

From the Pawpaw Patch

Kentucky Workshop a Success

By Kirk W. Pomper

Kentucky State University and the PawPaw Foundation hosted a Pawpaw Workshop on Saturday, September 11, 2004, at the KSU Research Farm in Frankfort, Kentucky. Approximately 100 people—including tobacco farmers, producers for farmer's markets, home gardeners, university faculty, and members of the press—attended the workshop. Participants were from 13 U.S. states as well as Germany.

After KSU Provost Dr. Juanita Fleming led the group in a moment of silence to remember those lost in the 2001 terrorist attacks, there were presentations as well as opportunities to taste pawpaw fruit. Dr. Kirk Pomper, the Principal Investigator of Horticulture in the KSU Land Grant Program, made two presentations: "Pawpaw 101" and "An Update on the



Attendees at the KSU Pawpaw Workshop tour the Regional Variety Trial orchard.

Kentucky Pawpaw Regional Variety Trial." A Propagation Roundtable, led by Dr. Robert Geneve, University of Kentucky (UK) and Ms. Sheri Crabtree (KSU), concerned cooperative research between the two universities in seedling and clonal propagation methods.

Dr. Douglas Archbold and Ms. Federica Galli, both from UK, discussed cooperative research on

pawpaw fruit ripening and storage. Drs. Changzheng Wang and Meshack Afitlhile, both from KSU, presented research on the high antioxidant capacity and healthy polyunsaturated fatty acid profiles in pawpaw fruit.

Mr. Neal Peterson of the PawPaw Foundation announced the release of new pawpaw cultivars. Pomper, Peterson, and Chris Chmiel of Integration Acres discussed the marketing of the pawpaws.

After the formal presentations, participants tasted over 20 pawpaw fruit varieties, toured the Kentucky State University orchards, and sampled pawpaw ice cream and pawpaw wine.

For information concerning pawpaw and future workshops, please call Dr. Kirk Pomper at 502-597-5942 or e-mail him at kpomper@gwmail.kysu.edu.

Pawpaw Postal Stamp Design Contest

The PawPaw Foundation Board of Directors is sponsoring a contest for a drawing, or other artwork, in the form of a pawpaw postage stamp. The winning artwork will be submitted by PPF to the Citizens' Stamp Advisory Committee for review as a future stamp. PPF will award **\$250** to the artist who submits the winning artwork, with **\$250 more** awarded if the post office actually issues the stamp. A post office website that describes how stamps are selected can be found at: <http://usps.com/communications/organization/csac.htm>. Stamp designing is an unusual art form requiring exacting skill in portraying a subject within very small dimensions. For further information, e-mail Dr. Kirk Pomper at kpomper@dcr.net or call 502-597-6174.

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Pawpaw Tasting Highlights Kentucky State/PawPaw Foundation Workshop

By Kirk W. Pomper

The Kentucky State University/PawPaw Foundation Pawpaw Workshop was the setting for a pawpaw variety taste test on September 11, 2004. This was an informal taste test without strict guidelines; however, some interesting trends are noticeable in the preferences of the people who participated in the tasting experience.

How was the test conducted? Each participant received a copy of the accompanying evaluation sheet, and slices of the pawpaw varieties were available on plates on a table. About 100 people attended the workshop; however, as can be noted in the "n" column above, between five and 33 people tasted each selection. Participants were not required to taste all the selections; therefore, some people may have tasted only a subset of the selections. Whole uncut fruit were also placed on each plate with the cut slices, so the size and appearance of the fruit, as well as pulp color, could have influenced whether a person chose to taste the pawpaw variety.

The greatest number of people ranked the pawpaw variety NC-1 in the excellent category. The selections Shenandoah, 1-7-2, 4-2, and K2-7 all received at least ten excellent ranking by participants. The former two selections, 4-2 and 1-7-2, will be released by Neal Peterson in the near future as new cultivars. Both K2-7 and K8-2 fared well in the taste test; these selections will be released as new cultivars this year by KSU.

