



The

# Chile Pepper Institute

N E W S L E T T E R

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## Chile Pepper Production in Kenya

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Straddling the equator, Kenya is a diverse country both agro-ecologically and socially. The country ranges in altitude from sea level along the Indian Ocean coast to 5,688 feet at the top of Mt. Kenya, the second highest mountain in Africa. The climate varies from humid tropical along the coast to arid in the northern interior. The central and western highlands enjoy a mild climate with a bi-modal rainfall pattern making the area one of Africa's most productive agriculture regions. The population is similarly diverse with a distribution of major groups as: Kikuyu 22%, Luhya 14%, Luo 13%, Kalenjin 12%, Kamba 11%, Kisii 6%, Meru 6%, other African 15%, and non-African (Asian, European, Arab) 1%.

Given the favorable agricultural climate, a wide range of annual and perennial crops are produced on the 8% of arable land. The horticulture industry, which comprises fruit, vegetable, nut, and flower production

sectors, had an overall domestic production value of 125,683 million Kenyan Shillings (US\$ 1,964 million) in 2007. Of this, vegetable production made up 41% or 52,069 KSh (US\$ 814 million) according to Horticultural Crop Development Authority of Kenya. Given the value of this market, there are more than 30 fruit and vegetable exporters in the country.

Chile peppers (*Capsicum* sp.) in Kenya are divided into "chiles," mainly

hot varieties, and "capsicums" that are sweet Bell peppers. Chiles and capsicums are grown for both domestic and export markets under rain-fed and irrigated production systems. In addition to bell, common pod types include cayenne, serrano, and jalapeño (*C. annum*), habanero and 'Scotch Bonnet' (*C. chinense*) and "African Bird's Eye" (*C. frutescens*).

Major production areas for chile and capsicums are eastern, central, western, coast, and rift Valley Provinces (Tables 1 and



Figure 1. Map of Kenya. Source: Amarendra 2008.



Figure 2. *C. chinense*. Source: McMullan, 2009.

2). Although the national area under production for chiles has decreased from 2005, it still remains at approximately 1,000 hectares. At 10 metric tons per hectare, this has generated an average of KSh 285 million (US\$4.1 million) during this period (Table 1).

National capsicum hectareage has also decreased from 1,047 ha to 990 during the three year period from 2005 to 2007. This has resulted in an average three year value of KSh 306 million (US\$ 4.1 million). Due to weakening of the dollar from 72.67 KSh US\$<sup>-1</sup> in 2005 to 63.96 KSh US\$<sup>-1</sup> in 2007, the total value of chile and capsicum production rose somewhat during this period from US\$8.7 million to US\$8.9 million

Principal consumption areas of chiles and capsicums in Kenya remain along the coast, especially in Mombasa, and in Nairobi where there are large Asian communities who enjoy spicy foods. Although not to the same extent, chiles and capsicums are available throughout the country in traditional markets as well as in grocery stores and supermarkets. The vast majority of these domestic markets are catered to by small producers. To enhance the capacity of small producers, the U.S. Agency for International Development (USAID) began providing funds to the Kenya Horticultural Development Program (KHDP) in 2003 with the aim of



Figure 3. A basket of fire. Photo by author.

assisting the fresh and processed food sectors. KHDP provides agronomic, production, postharvest handling, processing, and marketing support for smallholders and allied agribusinesses. With headquarters in Nairobi and field offices located in the main horticultural regions of Thika, Eldoret, Nanyuki, and Mombasa, KHDP is able to work in marginal areas where smallholders have received little assistance for horticultural crops. Two production guides have been produced, one for sweet peppers and another for African Bird's Eye chile, to help small growers with technical aspects of crop management and economic analysis.

