Fumigants & Pheromones

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A Newsletter for the Insect Control & Pest Management Industry

Continued Education Workshops

Current Training for the Food Processing, Grain and Fumigation Industries.

With the phase out of Methyl Bromide on January 1, 2005 many people are asking "What are the Alternatives?" Insects Limited has been working for ten years to provide answers to this question.

A series of one-day workshops will be offered around the country to offer licensed fumigators and food processing pesticide applicators with advanced continued education training. If you need continuing education credits to keep your license current or if you just want to educate yourself on changing trends and new products, go to www.insectslimited.com for more details.

Workshop Program

- Current Status of Methyl Bromide; *D. Mueller*
- New ProFume™ fumigant by Dow AgroSciences; *J. Welker, J. Mueller*
- $ECO_2FUME^{™}$ & $VaporPH_3OS$ fumigants; *B. McSwigan*
- The Combination Fumigation Method; *J. Waggoner*

Sharing through education is how we all get better at our jobs. A series of continuing educational programs will be offered in January and February. The 7th International Fumigants & Pheromones Conference and Workshop will be held in Monterrey, Mexico in March.

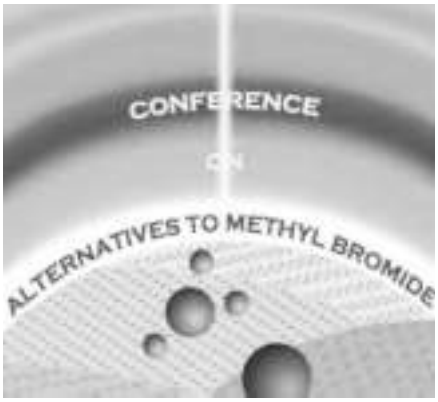
- Food Safety & Heat Treatments at Nestle Purina; *K. Kemp, L. Dean*
- Pheromone Update; *D. Mueller*
- Sulfuryl Fluoride Research, *D. Maier*

Dates and Details

- December 1-2, Reynoldsburg, OH *(Grain fumigation training)*
- January 18, Kansas City, MO
- January 20, Chicago, IL
- January 25, Indianapolis, IN
- January 26, Indianapolis, IN *(Insect ID workshop)*
- January 27, Indianapolis, IN *(Initial fumigation certification training)*
- February 9, Memphis, TN
- February 16, Columbus, OH
- March 8 - 10, Monterrey, Mexico
- July 22, Western Kentucky *(Grain re-certification training)*

To register or find out more go to www.insectslimited.com or call 1-800-992-1991.

IN THIS ISSUE:



Lisbon Conference

This four-day conference and workshop was attended by over 250 fumigators from Europe. It was organized by the European Commission in Brussels.

Over 40 speakers presented Methyl Bromide alternatives in post harvest applications. These presentations and papers can be viewed by going to: Proceedings of the Fifth Conference on Alternatives to Methyl Bromide, The **PowerPoint presentations** (in pdf format) from the Lisbon Conference on Alternatives to Methyl Bromide 27-30 September have been loaded onto the website http://europa.eu.int/comm/environment/ozone/lisbon_conference.htm. In addition, the **'Proceedings of the Conference'** which contains the papers have also been loaded—you can print off part or all of the papers.

Insect Limited's David Mueller presented two papers for this important conference. "It was a pleasure to participate in this conference again. The people you meet and the conversations that go on in the hallways with fellow fumigators helps confirm or deny ideas and experiences. We are a small industry with maybe 120 fumigation companies in Europe and 400 in North America. The phase out of Methyl Bromide has allowed us to get together and discuss ways to make our industry and the environment better."

Take some time and read these papers in this Proceedings and see how others around the world are approaching and solving this problem.

Mueller Testifies Before Congress

David Mueller, president of Fumigation Service & Supply, Inc. of Westfield, IN was invited to testify before the House Committee on Energy and Commerce on July 21. This hearing drew nationwide coverage and a standing room only attendance because of the proposed House Bill 3403 to amend the Clean Air Act to modify certain provisions regarding methyl bromide. This bill is authored by Rep. Radanovich from California and is co-signed by 43 members of Congress. This bill would change the Clean Air Act and virtually dismantle the Montreal Protocol, a 17 year old international environmental treaty signed by 191 countries to help phase out ozone depleting substances, like methyl bromide. Mueller was one of nine invited panelists that submitted testimony on how this House Bill would affect their business segment.

