

MIDWEST APPLE

IMPROVEMENT ASSOCIATION

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President's Message

Mitch Lynd

THE NEXT BIG THING!

Congratulations to Dennis Courtier, Pepin Heights, Minnesota for creating the perfect name for a company organized to profitably manage the next new apple destined for greatness. If we were to ask Dennis what his biggest problem is with the newly organized NBT CO-OP I'll bet his answer will have more to do with people than apples but certainly high on his list has to be trying to figure out just exactly what the next big thing will be after Minnesota 1914, his current first choice for capturing a worthwhile share of the apple market.

The growers want high yields, no pre-harvest drop, a harvest window that does not conflict with other favorites and a host of other production considerations; the packers want apples to be more bruise resistant; the politicians, environmentalists and charitable foundations want a smaller carbon footprint (locally grown), and less pesticide use; the health professionals want nutritional improvement; the retailers want longer shelf life, ceramic smooth skins, drop dead gorgeous colors, huge profit margins, and a failsafe marketing plan with a "killer" name.....

BUT NONE OF THIS MATTERS IF CONSUMERS DON'T BUY THE APPLES! THEY HAVE TO FLY OFF THE SHELVES IN THE FACE OF THOUSANDS OF OTHER FOOD CHOICES! IN A FREE MARKET ECONOMY.

ULTIMATELY, HOW APPLES TASTE TRUMPS EVERYTHING ELSE!

I must admit there was a good case for why late bloom trumped everything last year when we said nothing else mattered if there were no apples on the trees. This was certainly the case for a wide region south of I-70 and east of the Rockies in 2007 where apple crops were wiped out by late spring freezes. So, which is worse, "no crop" or no demand for it? The answer is both are essential but "no crop" is a local and/or temporary inconvenience compared to no demand. An occasional crop loss is more survivable than the loss of the consumer. Just ask American auto manufacturers or IBM (who no longer even makes computers) or the growers of Rome Beauty apples what happens when competitive product superiority erodes your market share. We will continue the pursuit of late bloom, disease resistance, and nutritional improvement but only while keeping the apples' taste number one on our improvement agenda with all other considerations remaining subordinate to taste improvement.

WHAT MAKES AN APPLE TASTE GOOD?

- **TEXTURE**, ranges from crispy and breaking like HONEYCRISP to chewy and tough like GRANNY SMITH. Crispy/breaking is preferred to chewy/tough. Some apples become mealy as they soften like DELICIOUS, very objectionable.
- **FIRMNESS**, ranges from hard to soft across all textures. All apples can be picked firm but the rate they soften (their respiration rate) is temperature and genetically driven. All apples eventually become soft. Long keepers like FUJI and GOLDRUSH are desirable for more days than poor keepers like MACINTOSH and CORTLAND. A chewy/tough texture is tolerated if the flesh is firm. Historically, long keeping quality was linked only with late season maturity dates but HONEYCRISP was a breakthrough apple with regard to a low rate of respiration linked with short season maturity. Prior to this, GALA was the best keeper among the short season (normally poor keeping) apples.
- **JUICINESS**, ranges from very juicy like HONEYCRISP to dry like ROME BEAUTY. Unless they are used for drying, the juicier the better.
- **SWEETNESS**, ranges from very sweet like GOLDRUSH and FUJI to very little sweetness like PAULA RED. In general the late season maturity date cultivars have much more sugar than the short season maturity date cultivars. In spite of low sugars, GALA tastes sweet because of low acids. Conversely, GOLDRUSH tastes tart because of very high acid levels overriding very high sugars. Apples with high soluble solids (mostly sugars) are strongly preferred over low soluble solids apples whether they come across the tongue as sweet or tart.
- **ACIDITY**, ranges from very little acidity like FUJI to tart like GOLDRUSH. There seems to be a strong ethnic preference by ASIAN people for lower acid apples and a decided ethnic preference by EUROPEANS for higher acid apples. Most people prefer a SWEET/TART balance between sweetness (sugar) and tartness (acid) like an eastern grown GOLDEN DELICIOUS or a western grown PINOVA. As time passes, acid levels in apples seem to drop faster than sugars. As a result, apples like SUNCRISP AND GOLDRUSH come off the tree tasting very tart but taste sweet/tart by Christmas, becoming very sweet by spring. The sugars are declining all this