At the other end of the production, processing, and marketing spectrum is AAA Growers, Ltd., the county's largest grower and exporter of chiles (www.aaagrowers.co.ke). With three farms and associated packing houses in Thika, Nanyuki, and Naro Moro, the company annually exports more than 4,408 tons of produce, mainly to the United Kingdom, other European countries, and South Africa. Chile production, entirely under drip irrigation, is undertaken at the Thika farm. Due to climatic variability, the company is currently shifting from field grown chiles to completely enclosed facilities. Varieties raised, exclusively for export, include jalapeño, African Bird's Eye, serrano, habanero, and a number of novelty



Figure 4. A happy consumer. Photo by author.



and experimental lines. Bulk and customized packaging is also available. Underscoring its commitment to quality products in 2007, the company was awarded the Legatum Pioneers of Prosperity Africa Grand Prize, worth US\$100,000.

With relatively elevated humidity, at least compared to New Mexico, a number of pests and diseases constantly give growers, both small and large, cause for concern and vigilance. Major insect pests include termites, aphids, whiteflies, and a number of caterpillar species. Bacterial and viral diseases are commonly transported by sucking insects. Chemical control is practiced following strict guidelines by large producers due to residue compliance restrictions mandated by importing countries. Smaller growers who belong to bulking cooperatives or work with bulking NGO's are

also entering into chemical control strategies for the same reason.

Given the current global economic crises and climate change concerns, growers are cautious about world markets. They see changing consumer preferences from the traditionally grown bullet and finger varieties into a wider and expanding range of varieties. Although production and domestic/foreign consumption are currently static, Kenyan growers are optimistic that markets will rebound as consumers realize the values of the chile pepper, first brought to Africa in the early 1500's. They see a bright future for chiles and capsicums produced in Kenya.

**Table 1. Chile Pepper (hot species) production in Kenya, 2005-2007.**

Province	Area (ha)			Production (MTons) <sup>a</sup>			Value (x 1,000 KSh)			Value (x 1,000 US\$)		
	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007
Eastern	554	443	450	5,540	4,430	4,500	138,500	110,750	11,250	1,906	1,585	176
Western	286	144	109	2,860	1,440	1,090	71,500	36,000	27,250	984	515	426
Rift Valley	283	130	114	2,830	1,300	1,140	70,750	32,500	28,500	974	465	446
Coast	128	132	176	1,280	1,320	1,760	32,000	33,000	44,000	440	472	688
Nyanza	32	200	233	320	2,000	2,330	8,000	50,000	58,250	110	715	911
Central	3	3	3	30	30	30	750	750	750	10	11	12
<b>Total</b>	<b>1,286</b>	<b>1,052</b>	<b>1,058</b>	<b>12,860</b>	<b>10,520</b>	<b>10,850</b>	<b>321,500</b>	<b>263,000</b>	<b>271,250</b>	<b>4,424</b>	<b>3,763</b>	<b>4,241</b>

<sup>a</sup> Production: assumed 10 MTons ha<sup>-1</sup>

<sup>b</sup> Value: assumed 25 KSh kg<sup>-1</sup>

<sup>c</sup> Exchange rate: end 2005 (72.66567 KSh US\$<sup>-1</sup>); end 2006 (69.88850 KSh US\$<sup>-1</sup>); end 2007 (63.95907 KSh US\$<sup>-1</sup>)

Source: HCDA, 2008.

**Table 1.2 Capsicum (Bell pepper) production in Kenya, 2005-2007.**

Province	Area (ha)			Production (MTons) <sup>a</sup>			Value (x 1,000 KSh) <sup>b</sup>			Value (x 1,000 US\$) <sup>c</sup>		
	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007
Eastern	409	405	301	4,090	4,050	3,010	122,700	121,500	90,300	1,689	1,738	1,412
Rift Valley	222	160	115	2,220	1,600	1,150	66,600	48,000	34,500	917	687	539
Coast	142	146	178	1,420	1,460	1,780	42,600	43,800	53,400	586	627	835
Central	117	156	213	1,170	1,560	2,130	35,100	46,800	63,900	483	670	999
Western	114	117	117	1,140	1,170	1,170	34,200	35,100	35,100	471	502	549
N. Eastern	32	26	31	320	260	310	9,600	7,800	9,300	132	112	145
Nairobi	11	12	15	110	120	150	3,300	3,600	4,500	45	52	70
Nyanza	0	5	20	0	50	200	0	1,500	6,000	0	21	94
<b>Total</b>	<b>1,047</b>	<b>1,027</b>	<b>890</b>	<b>10,470</b>	<b>10,270</b>	<b>9,900</b>	<b>314,100</b>	<b>308,100</b>	<b>297,000</b>	<b>4,323</b>	<b>4,408</b>	<b>4,644</b>