Participants also commented

PAWPAP FLAVOR								
Selection	1 Excellent	2 Good	3 Fair	4 Poor	5 Awful	Melon aftertaste	Bitter aftertaste	n*
Shenandoah	14	16	3			2		33
1-7-2	14	13	5			4		32
4-2	10	13	1	4		5	3	28
7-90	6	6	12	4	1	1	1	29
10-35	7	10	7	3		3	4	27
Overleese	8	11	10	4		5	1	33
PA-Golden		4	11	8	4	1	5	27
Zimmerman	5	11	10	1	1	2		28
NC-1	15	8	5	3		4	2	31
Prolific	4	10	12	1		1	2	27
Taylor	6	9	11	2		1		28
Taytwo	2	6	12	3		3	6	23
Sweet Alice	4	11	11	3		2	1	29
Middletown	5	5	9	2	2	1	2	23
Wells	1	3	12	6	1	1	3	23
K2-7	10	10	7	1		1	1	28
K8-2	2	13	7	4		3	1	28
Mitchell	2	11	5	3		2		21
Shawnee trail	9	9	3			4	2	21
Susquehana	5							5

The chart above shows the numbers for each of the pawpaw varieties that were tasted and rated by workshop participants.

on particular taste attributes. Many people have stated in the past that they believe that Overleese has a melon aftertaste; five of the 33 people who evaluated Overleese indicated that they detected a melon aftertaste. The melon aftertaste is a positive attribute for some people and a negative attribute for others.

Since PA-Golden is a very early ripening variety, the fruits from this cultivar were held in the refrigerator in self-sealing plastic bags for about two weeks prior

to the taste test. This could have caused a decline in fruit quality; however, we did note generally poor flavor and an astringent quality in fresh PA-Golden fruit this year. We do not recall PA-Golden fruit having this poor flavor previously. We will be tracking year to year variation in fruit flavor in the future.

Only limited quantities of the pawpaw variety Susquehanna were available; however, the five people who tasted it all ranked it in the excellent category.

From the Pawpaw Patch is an occasional newsletter published by the PawPaw Foundation and distributed to its members. We welcome your letters, articles, suggestions, and advertisements. This issue was edited and designed by Neal Peterson and Colleen Anderson.

Sequence and Consequence

Blossom development in *Asimina triloba*

By Neal Peterson and Eliane Norman

Blossom time for pawpaw trees is upon us, those of us who live in the Northern Hemisphere. Often times we read that hand pollination of pawpaws is an effective way of obtaining pawpaw fruit when flies and beetles fail to do their job. But how do we know when to collect pollen? And when is a flower ready to receive pollen? The following descriptions are a helpful guide.

Stage 1: The dark brown velvety bud expands in size; the pedicel (flower stem) elongates and bends downward.

Stage 2: The sepals separate, revealing the outer petals, green in color.

Stage 3: The petals emerge, green in color, and expand in size, revealing the small inner petals.

Stage 4: The petals begin to turn color, show a mixture of green and maroon, and continue expanding. The stigmas appear swollen and glossy (or fuzzy white).

Stage 5: The petals reach full size; the color is wholly maroon; the nectary band (found in the inner whorl of petals) is usually of a paler color. The flower shape is bell-like; the outer petals are positioned mostly downward and are somewhat closed; the tips of the inner petals become recurved and although mostly closed, they leave a small gap for the admission of insects. One must pull back the inner petals in order to view the pistils and anthers. The stigmas appear swollen and glossy, pale green or almost white in color (sometimes more fuzzy than glossy). The ball of anthers is a

hard, tightly packed mass, green in color, or rarely pinkish.

Stage 6: Both inner and outer petals flare back noticeably, exposing the ball of anthers. The tip of the outer petals becomes recurved, if they did not do so in Stage 5. The stigmas are dried, brownish in color, and often break off from the ovary. The ball of anthers turns tan or brown in color, is no longer hard, is instead loose and friable. The individual anthers dehisce (release their pollen) and pollen grains are visible as a yellowish powder among the anthers.

Stage 7: The anthers drop off the torus of the flower. The petals wither and detach. If the flower was successfully fertilized, the pistils begin expanding in size, and the pedicel begins to thicken. Otherwise the pistils detach from the torus, and the flower pedicel detaches from the branch.

Note: The flower is female and receptive in stages 4 and 5, provided that the stigmas appear receptive as described above. The flower ceases being receptive in stage 6, becoming male when the flower enters anthesis (the shedding of pollen). The length of time that the flower spends in stage 5 varies, depending on weather, especially temperature, but typically is two or three days. The length of stage 6 is briefer, usually one day. Pollen is most easily collected by means of harvesting whole anthers just as the flower enters stage 6, when the anther ball turns color and loses its compactness, but prior to anthesis.