FLAVORS FOUND IN MAIA APPLES

By a panel of Abbott Labs professional tasters, Oct. 2006

POSITIVE

APPLE
PEAR
RASPBERRY
STRAWBERRY
CITRUS
ORANGE
LEMON
ANISE
BROWN SUGAR
WALNUT

NEGATIVE

MUSTY
FERMENTED
ALDEHYDE
METALLIC
ASTRINGENT
BITTER

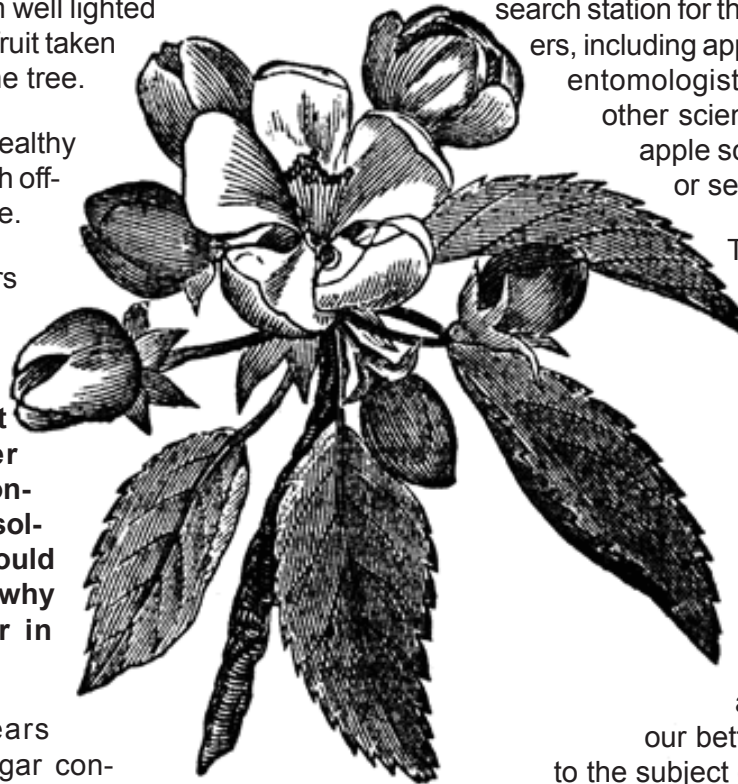
time but the acids decline even faster. About 25% of all people prefer tart apples, 25% prefer sweet and 50% prefer a sweet/tart balance. Across all ranges of the sweet/tart spectrum there is a broad based preference for all high soluble solids apples.

- **SKIN**, ranges from hard and tough like DELICIOUS and MACINTOSH to tender and soft like GOLDEN DELICIOUS and SUNCRISP. Most russet apples have tender/soft skins and like Golden and Sun-crisp. They are noticeably porous and shrivel from dehydration unless kept in very high humidity or protected by a plastic crate liner. Consumers often object to hard/tough skin on apples and show a definite preference for the softer tender skinned apples.
- **FLAVORS** that can occur in apple range wider than is generally realized including but not limited to most of the flavors found in the rose family of plants. They can be good or bad but the key point to remember about flavor is that complexity or blending several of the good ones gives the most desirable effect, a rich full flavored effect.

As a general observation most apples taste boring to most consumers most of the time. This was an observation of the above mentioned panel of professional food tasters. They were surprised to discover the wide range of flavors naturally occurring within apples and expressed their opinion that based on the flavor complexity of our best selections, apple demand could be expanded significantly. These were *subjective* findings by outside experts.

SOLUBLE SOLIDS

- Single best *objective* measurement of how good fruit tastes.
- Measured with a refractometer, cheap, easy to use instrument, quick results
- Higher in cultivars that are genetically small. (**Soluble solids are made in the leaves and stored in the fruit.** The smaller volume of fruit available for storage results in a higher concentration of soluble solids in small fruited cultivars.)
- Lower in fruit from over-cropped trees. Higher in well thinned crops.
- Higher in later maturing cultivars, lower in earlier ones (**more time**).
- Higher in fruit taken from well lighted part of the tree, lower in fruit taken from a shaded part of the tree.
- Higher from trees with healthy foliage, lower in trees with off-color or damaged foliage.
- Higher in russet cultivars than smooth skinned ones. (**My hunch is that the porous skins of russet apples result in evaporative water loss out of the fruit, concentrating the soluble solids left behind. This would also partially explain why apples taste sweeter in drought years.**)
- Higher in drought years (**Less clouds**) and sugar concentration from evaporative water loss through the fruit skins.
- Higher as apples approach maturity. Helps decide when to pick.