<sup>a</sup> Production: assumed 10 MTons ha<sup>-1</sup>

<sup>b</sup> Value: assumed 30 KSh kg<sup>-1</sup>

<sup>c</sup> Exchange rate: end 2005 (72.66567 KSh US\$<sup>-1</sup>); end 2006 (69.88850 KSh US\$<sup>-1</sup>); end 2007 (63.95907 KSh US\$<sup>-1</sup>)

Source: HCDA, 2008.

# Inexhaustible Energy and Admirable Leadership

By Wendy Hamilton

Emma Jean Cervantes was recently recognized for her 13 years of leadership as Chairwoman of the Chile Pepper Institute Advisory Board. Dean Lowell Catlett of the College of Agricultural, Consumer, and Environmental Sciences stated that Emma Jean is a role model for women and men alike. Dr. Paul Bosland, Chile Pepper Institute Director, echoed those sentiments, saying she is truly the "first lady of chile peppers."

Ms. Cervantes' lifelong passion for chile peppers, her success as business owner of JP Apodaca Farms and Cervantes Enterprises in La Mesa, NM, and her indomitable spirit of community service (having founded or co-founded five organizations in and around Las Cruces, NM) were just some of the praises made to Ms. Cervantes when she was recognized at the Chile Pepper Institute's Development Leadership Council meeting in September 2009. In recognition of her service to the Chile Pepper Institute, she was presented with an embossed plaque, complete with a Nambe chile the plaque signed by then NMSU Interim President, Dr.

Waded Cruzado, Dean Lowell Catlett, and Director, Paul Bosland. Ms. Cervantes is a La Mesa, NM native and director of Cervantes Enterprises, a diversified farming operation of about 1,200 acres started by her father in the 1920s. Besides growing chile peppers, she also manufactures cayenne hot sauce at their processing plant in Vado, NM. Her farm was the first in the region to experiment with drip irrigation and the use of chile pepper transplants. She allows NMSU scientists access to her farm for use as research plots.



*Emma Jean Cervantes*

In October 2008, the Chile Pepper Institute announced the formation of the DLC. This Council addresses issues previously administered by the Advisory Board, and focuses on making chile pepper research a permanent fixture at NMSU through the establishment of an Endowed Chile Pepper Research Chair and a new Chile Pepper Institute facility. The first meeting of the DLC was held March 31, 2009, and Ms. Cervantes graciously agreed to serve on the DLC alongside Lou Biad, John and Sue Hard, Doug Renfro, Chris & Anna Biad, John & Jim Thomas, Jit Baral and Jae Bok Park.

## The Chile Pepper Institute's Development Leadership Council



The Development Leadership Council is a dynamic group of chile pepper industry leaders. Their purpose is to raise \$10 million to build the new energy efficient Chile Pepper Institute, featuring a tourist venue for chile conferences, a sustainable teaching and demonstration garden/greenhouse, and to fund the Endowed (Chile) Chair to continue the legacy of NMSU's chile pepper research.

Leadership Council members provide:

- A yearly sustaining donation of \$1,500;
- Participation in semi-annual leadership council meetings;
- Facilitation of corporate sponsorships;
- ID of three or more colleagues who have the financial capacity to support the Institute's (ad)venture; and
- Encouragement of chile aficionados to become Chile Pepper Institute members.

Interested in joining the Council?

Contact Wendy Hamilton [whamilto@nmsu.edu](mailto:whamilto@nmsu.edu), 575-646-5284 or Mark Gladden [markglad@nmsu.edu](mailto:markglad@nmsu.edu), 575-680-5247.