From the Desk of the President

By Kirk W. Pomper

We had the largest pawpaw crop ever at Kentucky State University (KSU) in 2004. About 1500 pawpaw trees had fruit last year! The pawpaw orchards escaped several mid-April frost events without damage. A pawpaw rootstock trial, with the cultivars Sunflower and Susquehanna budded onto seedling rootstock from Sunflower, PA-Golden, or K8-2, was planted in 2004 and of the 160 trees planted only two trees were lost over the summer. This spring we will again conduct experiments to improve fruit set on young pawpaw trees and examine cluster thinning and its influence on fruit size.

In other news: about 100 people attended the 2004 KSU/PPF pawpaw field in Frankfort, KY. The KSU pawpaw ice cream and pawpaw wine, from White Owl Winery in Illinois, added to the festivities at the field day. Two pawpaw selections (K2-7 and K8-2) will be released this year to nurseries with KSU trademark names. Valentine's Gourmet Ice Cream, LLC, Winchester, KY is planning on making and marketing a pawpaw ice cream in 2005. Check out the KSU website at www.pawpaw.kysu.edu for more pawpaw news.

As always, happy pawpaw hunting!

Pawpaw Chef's Challenge

Last fall the Blue Moon Cafe in York, PA hosted a chef's challenge, for which four local chefs contributed original pawpaw dishes for a complete meal. The cafe was full, not a seat remained to be filled. Below is the menu:

Appetizer: Canapes d'Admiral with Pawpaw Cream, by Chef Hoyt Wine of La Country Cuisine Restaurant.

Salad: with Sweet and Sour Pawpaw Dressing, by Chef Diane Weaver of Blue Moon Cafe.

Entree: Stuffed Chicken Breast with Pawpaw Mousse on Portobello Mushrooms and Pawpaw Sauce, by Chef Denis Saurnier of Blue Moon Cafe.

Dessert: Choctaw Pawpaw Pudding with Creme Anglais, Pecans & Chocolate Sauce, by Chef David Haines and students of the York Culinary Institute.

The pawpaws used in the recipes were contributed by Jim Davis of Deep Run Pawpaw Orchard in Westminster, MD. Pawpaw bread and muffins were contributed by Judy Bono of Susquehanna Heartland Slow Food. And an excellent pawpaw sweet wine was contributed by White Owl Winery of Birds, Illinois.

A PawPaw

By Maurice Thompson

In dusky groves, where cheerily all day long,
Mocking the nuthatch and the cardinal,
The trim drab catbird trolls its fitful song,
I hear the mellow golden pawpaws fall.
... What luscious fruit! scorned as of little worth
By those who long for guavas of the South,
Figs and bananas, pining that the North
Is barren of the luxuries of the earth!
Fruit that I sought in childhood with a mouth
Eager to taste thy wild delicious juice!
What orange grown in groves of Italy,
Or what pomegranate ripened in the dews
Of Grecian isles, would I not now refuse
For the rare-flavored, racy pulp of these?

*Taken from the website "Old Poetry" <http://oldpoetry.com/poetry/38649>.
Maurice Thompson lived in Indiana and wrote in the late 19th century.*

Letters from R

Pawpaws Out West

June 2004

Neal,

This is an update. All three varieties of your pawpaws have leaves on them and are doing really WELL. When I planted them I gave them some tree root starter solution that is supposed to prevent shock. I don't know if it helped, but they were not in shock long, only 2 to 3 weeks. Then they started growing leaves. Now all three varieties have MANY leaves. All are very healthy and growing strong.

After they arrived we had a cold spring. That may have helped reduce transplant shock. Usually we can plant most things here after May 12 since that is usually the last day of frost. Until then the pawpaw trees were in shock and didn't do much. But when it warmed up the pawpaw trees grew leaves. Since then it has been an unusually HOT spring in the low 90s. The pawpaw trees seem to love this.