I well remember when we owned an orchard with some Chestnut Crabs as pollinators. My mother would always request a 5 gallon bucket of them for her annual migration to Florida. She loved their intense flavor and conveniently small snack size, 1.5 to 2". We are not breeding and selecting for small russets but I will

be slow to discard a good one remembering that mom could have asked for any of the 30 apples we grew at the time but she always insisted on those little russeted Chestnut Crabs. We never harvested them except a few for her because of the high cost of picking plus they would immediately drop through the cull eliminator chain at the beginning of the packing line. The orchard was not located where we could U-Pick it but in retrospect it does not seem like a totally crazy idea to establish a new U-Pick orchard that would include this choice for folks. Chestnut Crabs typically score above 20% soluble solids in central Ohio.

USDA-ARS APPLE GERMPLASM REPOSITORY, GENEVA, NEW YORK

Curator Phil Forsline and his staff maintain a collection of over 4,000 different cultivars of apple at this U.S.D.A. research station for the benefit of apple researchers, including apple breeders, horticulturists, entomologists, plant pathologists and other scientists or hobbyists needing apple scionwood, budwood, pollen or seeds.

The value of the system has expanded exponentially with the coming of computers, data base programs, extensive public data and easy internet access.

In plowing through their data base I have made some interesting discoveries with regard to apples in general and especially as compared to some of our better seedlings. With regard to the subject of soluble solids they have posted data from 11 recent years. The numbers posted are the average refractometer readings from 3 different fruits selected at maturity.

In each of the 11 studies the soluble solids are indexed from the lowest to the highest readings. In the 2003 study of 500 accessions the top 70 were crab apples. The highest rated large fruited apple was GOLDEN RUSSET in 71st place with a soluble solids reading of 21.2%. Almost all the commercial sized cultivars with over 17% soluble solids were somewhat to fully russeted cultivars.

What is striking to me is that we have identified about 20 MAIA seedlings so far that have soluble solids readings over 17% and at least half of them have glossy smooth skins! Fuji is the only commercially grown apple currently rolling off U.S. packing lines that can consistently make 17% soluble solids! LY1-60, a seedling growing behind my house registered 18% soluble solids on October 5th this past fall, pressure tested 20 pounds at the time and tasted so good that the grandkids ate them all before I remembered to put some away for the show at Dawes Arboretum and testing for storage life.

This fall hundreds of seedlings will fruit for the first time. I will not be surprised if the next big thing comes from seedlings growing in the MAIA collections. I am especially eager to make more crosses this spring to further upgrade our best selections and spread their genes across more maturity dates. A key cross for this year involves our best advanced selections and the best carrier of multiple pyramided scab resistance genes to hopefully hold scab off for the next 300 years! We'll be making our 2nd red fleshed cross and several crosses aimed at eclipsing the magic 17% soluble solids target.

CLOSING THOUGHT

The Europeans have for many years maintained an apple per capita consumption rate about 3 times of the U.S. Could it be that all those russet apples they grow have something to do with this? Is it possible we could become creative and courageous enough to promote one apple that tastes fantastic but looks a little more "country" and a little less like Madison Avenue or Wall Street? After all, those folks aren't lookin' all that slick right now as they try to figure out how much to mark down the value of their sub prime derivatives! Short term thinking can lead to long term disaster. Just maybe obsession with outward appearance at the expense of internal quality is why Americans eat less apples than Europeans. It has often been said "Americans buy apples with their eyes, Europeans buy apples with their tongues".

OPPORTUNITY TIME

It's time to write a check for \$100 to MAIA, and mail it to:

MAIA
Attn: Anna Whipkey
Dept. of Horticulture and Landscape Architecture
625 Agriculture Mall Drive
West Lafayette, IN 47907-2010

MAIA (brief) History & Outlook

Ed Fackler

History

For those new members I'd like to briefly outline how it all began. Sometime in 1995 Mitch and I started discussing the problems facing lower Midwest apple growers. And it was quickly concluded that the single MAJOR problem was lack of annual cropping within the *then-current* available (and poplar) varieties. All of them were bred somewhere else with annual cropping abilities severely wanting.