Mueller stated: "Seeing first hand how this partisan proceeding unfolded was an educational experience for me. I was pleased to answer a number of questions the Congressmen asked me after all testimonies were delivered and entered into the record. All in all this was a very good experience and I hope that I'm invited to participate again in the future."

To see Dave Mueller's complete testimony at the July 21, 2004 House Committee on Commerce and Energy log on to www.insectslimited.com

Mouse Fact:

A mouse can breed 35 days after it is born, and can have its first litter of up to eight pups by the time it is two months old.

Dave's Soapbox

...for what it's worth

With the election behind us now, maybe we can all sit back and laugh a little about politics. Even some of the worst commercials on TV now don't seem that bad. I hope you enjoy this as much as I do.

Democrat
You have two cows. Your neighbor has none. You feel guilty for being successful. Barbara Streisand sings for you.

Republican
You have two cows. Your neighbor has none. So what?

Socialist
You have two cows. The government takes one and gives it to your neighbor. You form a cooperative to tell him how to manage his cow.

Communist
You have two cows. The government seizes both and provides you with milk. You wait in line for hours to get it. It is expensive and sour.

Capitalism, American Style
You have two cows. You sell one, buy a bull, and build a herd of cows.

Democracy, American Style
You have two cows. The government taxes you to the point you have to sell both to support a man in a foreign country who has only one cow, which was a gift from your government.

Bureaucracy, American Style
You have two cows. The government takes them both, shoots one, milks the other, pays you for the milk, and then pours the milk down the drain.

American Corporation
You have two cows. You sell one, lease it back to yourself and do an IPO on the 2nd one. You force the two cows to produce the milk of four cows. You are surprised when one cow drops dead. You spin an announcement to the analysts stating you have down sized and are reducing expenses. Your stock goes up.

French Corporation
You have two cows. You go on strike because you want three cows. You go to lunch and drink wine. Life is good.

Japanese Corporation
You have two cows. You redesign them so they are one tenth the size of an ordinary cow and produce twenty times the milk. They learn to travel on unbelievably crowded trains. Most are at the top of their class at cow school.

German Corporation
You have two cows. You engineer them so they are all blond, drink lots of beer, give excellent quality milk, and run a hundred miles an hour. Unfortunately they also demand 13 weeks of vacation per year.

Russian Corporation
You have two cows. You have some vodka. You count them and learn you have five cows. You have some more vodka. You count them again and learn you have 42 cows. The Mafia shows up and takes over however many cows you really have.

Iraqi Corporation
You have two cows. They go into hiding. They send radio tapes of their mooing.