## NuMex Heritage Big Jim – Taste the Difference!

The ‘NuMex Heritage Big Jim’ seed packet found within this issue of the Chile Pepper Institute Newsletter is our newest release. The “new” ‘NuMex Heritage Big Jim’ is hot and big. ‘New Mexico Big Jim’ was developed by Dr. R. Nakayama at New Mexico State University and released in 1975. It is listed in the Guinness Book of World Records as the producer of the largest chile pepper pod ever grown, with specimens in excess of 12 inches. Unfortunately, ‘New Mexico Big Jim’ lost its true identity over time.

This cultivar has been very popular with gardeners because of its large fruit size, the cultivar is a favorite for making great “chile rellanos,” a stuffed chile pepper pod. Measured in field plots at Las Cruces for three



years, ‘NuMex Heritage Big Jim’ has averaged 8.5 inch long pods with some as long as 12 inches. Up to 30 smooth fleshy pods may be produced on a single plant with the pods ripening from a rich green to a deep red in about 80 days after transplanting. The heat level has been stabilized at around 7,000 Scoville Heat Units. This would be considered a medium hot chile pepper. We have set as a high priority replacing poor flavor cultivars with good flavored cultivars from among those that already exist and/or by selecting new cultivars with superior flavor and good textural quality. We hope you enjoy this new cultivar.

## Recipe: Chile Rellenos with Corn

2 tablespoons butter  
 1 medium onion, chopped  
 2 cloves garlic, minced  
 1 1/2 cups whole kernal corn  
 1 tsp dried oregano  
 1/3 cup sour cream  
 6 ounces cheddar cheese, cubed  
 6 ‘NuMex Heritage Big Jim’ pods, roasted, peeled and stems left on.  
 flour for dredging  
 3 eggs, separated  
 1 tablespoon water  
 3 tablespoons flour  
 1/4 tsp salt  
 Vegetable oil for frying

Heat the butter in a skillet on medium heat and saute the onion and garlic until soft. Add the corn and oregano and cook for an additional 5 minutes.

Remove from the heat and stir in the sour cream and cheese.

Make a slit in the side of each chile and stuff with the corn mixture. Dredge the chiles in flour and shake off any excess.

Beat the egg whites until the form stiff peaks. Beat the yolks with the water, 3 tablespoons flour, and the salt. Fold the yolks into the whites and stir gently.

Dip the chiles in the egg batter and fry one at a time in 1-2 inches of oil until they are brown.

Serve with New Mexico Green Chile Sauce.

*From the Complete Chile Pepper Book, and can be found at the Chile Pepper Institute Chile Shop.*

IS YOUR LABEL RED?  
 IT'S TIME TO RENEW YOUR CPI  
 MEMBERSHIP!!



# CAPSICUM NEWS

## Helping Vegetable Plants Make a Less Stressful Transition from the Greenhouse to the Field

New research at the *Texas AgriLife Research and Extension Center* can aid in the successful production and possibly even further the profitability of some vegetable crops by producing high-quality, more adaptive plants that will establish well. Dr. Daniel Leskovar is leading new research on transplanting management that could enable some vegetable plants to produce beyond their regular season or succeed within a stressful growing environment. The research is centered around the identification and understanding of plant adaptation mechanisms to temperature, water, and biological stresses as part of an integrated vegetable cropping system. The work has primarily involved modulating naturally occurring growth regulators in vegetable plants, one of which is abscisic acid, or ABA, which is a hormone naturally produced by the plant. Abscisic acid affects the closing of plant stomates and controls plant physiology such as leaf transpiration. This hormone also slows plant growth temporarily, which is important for producing compact transplants in commercial nurseries. Dr. Leskovar and his collaborators already have been successful in creating heartier chile pepper, tomato, watermelon and cantaloupe seedlings for transplantation.

## Dr. Paul Bosland Awarded for Service to New Mexico

Even in New Mexico, it's rare to find someone with a front license plate that reads "Chileman." Then again, it's rare to find anyone who knows more about chile and whose research has done more to help the state's chile industry than Dr. Paul Bosland. Bosland is the recipient of one of this year's Governor's New Mexico Distinguished Public Service Awards.



*Former New Mexico Governors, Gary Carruther and David Cargo, and Dr. Paul Bosland at the awards ceremony in November.*

"Service is an important component of my appointment at NMSU, and I have tried to reach out to the community through chile pepper research," Bosland said. "As an educator, teaching and helping others is always fulfilling. Seeing students learn and grow makes my job very rewarding."