Anyway we started contacting various direct-market growers and Midwest University apple experts to ascertain the amount of interest in breeding late-blooming apples with quality equal to or greater than Fuji. Much to my surprise, there was much interest in pursuing the project largely due, I think to Mitch's exceptional oratory skills. He was invited to speak on many Horticulture programs that winter and the rest is history.

The first formal business/planning meeting was held at our home in Southern Indiana and turned out to be a very productive session. In my mind, Jim Eckert and Jules Janick were very instrumental in jump-starting MAIA's immediate future during that meeting with timely comments and very good questions.

The first set of crosses was made in 1997 and resulted in several thousand seedlings being distributed to many growers in the spring of 2000. One of those crosses has already produced 20 or more "elites" or selections worthy of propagation for further detailed evaluation.

Since then more crosses have been made and trees planted, primarily at Dawes Arboretum in Newark, OH. Dawes donated several acres for seedling planting and a deer fence has been erected. Some of those seedlings will fruit for the 1st time this year. Dawes has also donated land for planting potentially new genetic and/or unusual germplasm trees from Diane Miller's collection efforts in South-Central Asia.

Outlook

Often to my surprise MAIA's future looks great! At last year's annual meeting the members present voted unanimously to incorporate as a 501c5 and authorized the Board of Directors to draft by-laws. We have also created the Midwest Apple Foundation, a 501c3 corporation who's main purpose is to fund MAIA. Through

MAF we can apply for grants and accept charitable gifts which are deductible. Annual hybridizing continues on several levels and we've finally found an eastern nursery that will grow off the seed at very little expense. Several advanced selections (I hate to call them "elite" at this stage) have been budded to Bud. 9 and trees have planted in three locations this spring.

One thing that continues to haunt me some is the evaluation process of fruit from seedling trees. A huge number of them will produce their first crop this fall. Currently only Mitch and I are doing annual evaluations at different locations. And **both of us are very biased** (in different ways, I should add)! We desperately need other, **non-apple folks** to become familiar with and annually partake in this tedious process. If any of you are available this fall and willing to assist, please contact either Mitch at 740-967-5355 or me at 812-366-3181. We have a weekly schedule beginning in late August through October for these evaluation adventures. We'd be glad to have you come along or meet us at the respective location.

The other aspect of evaluations that I think requires a bit of attention is defining the character that I'll call "eatibility" or plain old **mouth feel when taking that 1st bite**. A number of folks rely on cute little gadgets called refractometers (soluble solids or sugar levels) and pressure testers (firmness) to define "keepers" or "spitters". While I'm fully aware that these tools are legit in the evaluation process, I'd like to share the following observation. The two **most popular (and heaviest planted) "new" varieties** are Gala and Honeycrisp according to tree broker, Van Moore. Neither of these apples possesses high soluble solids or hard/firm fleshed fruit. So I strongly think that "eatibility" trumps everything in the selection process or more bluntly, if folks won't eat them we don't need to grow them!

Anyway the future of MAIA continues to improve I think. Diane Miller is putting together a great meeting this November 1 at Dawes. If you attended the last meeting at Dawes, you know what a great meeting can be. If you didn't attend you missed a great one indeed. Attendance was at an all time high with many new folks attending from several eastern states. Janna Beckerman (of Purdue) gave a great talk on the fallacy of "disease resistance" (scab mutants which ignore the V_f gene), Diane Miller (of Ohio State) discussed the opportunities in the use of different germplasm (and combinations) to deal with this breakdown in scab resistance, and Joe Goffreda (of Rutgers) talked at length about the trials and tribulations of his evaluation process plus

he brought some 60 odd selections of apples from his hybridization efforts for us to sample.

The only thing missing (my vantage point, only) was apple beer. And I'm working on that!