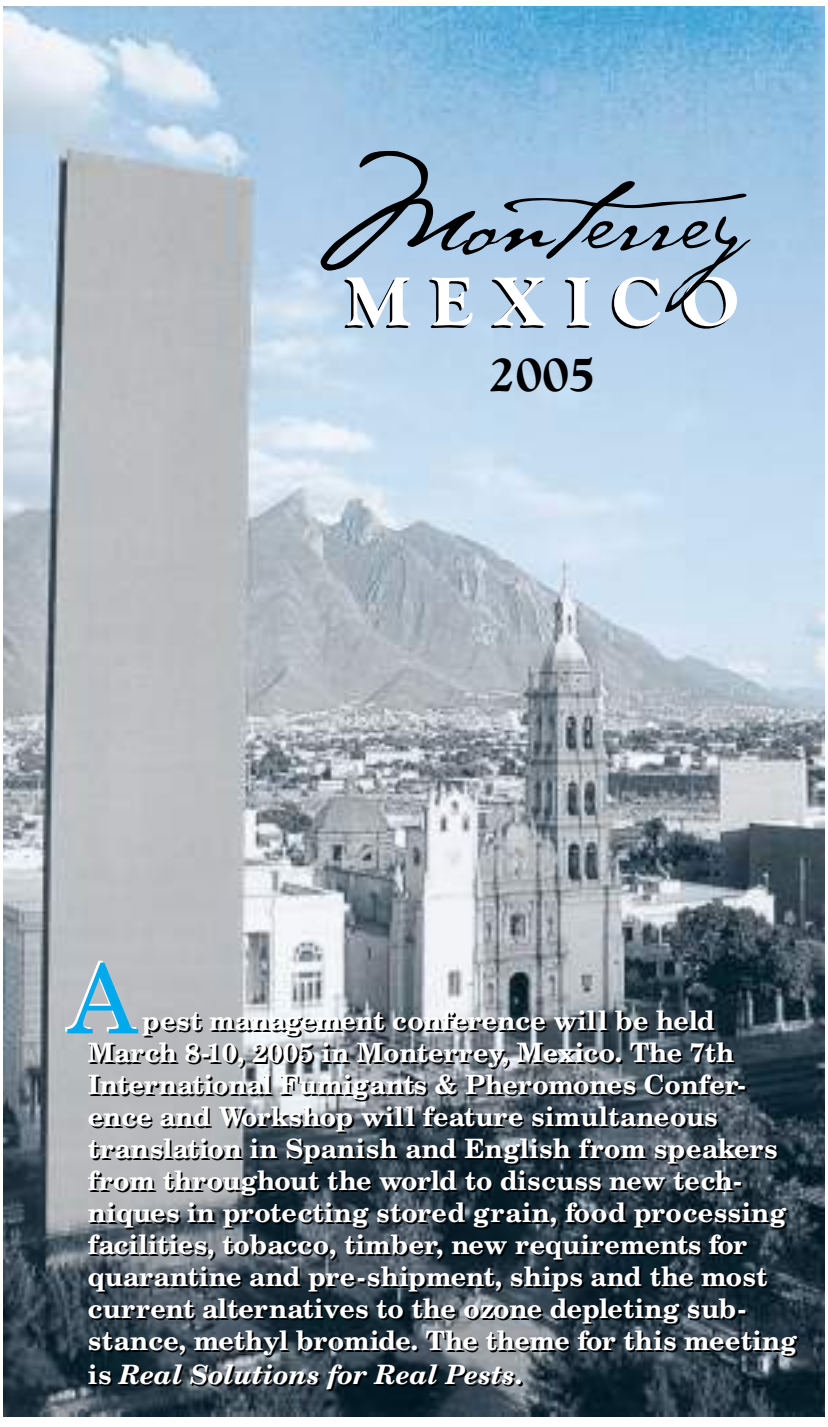
Polish Corporaton
You have two bulls. Employees are regularly maimed and killed attempting to milk them.

Florida Corporation
You have a black cow and a brown cow. Everyone votes for the best looking one. Some of the people who like the brown one best, vote for the black one. Some people vote for both. Some people vote for neither. Some people can't figure out how to vote at all. Finally, a bunch of guys from out-of-state tell you which is the best looking cow.

California Corporation
You have a cow and a bull. The bull is depressed. It has spent its life living a lie. It goes away for two weeks. It comes back after a taxpayer-paid sex-change operation. You now have two cows. One makes milk; the other doesn't. You try to sell the transgender cow. Its lawyer sues you for discrimination. You lose in court. You sell the milk-generating cow to pay the damages. You now have one rich, transgender, non-milk-producing cow. You change your business to beef. PETA pickets your farm. Jesse Jackson makes a speech in your driveway. Scharwzenager signs a law giving your farm to Mexico. You declare bankruptcy and shut down all operations. The cow starves to death.

1st Latin America Fumigants & Pheromones Conference & Workshop

March 8-10, 2005 Monterrey, México. *Real solutions for real pests*



A pest management conference will be held March 8-10, 2005 in Monterrey, Mexico. The 7th International Fumigants & Pheromones Conference and Workshop will feature simultaneous translation in Spanish and English from speakers from throughout the world to discuss new techniques in protecting stored grain, food processing facilities, tobacco, timber, new requirements for quarantine and pre-shipment, ships and the most current alternatives to the ozone depleting substance, methyl bromide. The theme for this meeting is *Real Solutions for Real Pests.*

Go to www.insectslimited for details and registration.

This conference will be held at the Radisson Plaza Grand Hotel Ancira & Conference Hall in downtown Monterrey. This workshop will feature a demonstration on various techniques of grain fumigation, inspection, new gas monitoring equipment, pest control products, insect resistance screening, and methyl bromide alternatives. This international conference is organized by Insects Limited, Inc. of Indianapolis and Pheromone Service & Supply of Monterrey.