I realize I haven't followed your instructions of not giving any fertilizer the first year. Since the soil and water are alkaline here in Salt Lake City, I have been giving the pawpaw trees 1 to 1.5 gallons of water every weekend that has Miracle Gro liquid soluble fertilizer in it (acid variety). I have been told by local nursery people that acid loving plants will do well here if they are given acid loving fertilizer every week or two weeks.

We are the 2nd driest state in the nation. Because of this we use about the most water per capita of any state. Our humidity levels are often 5% or less, which is as dry or drier than most big famous deserts. This means watering is

critical here. We are also in our 6th continuous year of a severe drought. We don't have a hard pan soil like you imagine Arizona and Nevada to be. We might in rural Utah but not in the city. Our environment here is quite man made and unnatural. The soil is often rich and nice.

Yesterday I went to a plant nursery. The owner asked me how the pawpaw trees are doing. He is very interested. If they do well this summer, he will probably order some from you next year. Everyone here who knows about the pawpaw trees asks me about them. They have sort of made me famous among people I know. No one here I've met has ever seen a pawpaw or eaten one. Everyone here who I tell about the pawpaw trees is VERY interested.

I have much hope the pawpaw trees will survive here since magnolia trees and other acid loving trees and plants foreign to here do well if they are given the proper care.

Thank you again for these very special trees!!! This is a wonderful legacy you are leaving on this Earth. Very few people leave such a legacy.

Brian Roberts
Salt Lake City, UT

Spreading the News

January 2004
Hi Neal,

After all these years, I had a nice crop of pawpaws on one of my trees. A few each year, but nothing like this year. Hence, this brought back memories of our collaboration and I was wondering how you were doing. My wife blended pawpaws with bananas in a nut bread that was really great. So

great that my son-in-law's parents who visited us a few week-ends ago wanted to know more about pawpaws. So I told him what I knew. I knew I had your brochure from last year and found it. I gave them a copy and told them to go on your website to learn more. My wife and I too are on your website now. You have a great website! I am pleased that all is going so well. My son-in-law's father wants to plant pawpaws now. You should hear from him.

I too want to plant pawpaws at our home in West Virginia. We own a home with about 3 acres in Arthurdale just southeast of Morgantown, in Preston County. My wife says you need to put some recipes for pawpaws on your website. Possible where homemakers can send in their favorites so we can share in the great taste of this fruit in some neat desserts. Take care.

John P. Cherry
Blue Bell, PA
E-mail communication

Experimental Pawpaws

Neal,

I'm in Southern California, which is considered experimental.

The Pawpaws I've tried are grafted 9 inch sleeves (Sunflower, Rebecca's Gold, Prolific, Pennsylvania Golden). They grow very slow and get clorotic leaves after July. Then the leaves turn yellowish and some fall off as early as August.

I've experimented with full sun, 55% shade cloth and standard wood lattice. The 55% shade cloth was slightly better than full sun. Best results were with alternating

full sun/full shade with the wood lattice.

The Shenandoah variety and another local variety did not have this leaf problem. The leaf structure of your variety and this local selection appear different than the other varieties mentioned above.

I live in an inland valley with hot dry summers. People on the coast and north from me report growing pawpaws very well.

I couldn't grow papayas before (very marginal area because of winter cold and root rot issues) but have figured out how to do it. I'm sure it's just a matter of time before I figure out this pawpaw problem.

Thanks for letting me know your status and please update me when you are ready to take orders.

Do you know if there is a Mycorrhizal fungi that the pawpaw has a symbiotic relationship with? That may be part of my problem since I'm growing in a fir bark, peat and sand media.

Tom Conover
Huntington Beach, CA

Below: Texas reader and pawpaw grower Roy Stark sent us this picture of himself and his tree.