MAIA 2008 Meeting

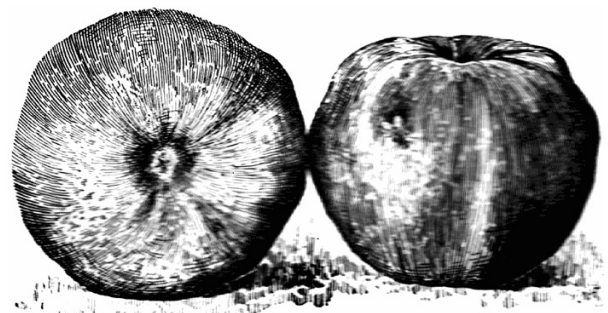
Dawes Arboretum

Newark, Ohio

Saturday, November 1

NOVEMBER 1, 2008! SAVE THE DATE! The annual meeting of the Midwest Apple Improvement Association will be held on Saturday November 1, 2008 at Dawes Arboretum, Newark, OH. We will have apples to taste and education galore! We intend to have a speaker to answer the questions: "Just what is the V_f gene for scab resistance; How has the scab fungus overcome that resistance; and How is pyramiding of resistance genes accomplished?" We also intend to have an update on the newest information from the Apple Germplasm Repository. And of course, we will have reports on the crosses made by MAIA in 2008 and the latest thoughts on growing and evaluating seedlings.

Our MAIA meeting will follow the Apple Crop Germplasm Committee meeting (USDA committee) at Dawes Arboretum all day on Friday October 31. This committee meets annually (often at Geneva, NY) to discuss current events in apple germplasm collection, usage and evaluation. In 2008 the committee is meeting at Dawes to find out about the activities of the MAIA! The committee includes approximately 20 apple researchers and enthusiasts from around the U.S. If any MAIA members would like to sit in as guests to the Apple Crop Germplasm Committee meeting please let Diane Miller know and a request to attend will be made on your behalf. In addition, we are hopeful some of the ACGC members will participate in our MAIA meeting the following day.



MAIA to be important part of SARE Grant

Diane Miller is project coordinator for a North Central Region – SARE grant with primary grantee being Fruit Growers Marketing Association. Partner Organizations are the Midwest Apple Improvement Association and the Upper Midwest Organic Tree Fruit Growers Network. The grant is over three years beginning November 2008 and funded at \$121,200 with the goal of figuring out how to introduce a diverse array of new apple varieties into the marketplace.

Abstract – Project Title: Marketing Apple Diversity

Project Coordinator: Dr. Diane Doud Miller, Tree Fruit Extension and Research, OARDC/Ohio State University, Wooster, OH 44691; miller.87@osu.edu; 330-705-1357

An interesting new array of apple varieties, which are diverse in genetic traits (flavor, texture, disease-resistance) could be grown by Midwest fruit growers (organic, sustainable and conventional), with even more interesting diversity in the variety development pipeline. Growers are concerned however that the marketing of these varieties will be limited by consumer unfamiliarity with the variety names. In this project we will determine if consumers will purchase/select apples based upon labeling by fruit characteristics (such as mild-sweet; spicy-tart; predominately tart), production method (sustainable), and/ or growing area (locally grown), with or without variety name. If so, this knowledge will greatly facilitate introduction of new varieties, reduce pesticide use and allow an evolution to more adapted and interesting local varieties in the Midwest US. Consumers

in this project will be college students (future customers), natural food market customers, and conventional grocery store customers. Outcomes will be grower and consumer awareness of new apple variety attributes and increased demand pulling increased production of environmentally friendly varieties. Results and updates will be presented to growers in the Midwest annually using a range of communication technologies, including the MOSES network. Evaluation will include surveys of attitude changes, number of farmers and consumers involved and their review of information, increased planting and marketing of new varieties. This project will also help determine new variety selection criteria for the apple breeding project, Midwest Apple Improvement Association (MAIA), a regional not-for-profit, with which FGMA is involved, and a multi-state board of MAIA members will advise and oversee the project.

If you are interested in seeing the entire proposal please contact Diane Miller and she will email you a copy. There is an important role for a group of advisors representing MAIA in this project!



MAIA

Finance Report 2007

INCOME

Dues	\$7,725.00
Donation	\$2,500.00
Interest	\$678.87
Total income	\$10,903.87

EXPENSES

Seedling trees	-\$719.00
Treasurer	-\$800.00
Postage	-\$84.49
Newsletter	-\$91.79
Office supplies	-\$33.47
Meeting	-\$778.00
Incorporation fees	-\$4,385.00
Total expenses	-\$6,891.75

Balance **\$20,076.86**