This international educational series of conferences starting in 1993 in Lübeck and continued to Bologna, Chicago, York, Indianapolis, Thessaloniki, and most recently Copenhagen in 2003. Monterrey 2005 will be the first Fumigants & Pheromones Conference held in Latin America. Over 1200 people have attended these popular educational conferences from 37 countries in the past. This is a great place to meet people with common interests.

Speakers include: David Mueller, César Altmirano, Dr. Nahum Marban-Mendoza, Dominique Kayser, Benjamin Gómez, John Mueller, Pat Kelley, Alain Van Ryckeghem, Brian McSwigan, Frank Meek, Dr. Ted Granovsky, Jeffery Welker, Dean Stanbridge, Dr. Jürgen Böye, Ricardo Ituarte, Pedro Horn, Dr. Franciskus Horn, Fausto Martínez, Henrik Lange, Vasilois Sotiroudes, Robert Baker, Jay Coleman, Roberto Tapia, and Jesus Larios.

For more information and details about this stored product protection conference and workshop go to www.insects limited.com, or contact Barb Bass at e-mail: barblbass@aol.com, fax: (1) 317-867-5757, tel: (1) 317-896-9300 or in Latin America contact César Altmirano at pheromones@usa.net, tel: +52 (81) 8365 7381 fax: +52 (81) 83657322

Fumigation Ghosts

by John Mueller

The battle over continued Methyl Bromide use versus conversion to viable alternatives has clearly isolated the issue of fumigation expectation.

What is your fumigation expectation?

General fumigation in mills has evolved rapidly over the past ten years. Conventional fumigants seem to be a ghost—what I mean by this is you see little data on the actual performance of conventional fumigants. The industry standard for grading a "good fumigation" is whether the adult insect bioassays are killed. Adult insects are very easy to kill with even low levels of fumigants. It is usually the egg stage which is the most difficult to "completely" control. By using adult insect assays, a false sense of security has been developed. If all ten adult insects are dead in all the test cages placed in a facility, the observer states "we got a 100% kill." Here is the problem—labeling the fumigation 100% effective by killing the easiest life stage is not entirely true—but this practice has become standard and thus our treatments have evolved to be 100% effective?

Another way many assess fumigation performance is through continued observation of tailings reports from rebolt sifters (live, dead or fragments of insects found in the final sifter collection pan) in the mill or food processing plant. This method is very effective, but it is important to understand that early tailing performance is based on how empty your bulk storage was during the fumigation. If you have bulk product in the bins you must first use phosphine to fumigate these storages to be effective.

These bins should be drawn down to with in ten feet of the bottom. It is best to use cylinderized phosphine to treat these tanks, because this product gives you immediate concentration and provides better penetration. It is best to hold the flour tank fumigation for 48 hours or longer but new cylinderized phosphine labeling allows for 24 hour treatment if the temperature is over 80°F. Remember structural fumigations do very little to impact early tailings reports and any compromise in flour storage volume is a direct compromise to the performance of the fumigation.

Great Expectations

Many managers rely on their gut-feeling after the fumigation. This is the third component to fumigation performance: the overall observation and opinion of the sanitation manager, miller, grain storage manager, operations personnel and anyone else with an opinion. This is not an area to ignore and it can be effective. However, it is also important to understand reasonable expectation. Fumigation is acute pest control—meaning the gaseous pesticide will [if used correctly] kill the target pest but once the gas is evacuated no residual pesticidal effect exists. With this understood we must consider the capability of the target insect.

Biology of Stored Product Pests

Flour beetle eggs are microscopic and hard to destroy by normal grain movement. Moth eggs are easily destroyed in the grain handling process. Some flour beetle eggs even survive the Enolator™ (a compaction piece of equipment designed to crush insect eggs). This is one reason why you see flour beetles as the primary pest of mills and not moths.

Insect Species	Life Cycle	Egg Capacity	Larva Stage	Pupa Stage	Adult Stage
Confused Flour Beetle	28-52 days	200-500	18-23 days	5-8 days	6-12 months
Red Flour Beetle	20-30 days	200-450	12-15 days	4-6 days	6-18 months

By focusing on the biology of the target insects we can create reasonable fumigation expectation. With this dynamic considered, fumigation should protect a facility for 20-30 days before insect activity can begin to rebound.

