Sodium rushes through the opening, the charge of the neuron changes, and the signal moves through the receptor cell. The enzyme acetylcholinesterase rapidly degrades acetylcholine, allowing receptors to close ... the impulse has been transmitted and the system is again ready for subsequent impulses. The idea is that neurons transfer information (they “fire”) when needed, and they must stop firing when the job is done. Insecticides typically disrupt at least one of the previous steps, poisoning the organisms exposed to them at sufficient doses.

Neonicotinoids are acetylcholine mimics ... they act like the neurotransmitter acetylcholine in synapses. They open the gates of receptor cells and trigger their actions when no message is otherwise being transmitted by the nervous system. Portions of the molecules of the insecticides in this group are similar enough to acetylcholine that they attach to receptors, but they are not similar enough to be degraded by acetylcholinesterase. They open the gates, sodium rushes in when it should not, and the receptor cell begins to fire when it should not. Then they “hang around” because they are not susceptible to breakdown by acetylcholinesterase. The symptoms of neonicotinoid poisoning usually include tremors and convulsions in the poisoned organism.

Several neonicotinoids are “systemic insecticides” in plants. They are taken up by roots (or sometimes leaves) and flow through the plant’s vascular system to other parts of the plant, where they are ingested by feeding insects. First developed in the 1970s, neonicotinoids first entered the market place in the 1980s. Their popularity exploded in recent years as new active ingredients were identified and more soil or seed treatment uses were approved (for systemic uptake and control of pests feeding on above-ground parts of plants). Today, the majority of seed corn (for field corn production) is treated with some type of neonicotinoid seed treatment (imidacloprid and thiamethoxam primarily). This is likely to have some long-term implications for both row crop and vegetable production. Other popular row-crop insecticides are not very systemic, and they are typically applied in a band that surrounds the seed. As the roots of the plant grow beyond the band, a refuge is created. In other words, pests feeding outside the band are not exposed to the insecticide. Only those feeding within the band are exposed. If resistant individuals are present, the evolution of resistance is slowed because resistant individuals mate with those not exposed to the banded insecticide. Because neonicotinoids course throughout the plant, there is no band-like refuge. Nor are there neonicotinoid refuge requirements in row crops. All insects feeding on a neonicotinoid-treated seedling are exposed to the insecticide, and no “dilution” of resistance occurs. This is likely to lead to resistance to neonicotinoids in at least some pest species that also infest vegetable crops (perhaps corn flea beetles, as an example).

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Local Foods Issues

Illinois SARE Facebook Page

The Illinois SARE PDP program now has a Facebook page (<https://www.facebook.com/ILSARE>). It's intended to provide yet another resource for farmers, ranchers, and interested community members to connect over issues important to sustainable agriculture, local foods, pest management, food safety, Farm-to-School, and more. Please visit and tell us what you would like to see on our page.

And, what do you think?... In the Local Foods Issues section of the February 22, 2012 issue of Illinois Fruit and Vegetable News, the article: "*Multiple Routes of Pesticide Exposure for Honey Bees Living Near Agricultural Fields*" suggested that neonicotinoids used as seed treatments on corn and soybeans may be playing a role in the mortality of honey bees. Visit the Illinois SARE Facebook page (<https://www.facebook.com/ILSARE>) and share your opinion ... are you seeing a decline in bee populations and pollination on your farm?

The Illinois SARE Facebook page (<https://www.facebook.com/ILSARE>) also provides a link to a video recording of a recent presentation by Dr. Christina Grozinger of Penn State University on *The Global Pollinator Crisis*.

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Introducing the Know Your Farmer, Know Your Food Compass

The Know Your Farmer, Know Your Food (KYF) Compass is a new online resource about USDA's support of local and regional food, available at <http://www.usda.gov/KYFCompass>. The Compass is an online, multi-media narrative with stories, pictures and video about USDA's support for local and regional food systems, plus an interactive map of USDA-supported local and regional food activities in all 50 states. With the Compass, you can:

- Learn about USDA resources to develop local and regional food enterprises - from seasonal high tunnels that extend the growing season, to technical assistance for beginning and experienced producers, to support for marketing, processing, distribution and retail infrastructure.
- See case studies and photos of successful producers and projects from around the country.
- Navigate the interactive KYF Compass Map, which shows the location and focus of many USDA-supported local and regional food projects.
- Watch videos documenting how others are building strong local and regional food businesses, expanding local food production on their farms and ranches, and making change in their communities.
- Join the national conversation. If you're a customer, meet a farmer. If you're a farmer, talk to your customers. Continue the conversation in your neighborhood, town and community about what local foods mean to you.