Bosland leads the chile breeding and genetics research program at NMSU. He is the co-founder and director of the Chile Pepper Institute at New Mexico State University and is recognized internationally as one of the foremost experts on chile. The 2009 event marked the 40th anniversary of the Governor's New Mexico Distinguished Public Service Awards, an annual celebration that recognizes citizens throughout New Mexico for their

outstanding contributions to public service and to the improvement of government at all levels by both government employees and private citizens. Bosland has been named a Regents Professor, a Fellow of the American Society of Horticultural Science, and one of the 2,000 Outstanding Scientists of the 20th Century. The European Scientific Committee on Capsicum and Eggplant honored him by being the first American ever selected to serve on this committee. Bosland and his program have been featured in media outlets ranging from National Geographic, the New York Times, New Yorker Magazine, Men's Health, CBS Sunday Morning, Food Network, Discovery Channel, and he was an expert consult to the television show "Who Wants to be a Millionaire?"



# BURNING QUESTIONS

Q. I bought a box of New Mexico green chile and had them roasted in a big propane burner. Most of them turned loose of the skin, but about a third of them still have the skins. Can they be roasted again or is there a way to use



*New Mexico green chiles, starting to turn red.*

them with the skins on? been roasted. This helps the skins to “pop” off the flesh for easier peeling. You don’t want the pods to steam for more than 15 minutes because they will start to cook and the flesh will become mushy. If some of the skins have stayed on the pods even after attempting to peel them you can still freeze them this way and the skins will come right off when the pods are thawed.

Q. I have some chile peppers that are looking almost like they have blossom end rot, and some like they are getting scorched by the sun. The plants themselves are very healthy, and only some of the chile peppers are having that problem. I also was suggested to use sulphur in the ground around the plant in case the soil had lost its calcium level. I would like to know if you have any ideas, or suggestions on this matter. We live in an area

with a lot of alkalai, but use horse manure to plant in our garden. Only the ends of the chile peppers are showing these symptoms.

A. Unfortunately living in New Mexico means battling blossom end rot and sunburn when growing chile peppers. Blossom End Rot is due to a deficiency of calcium in the fruit and in parts of the country with acid soil this is a problem in the soil. In the Southwest, with our alkaline soils and super abundance of calcium, it would seem that blossom end rot would be impossible. However, if water, which transports calcium and other minerals, doesn’t reach the end of the fruit during the critical time when the fruit is developing, blossom end rot will develop. Sunburn happens when the plant does not have a sufficient canopy to shade the pods from direct sunlight. Many sensitive varieties include bell peppers and New Mexican pod types. Using a higher nitrogen fertilizer early in the planting cycle may help the plant grow a larger foliage canopy.

A. The traditional method of preparing your roasted green chile is to let the pods steam for a short amount of time after they have

been roasted. This helps the skins to “pop” off the flesh for easier peeling. You don’t want the pods to steam for more than 15 minutes because they will start to cook and the flesh will become mushy. If some of the skins have stayed on the pods even after attempting to peel them you can still freeze them this way and the skins will come right off when the pods are thawed.

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*Sunscald on orange bell peppers.*

## *Capsicum News Continued*

### **Holy Jolokia Salsa; A New Addition to the Chile Pepper Institute**

John Hard of CaJohn’s Fiery Foods has created a new salsa that is a cousin to the infamous Holy Jolokia Hot Sauce made with the world’s hottest chile pepper the ‘Bhut Jolokia.’ Proceeds from the salsa also help to endow a permanent research chair for chile pepper research at New Mexico State University. The salsa is a unique blend of tomatoes, onions, garlic, turbinado sugar, habaneros, jalapenos and of course the Bhut Jolokia that creates a unique salsa experience. You can get your own jar from the Chile Pepper Institute or CaJohn’s Fiery Foods. [www.cajohns.com](http://www.cajohns.com) -- [www.chilepepperinstitute.org](http://www.chilepepperinstitute.org)

