

Table of Contents

CICADA-LICIOUS:

Cooking and Enjoying Periodical Cicadas

Introduction to Entomophagy.....2

Cooking with Cicadas.....5

The Recipes:

Appetizers and Main dishes.....6

Desserts.....12

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****Disclaimer: the University of Maryland and the Cicadamaniacs do not advocate eating cicadas without first consulting with your doctor. While many people do eat cicadas, there is no guarantee that they are safe for every person to eat. As with all foods, it is possible that certain individuals will have allergic reactions to substances within the cicada.****

An Introduction to Entomophagy; or, How I Learned to Love the Bug

Eating bugs sounds disgusting? If you have ever eaten a crawfish, lobster, crab, or shrimp then you have already eaten members of the class Arthropoda, of which insects are a part. So popping a big juicy beetle, cricket, or cicada into your mouth is only a step away.

In fact, most Americans don't realize that they are probably already eating a pound or two of insects each year. Insects are a part of all processed food from wheat meal for bread to tomato ketchup. It's impossible to keep mass-produced food 100% insect-free. There are regulations stating the maximum amount of bug bits that food can contain and still be fit for human consumption. These bits, unseen, have been ground up into tiny pieces in such items as strawberry jams, peanut butter, spaghetti sauce, applesauce, frozen chopped broccoli, etc. These insect parts actually make some food products more nutritious.

Many people all over the world eat insects and other arthropods both as a delicacy and staple. This is sensible because insects are nutritious. Insects provide as much protein pound per pound as lean beef. Although their amino acid content is not as well-balanced for human nutrition, this can be easily corrected by including fiber and other plant proteins into your diet. Insects are also a good source of minerals and some vitamins, especially for people who have limited access to other animal proteins.

Overall, over 1,000 insect species are eaten by humans. Archaeological evidence tells us that entomophagy has been practiced since mankind first made an appearance on this planet. It would appear that all levels of society consumed various insects and today they remain an important food source in many parts of the world. Not all insects are edible though--Some insects are toxic and may create allergy problems--so one needs to be careful about what they are consuming. Here are just a few examples of insects that are eaten around the world:

- Witchetty Grub is the caterpillar of the large Cossid Moth (*Xyleutes leucomochla* Turn) which lives inside and feeds on acacia stems and roots. Eaten raw by Australian aborigines, they are said to taste of

almonds. Ten large grubs provide all the calories, protein and fat that an adult human needs in a day.

- The people of Zaire eat more than 35 different types of caterpillars, usually toasted or sautéed in butter. In parts of Africa where winged termites emerge in dense numbers, they are eagerly collected. They emerge with the first rains at the end of the dry season when the people are weak from malnutrition. They are either fried, roasted and eaten salted, or ground into flour. In Nigeria, stock cubes based on termites are easily available.
- Dragonflies and damselflies are hunted and eaten in Bali. They are caught with a sticky stick and then eaten grilled, or boiled with spices.
- Filipino farmers flood their fields to capture mole crickets that are sold to restaurants.
- In Mexico, chocolate covered bees and bees in syrup are canned and sold and exported as a gourmet item.
- Sago grubs are popular for cooks in Papua New Guinea, most often boiled or roasted over an open fire.
- In India and Indochina, a paste of green weaver ants is a spicy condiment. These ants also spice up rice in Borneo and is made into a drink in Australia.
- You can buy deep fried Giant Water Bugs at streetside stalls in Thailand. An extraction of its abdominal glands are used to flavor many Thai dishes.
- And finally, wasps have the highest protein content of all edible insects (80%) and the larva is food in rural parts of Thailand and Laos. Fried wasps, mixed with boiled rice, sugar, and soy sauce was a favorite dish of Emperor Hirohito of Japan.

The benefits to eating insects are numerous, as many of these societies have discovered. Most insects are cheap, tasty and a good natural protein source, requiring less land and feed than raising cows or pigs. For example, one hectare of US ranch land supports 100kg of beef, but can support 1 ton of insects. Additionally, they are far cleaner than other creatures: grasshoppers and crickets eat fresh, clean, green plants whereas crabs, lobsters and catfish eat any kind of foul, decomposing material. Finally, insects are low in cholesterol and low in fat.