By starting with the insect first, one can understand why flour beetles thrive in the milling and food processing environment. Most facilities fumigated during the warmer months have an internal temperatures range from 95 to 105 degrees inside the building. These temperatures actually stress the flour beetles and slow development. In years where temperatures are below average, mills (2004) detected a quicker rebound from fumigations, greater variety and larger populations of insects. In short, conditions change and expectations should vary too.

strategy. From long and short term grain storage to ingredients arriving in railcars to the grain transfer system coming into the facility to vendor assurance programs as well as the fumigated site itself—successful pest control is linked through these systems. Do not let the "fumigation ghost" distract your effectiveness and always seek to understand your changing environment and make effective decisions to setup successful fumigations.

Tips

1) Keep your adult bioassays for 30 days at about 72°. Insects release eggs and these fresh insect eggs are the important bioassay to kill.

2) Always keep control assays when testing fumigation efficacy.

3) Show up during the fumigation. Understand the monitoring process and directly observe the readings. Make sure you understand the gas monitoring device, the method of monitoring and what gas levels to expect, and when.

4) Specifically audit the results of the fumigation immediately after the fumigation. Note on a map where dead insects and mice are found and determine why they are there. Audit again at 7, 14, and 21 days after the fumigation to look for emergence of insects. If you do find activity try to determine whether this was a fault of the fumigation or translocation after the fumigation.

Every fumigation should be treated like a research project. The details will perfect your fumigation program and scare away the Fumigation Ghosts.

Temperature Effects on Biology

	Lower Limit	Upper Limit	Moderate 100% Kill	Extreme 100% Kill
Red	68°F	97°F	113°F/ 45°C	122°F/ 50°C
Flour Beetle	20°C	36°C	30 hours	<30 minutes
Confused	63°F	90°F	111°F/ 44°C	122°F/ 50°C
Flour Beetle	17°C	32°C	24 hours	<30 minutes

In summary

Many processors are beginning to reduce the number of general fumigation. These managers consider broader treatments of the entire system and changing environmental conditions when developing their pest control

Quotable Quotes

"It isn't pollution that's harming the environment. It's the impurities in our air and water that are doing it."
Former Vice President Dan Quayle

"The secret to managing a baseball club is to keep the five guys who hate you away from the five who are undecided."
Casey Stengel

"The dangers of capitalism, especially when greed and short-term thinking is involved, are scary. Remember when we just would not be able to live without liquid fumigants?"
Curt Hale

"Each moth larvae that walked, left a silk thread as he passed, and the whole procession made a broad and silken highway, which would take them home on the darkest night."
Henri Fabri, 1905

"When our resources become scarce, we fight over them. In managing our resources and in sustainable development, we plant the seeds of peace."
Wangari Maathai, of Kenya, winner of the 2004 Nobel Peace Prize.

The Do's and Don'ts of Trapping Beetles, *Part 2*

by Alain Van Ryckeghem, BCE Technical Director

Both sexes of flour beetles, grain beetles, and weevils are attracted to aggregation pheromones and food odors (kairomones). Pantry Patrol™ traps use a no spill gelled oil food attractant combined with aggregation pheromones of flour beetles (among several other species). Dome traps use food oil attractants and separate pheromone lures for flour beetles. The dome is a good cover for dusty areas. The new PC floor trap only uses a food attractant, but the trap keeps the captured beetles alive, thus allowing natural pheromone to be emitted from the beetles in the trap. The PC floor trap is especially effective with the grain beetles. Unfortunately, there is no commercial pheromone for the saw-toothed and merchant grain beetles available yet. The weevils seem to be caught easily in any of the traps. Some weevil pheromones are available and can improve catch compared to food attractants only. Flour beetles are more selective based on pheromone concentration, and trap design/placement. In places where competing food is available (e.g. flour) the trap catch can be dramatically less. Sanitation improves catch as the beetles are more starved and need to search further. To monitor for pests in food product or for locating structural infestations:

7. Use traps best suited to the target beetles.
8. Use lure/ food combinations that are most attractive to the target beetles.
9. Place traps in covered stations if necessary for dust and people protection. Flour beetles are very poor climbers and the covered station may prevent access to the traps. Choose a design that has holes flush to the floor.
10. Map your traps so that you can account for them. Lost traps mean no data and possibly problems if they end up in the "food channel."