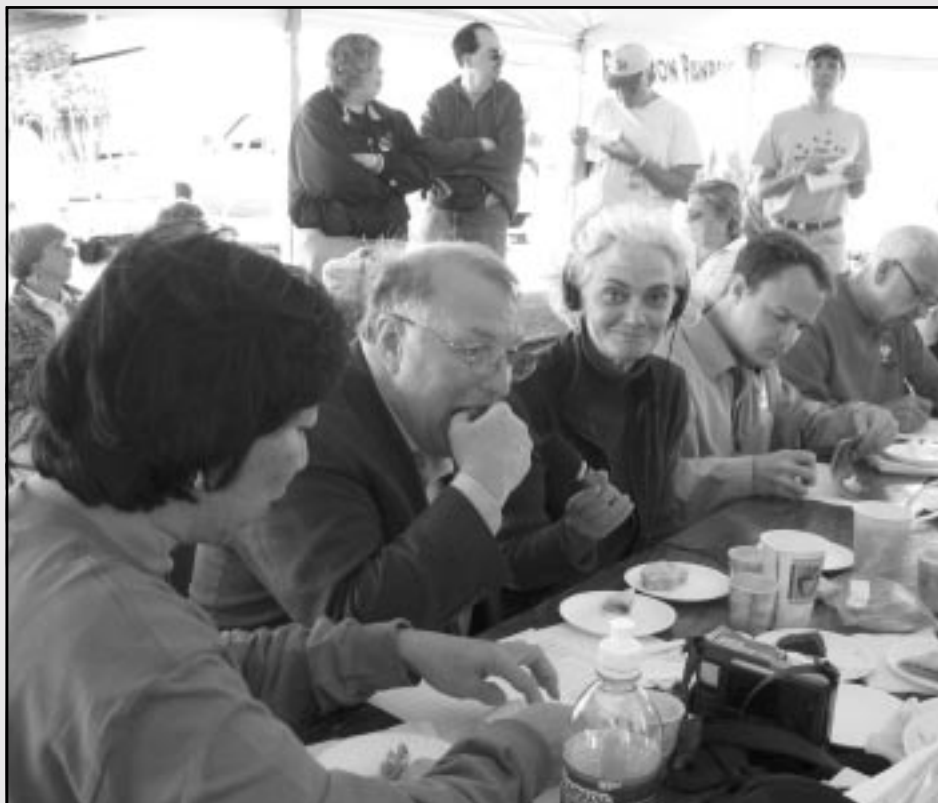
Whatever the Weather, the Show Goes On

2004 Ohio Pawpaw Festival

Hurricane Ivan hit Ohio with rain and thunder on the Friday before the Festival weekend. Many of us couldn't remember an Ohio storm with more wind and rain. Creeks and rivers overflowed their banks. Roads were impassable in places. The impact on festival turnout was huge as local folks contended with urgent matters, like flooded basements. And other folks altered their plans for the weekend out of fear of the weather.

Then Saturday morning of the Festival Saturday dawned with brilliant sunshine and a serene blue sky. Ivan was gone and Canadian weather had arrived. The festival would not be a washout after all. And with the sudden change in the weather for the better, people's spirits were singing. There were artists and craftspeople and music and pawpaw displays and pawpaws for sale and the best pawpaw contest and five different categories of best pawpaw recipes.

Even so, Ivan had taken its toll and attendance was down by about half from the previous year. We all live with the weather, not only farmers. There will be another festival in Albany, OH, next year ... God willing and the creek don't rise!



Candidly Caught in the Act — The judges at the 2004 Ohio Pawpaw Festival consider the elusive qualities that make for a great pawpaw.



Experiments and Observations on Germinating Pawpaw Lured to Investigate Pawpaws Seeds

By Peter Haarmann, August 2004

I have been reading about the Iroquois in "Parker on the Iroquois" (copyright 1968, Syracuse University Press) which reports Arthur C. Parker's 1900 study of the last remaining cluster population of these native people. The pawpaw was a main food described by Parker as part of the diet of these people. Pawpaws are not native here on Long Island, where I live, but they are found naturally in the southwestern tier of New York State, an area that includes the Finger Lakes region, an area that was originally inhabited by the Iroquois. In 1779 General John Sullivan with a force of 3,500 men killed off most of the Iroquois in the Finger Lakes region and Genesee Valley. Sullivan reported that the natives had this entire area under cultivation including orchards and livestock. Sullivan killed off these people by burning their crops; hence the people starved to death: a sad report on our heritage. I discovered the pawpaw tree from my historic readings of these native people. That is what lured me to investigate the fruit.

In March 2004 I met John Gordon at the Northern Nut Growers conference held in Cobleskill, NY. John is in his eighties and is relatively modest. He doesn't put on any pretenses. He answers your questions and doesn't offer much more. So you have to continue the questioning or the conversation dies. We had lunch together and he shared with me some of his experiences. He was at that time the only person with whom I had had a real nuts-and-bolts conversation about pawpaws. Everything

I knew up to that point was based on things in print. Now I had the opportunity of a live person to share concerns with. I got limited information but it was information based on first hand knowledge. So I adopted his methods.