The KYF Compass is a result of the USDA's Know Your Farmer, Know Your Food Initiative. Launched in 2009, the Know Your Farmer, Know Your Food Initiative has been working with the USDA's 17 agencies to coordinate USDA's work and investments in local and regional food systems.

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USDA NRCS Funding Opportunities

Conservation Reserve Program

Deadline: April 6, 2012. General Sign-Up #43: March 12 to April 6, 2012

CRP is a voluntary program that helps agricultural producers use environmentally sensitive land for conservation benefits. Producers enrolled in CRP plant long-term, resource conserving covers to control soil erosion, improve water and air quality and develop wildlife habitat. In return, FSA provides participants with rental payments and cost-share assistance. Contract duration is between 10 to 15 years.

Environmental Quality Incentives Program (EQIP)

Four Major Conservation Initiatives are open for funding, and NRCS accepts applications for financial assistance on a continuous basis throughout the year. Applications will be ranked for each initiative in the following periods:

Seasonal High Tunnel: February 3, March 30, and June 1, 2012

Organic: February 3, March 30, and June 1, 2012

On-Farm Energy: February 3, March 30 and June 1, 2012

Air Quality Initiative: February 3 and March 30, 2012

At the end of a ranking period, NRCS ranks all submitted proposals for funding consideration. NRCS will notify all applicants of the results of the rankings and begin developing contracts with selected applicants. Visit the NRCS [National Web site](#) for more information on how to apply for these initiatives and connect with an [NRCS office](#) near you.

Seasonal High Tunnel Pilot Initiative: NRCS helps producers plan and implement high tunnels, steel-framed, polyethylene-covered structures that extend growing seasons in an environmentally safe manner. High tunnel benefits include better plant and soil quality, fewer nutrients and pesticides in the environment, and better air quality due to fewer vehicles being needed to transport crops. More than 4,000 high tunnels have been planned and implemented nationwide through this initiative over the past two years.

Organic Initiative: NRCS helps certified organic growers and producers working to achieve organic certification install conservation practices for organic production. New for fiscal year 2012, applicants will be evaluated continuously during the ranking periods. Applications meeting or exceeding a threshold score may be approved for an EQIP contract before the end of the ranking period. Applications rating below the threshold score will be deferred to the next period. A new threshold score will be established at the beginning of each ranking period. This new scoring process allows organic producers to implement conservation practices in a timelier manner.

On-Farm Energy Initiative: NRCS and producers develop Agricultural Energy Management Plans (AgEMP) or farm energy audits that assess energy consumption on an operation. NRCS then uses audit data to develop energy conservation recommendations. Each AgEMP has a landscape component that assesses equipment and farming processes and a farm headquarters component that assesses power usage and efficiencies in livestock buildings, grain handling operations, and similar facilities to support the farm operation.

Air Quality Initiative: NRCS helps producers address air quality concerns on their operations. Assistance includes establishing cover crops, planting windbreaks, implementing nutrient management practices and applying other conservation measures that mitigate and prevent air quality problems. Conservation practices installed through this initiative reduce airborne particulate matter and greenhouse gases and conserve energy.

Less seriously ...

At the Great Lakes Vegetable Workers Group meeting in Lansing, Michigan last week, several of us ate supper at Leo's Lodge, a popular local establishment. Not to be outdone by the more high-brow establishments that offer "surf and turf" in a more expensive form, Leo's menu includes "Great Lakes surf and turf" – batter-fried smelt and a venison burger. Hey, it was *local* food (and you could get it with vegetables).

A few oxymorons ... (or I guess, to be correct, oxymora) ...

Deliberate mistake
Unbiased opinion
Extremely average
Incredibly common
More unique
Exact estimate
Working vacation
Legally drunk
Act naturally

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