The new PC Flor trap contains a lure made with natural food attractants that is especially good at attracting small crawling food insects like grain beetles, flour beetles and weevils.

Cigarette beetles *(Lasioderma serricorne)*, drugstore beetles *(Stegobium paniceum)* and warehouse beetles *(Trogoderma variabile)* are much more active. They are good fliers, can be found outdoors as well as indoors in the southern states and are attracted to light. The females produce sex pheromones, which unlike aggregation pheromones attract only the male beetles and can be detected from more than 25 feet. Presently the pheromone for drugstore beetles is limited in the US. Cigarette and drugstore beetles will fly when the temperature is above 70°F(21°C) while warehouse beetles fly when it is above 65°F(18°C). For these beetles:

11. Use sticky hanging traps like diamond, delta and wing traps with a good pheromone lure for monitoring large warehouses.
12. Flat sticky traps with lures and floor traps like Pantry Patrol and Dome trap can be used for smaller areas like grocery stores and residential kitchens.
13. Replace lures according to manufacturer (4-12 weeks depending on type).
14. Date your traps to indicate when the lure was installed.
15. Remove beetles from the traps to make counting new beetles.
16. Replace traps if they are 50% filled or more.
17. Do not place traps with these pheromones within 30 feet of an outside door or exterior window to reduce the opportunity of immigration from outside.
18. Document the number of newly caught beetles on a separate record/report.
19. Adding a sex pheromone lure to a light trap can attract males and females to the glue traps.
20. Using pheromone traps in a trap line outdoors about 50 feet away can monitor the outdoor population and indicate if indoor catches are from beetles entering the facility from outside.

Trapping stored food pests takes time, patience, and knowledge. The data you collect can help you understand the dynamics or origin of a population inside a commercial facility or even a residence. The best way to learn how to use these systems is to try them in one account on a small scale. Let the customer know what you are doing and what you can expect to gain in terms of timely or reduced pesticide applications. You can also evaluate the effectiveness of your pest management program by looking at the numbers. Gathering this data is a way of gaining knowledge and experience. Before long you will be comfortable with their use and know what to expect.

...hope to see ya there!

ON-SITE TRAINING

If you would like to have a speaker or complete training session tailored to your needs, call Insects Limited at 1-800-992-1991

Dec. 1-2, 2004*
Ohio AgriBusiness Assoc., Ohio State University Extension & Insects Limited, Grain Fumigation Workshop, Reynoldsburg, OH www.oaba.net

Jan. 10-14, 2005*
69th Purdue Pest Control Conference, Purdue Univ., West Lafayette, IN

Jan. 18, 2005**
Methyl Bromide Alternatives Continuing Education Seminar, Kansas City, MO

Jan. 20, 2005**
Methyl Bromide Alternatives Continuing Education Seminar, Chicago, IL

Jan. 25, 2005**
Methyl Bromide Alternatives Continuing Education Seminar, Westfield, IN

Jan. 26, 2005**
Insect Identification Short Course, Westfield, IN

Jan. 27, 2005**
Initial Fumigation Certification Training/Testing, Westfield, IN

Feb. 2, 2005**
Methyl Bromide Alternatives Continuing Education Seminar, St. Louis, MO

Feb. 9, 2005**
Methyl Bromide Alternatives Continuing Education Seminar, Memphis, TN

Feb. 16, 2005**
Methyl Bromide Alternatives Continuing Education Seminar, Columbus, OH

July 10-13, 2005
5th International Conference on Urbgan Pests, Singapore, www.icup2005.com.sg

** invited speaker, ** organizing*

March 8-10, 2005** Monterrey, Mexico

www.insectslimited.com

NEWSLETTER

Fumigants & Pheromones is published by Fumigation Service & Supply, Inc. and Insects Limited, Inc. We hope that the information that you receive from this newsletter will help you in your business, and you, in turn, will support our business efforts. If you have an associate who would be interested in receiving this newsletter, please contact the address below. We would welcome any comments or suggestions for topics. Address correspondence to: David K. Mueller, Fumigation Service & Supply, Inc., 16950 Westfield Park Rd., Westfield, IN 46074 USA.

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