John germinates his seed in sand. He will go into the bed daily and search for seeds whose radicle roots have emerged. I remember him saying "these are the darnedest seeds" because he would be amazed at how quickly and large a root could grow between search visits, digging about in the sand. He would say to himself "How did I ever miss this seed last time? Look at the size of the root!" Both he and my reading indicated that not all the seed germinates, so I felt why bother plant a seed per container only to have that container wasted if the seed doesn't germinate. Hence the rationale for planting seed in a bed rather than directly in pots.

In December, I planted 14 seeds in individual containers. The containers were buried in the garden to a depth flush with soil surface. I mulched them over with sawdust and bark. January came and we had the coldest temperatures in these parts in 50 years. Then I learned that pawpaw seeds can't freeze. Oh well. In March, when the soil could be worked, I pulled out all the nice soil from the pots and sifted out the seeds. I took those seeds and planted them along a garden fence to see what, if anything, would happen.

On May 5, I planted 80 seeds in a bed of sand four inches deep, held in greenhouse conditions, with a soil thermometer showing a

constant 80 degrees. The sand bed was pure quartz sand with traces of yellow clay that is found in our glacial parent material soils mined below four-foot depth. After three weeks I didn't see any activity so I started doing the John Gordon routine — digging about in the sand. Some roots were 3.5 inches long, some .25 inches long, and most hadn't emerged. Any seeds I found with roots got potted in my custom-designed 14-inch-tall pipe pots and stayed in the greenhouse. I potted 15 seeds. I had Osmocote fertilizer mixed in the soil medium in accordance with one of Dr. Pomper's papers.

Given my commitments at school, I was pressed for time, so I just covered up the tray and didn't examine it for another 3 weeks. When I examined them next, at week seven, two dozen sprouts were about two inches tall above the sand surface with taproots 4 inches deep. The taproots did not follow along the bottom of the plastic pan. Elongation of the taproot appeared to stop once in contact with the pan bottom. I potted twenty seedlings.

Jumping ahead to summer: The last 20 seedlings that I potted, the ones that were two inches tall, are now my largest plants, about eight inches tall, with well developed normal-size leaves. The main taproots on the sprouts are sturdy and heavy; they average approximately 3/16 inches diameter. The thickest section is above the uppermost lateral root (the root collar). The lateral root branches are heavy and frequent, at short intervals of

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Lured to Investigate

continued from page 7

approximately .5 to .75 inches apart.

Conversely, the 15 seedlings that I planted in the pots after three weeks, the ones with small radicles, took the longest time to emerge from the soil surface, 10 to 12 weeks. It is these plants that have long spindly taproots. The taproots in the pipe cylinders extend the length of the pipe. The root diameter doesn't appear to be even 1/8 inch. Laterals are two or more inches apart with no extensive development. All root material appears leggy, absent of the secondary root formation that was easily present in the sand bed root systems.

This week I went into the garden area to pull up weeds along the garden fence, the overgrown mint, and the pumpkin vines that were not yielding any pumpkins. There

I found to my surprise a row of pawpaw seedlings at about the same heights as the plants I raised in the green huse conditions and special sand beds. I said to myself "Why all this fuss? Look at these devils. You can't kill them and here they are!"

On one occasion John Gordon was discussing taproots in pawpaws and he laughed about the topic because the trees are naturally found still wild in the southwestern tier area of New York State, even along old abandoned railway right-of-ways growing in the shallow soils along rock slope excarpments. His point was look at how this tree is surviving in less than ideal conditions. (I tend to think that one factor that assists pawpaws in this habitat is that railroad right-of-ways cut into hillsides, exposing layers of strata. The ground water in this region travels along these natural strata

in the shale. So the cutaway aids in keeping the plants watered.)

I do know from my own observations that this plant is a hardy plant that wants to survive against the most difficult odds. Some of my seedlings got infected with a black rot or wilt in the sand bed. I didn't toss those seedlings. Ultimately those stubs developed buds that developed into new stems and leaves.



The PawPaw Foundation
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