Fifty years ago, it was common for an apple to have worms inside, bean pods with beetle bites, and cabbage with worm eaten leaves. While this

might seem initially unappealing to the average consumer, the consequence was that fewer pesticides were used on these products, making them an overall much safer and healthier food to eat. If Americans could tolerate more insects in what they eat, the U.S. Food and Drug Administration could relax the limit for insects and their parts (double the allowance) in food crops, and farmers could significantly reduce the amount of pesticides applied each year. It is far better to eat more insects and less pesticide residue.

Acknowledgements and Further Information:

Arthropods for Breakfast:

<http://www.szgdocent.org/ff/f-arth3c.htm>

How to Use Insects as Food:

<http://members.aol.com/keninga/insects.htm>

The Ohio State University Factsheet:

<http://ohioline.osu.edu/hyg-fact/2000/2160.html>

Cooking “with” cicadas

A staple food in the past for Australian Aborigines, New Guineans, Siamese people, and American Indians, cicadas were considered a special delicacy in ancient Greece and Rome, as well as modern-day Japan. They contain a high protein content, and since cicadas eat only vegetable matter, they are a pure and wholesome food source. Additionally, they are said to be tasty, having a delicate nutty flavor.

Who to cook: newly hatched cicadas, called teneral, are considered best for eating because their shells have not hardened. It is best to collect these in the very early hours of the morning, just after they have emerged, but before they have time to climb up out of reach. The best way to do this is to simply go outside with a brown paper bag and starting scooping them in. You can cook with them immediately, or refrigerate them (they will remain alive but will mature much more slowly) or freeze them. Keep in mind that freezing them will work best for those that you are going to roast, as the consistency of the cicada may change and make them inappropriate for dishes which call for fresh cicadas. If you are unable to get any teneral, then mature females are the next best thing. Adult males have very hollow abdomens and will not be much of a mouthful, but the females are filled with fat. Just be sure to remove all the hard parts, such as wings and legs before you use the adults. These parts will not harm you, but they are also not very tasty.

When the recipe calls for dry-roasted cicadas: place cicadas on cookie sheet and roast for 10 to 15 minutes at 225F. Cooking time will vary depending upon size and water levels. Check your cicadas when you remove them from the oven. They should be a soft dry consistency, a bit like a nut. If they are still moist inside, they should be roasted for longer. When dry grind coarsely and use as nut substitute in bread or on ice cream. A finer grind can be mixed 50:50 with flour to make a high-protein dough.

And now for **the recipes...**

Soft-Shelled Cicadas

Ingredients:

1 cup Worcestershire sauce
60 freshly emerged 17 year cicadas
4 eggs, beaten
3 cups flour
Salt and pepper to season flour
1 cup corn oil or slightly salted butter

Directions:

Marinate cicadas, alive in a sealed container, in Worcestershire sauce for several hours.*

Dip them, in beaten egg, roll them in the seasoned flour and then gently saute them until they are golden brown.

Yield:

4 main dish servings

*this step may be skipped and you may go directly to the egg step instead.

Borrowed from:

<http://www.markjcooking.com/recipe.php/59491>

Shanghai Cicadas

Ingredients:

30 newly-emerged cicadas
2 tbps anise seeds
1 tsp salt
2 cups rice wine
additional water and rice wine
8 cloves mashed garlic
celery to garnish
turnip greens to garnish

Directions:

1. Boil the cicadas and anise in salted rice wine for five minutes, then remove the cicadas.
2. Sauté the mashed garlic, adding enough of equal parts water and rice wine to make a thick paste.
3. Deep-fry the cicadas, then skewer them with bamboo picks. Arrange them on a plate with the turnip greens, celery, and garlic paste to look like cicadas climbing out of a mud pie into green foliage.

Yield:

4 appetizer-sized servings

Borrowed from:

<http://www.ia.wvu.edu/~magazine/sum99/htmlfiles.cicada.html>

Cicada Dumplings

Ingredients:

20 Chinese black mushrooms, soaked and destemmed
6 egg whites
4 oz cicadas, wings removed and pre-boiled for 5 minutes
1/2 oz cooked Chinese ham, cut into 1"-long, 1/16"-thickstrips
1/2 tsp cornstarch
1 tsp salt
3/4 tsp MSG (optional)
2 cups chicken broth

Directions:

1. Mince 2 oz cicadas and 1 oz fat pork separately, then mix in bowl. Add 1/8 tsp salt and 1/4 tsp MSG. Stir until firm. Divide into 10 portions for mushroom stuffing.
2. Squeeze excess water from mushrooms. Put in bowl, add a little broth and steam for 30 minutes. Remove and squeeze out excess liquid. Place in dish, stem sides up, and sprinkle with cornstarch. Place one portion cicada stuffing in middle of a mushroom and cover with another mushroom, black side up, to make a stuffed mushroom pouch. Repeat until 10 pouches are done.
3. Mince remaining pork and cicadas separately, then mix in a bowl. Add 1/4 tsp salt and 1/2 tsp MSG. Stir until firm. Make 20 balls in the shape of a cicada. Beat egg whites. Grease pan. Make a thin small round pancake with one tbsp egg white. Place a cicada ball in the middle and wrap pancake around. Pinch ball to form head and body of the cicada. Fry for 1/2 minute and remove. Put two strips ham in head. Repeat until 20 "cicadas" are made. Put mushroom pouches and shrimp cicadas on plate. Steam for one minute over high heat. Remove and place separately in fureen. Bring stock to boil and add remaining salt. Pour stock slowly into fureen and serve.

Yield:

Serve 4 to 6.

Cicada Stir-Fry

Ingredients:

1 onion, minced
2 tbsps fresh coriander (cilantro), chopped
1 tbsp fresh gingerroot, minced
3/4 cup sliced carrots
3/4 cup chopped cauliflower and/or broccoli
1 can water chestnuts
3/4cup bean sprouts
3/4cup snow peas
40 blanched teneral cicadas

Directions:

1. Capture cicadas at night as they emerge from the ground. Blanche for 1 minute in boiling water. They can now be stored in freezer or used immediately in recipes.
2. In a wok or other suitable pan, heat a couple tablespoons of vegetable oil. Add ingredients in the order listed above when those in the most recent addition are partially cooked.
3. Serve over whole-grain rice and add soy sauce to taste

Yield:

4 main course servings

Maryland Cicadas

Ingredients:

1/2 cup Old Bay® Seasoning
2 tablespoons salt
4 quarts water
1 (12 fluid ounce) can beer (optional)
8 red potatoes, quartered
2 large sweet onions, cut in wedges
2 pounds lean smoked sausage, cut in 2-inch lengths
8 ears fresh corn, broken in half
4 pounds large cicadas

Directions:

1. In an 8-quart pot, bring Old Bay, salt, water and beer to a boil. Add potatoes and onions; cook over high heat for 8 minutes.
2. Add smoked sausage to potatoes and onions; continue to cook on high for 5 minutes. Add corn to pot; continue to boil for 7 minutes. Add cicadas, cook for 5 minutes.
3. Drain cooking liquid. Pour contents of pot into several large bowls, shallow pails or mound on a paper-covered picnic table. Sprinkle with additional Old Bay if desired.

Yield:

8 servings

El Chirper Tacos

Ingredients:

2 tablespoons butter or peanut oil
1/2 pound newly-emerged cicadas
3 serrano chilies, raw, finely chopped
1 tomato, finely chopped
1 onion, finely chopped
1/2 tsp ground pepper or to taste
1/2 tsp cumin
3 tsp taco seasoning mix
1 handful cilantro, chopped
Taco shells, to serve
Sour cream
Shredded cheddar cheese
Shredded lettuce

Directions:

1. Heat the butter or oil in a frying pan and fry the cicadas for 10 minutes, or until cooked through.
2. Remove from pan and roughly chop into 1/4 inch cubes. Place back in pan.
3. Add the chopped onions, chilies, and tomato, and season with salt, and fry for another 5 minutes on medium-low heat.
4. Sprinkle with ground pepper, cumin, and oregano, to taste.
5. Serve in taco shells and garnish with cilantro, sour cream, lettuce, and cheddar cheese .

Chocolate Covered Cicadas

Ingredients:

8 squares of good-quality semi-sweet chocolate
30 dry roasted cicadas

Directions:

1. Roast teneral cicadas for 15 minutes at 225F.
2. Meanwhile, melt chocolate in a double-boiler over low heat. Dip insects in chocolate, place on wax paper and refrigerate until hardened.

Yield:

30 cicadas

Cicada-Rhubarb Pie

Ingredients:

4 cups chopped rhubarb
1 cup fresh cicadas, washed and any hard parts removed
1 1/3 cups white sugar
6 tablespoons all-purpose flour
1 tablespoon butter
1 recipe pastry for a 9 inch double crust pie

Directions:

1. Preheat oven to 450 degrees F (230 degrees C).
2. Combine sugar and flour. Sprinkle 1/4 of it over pastry in pie plate. Heap rhubarb over this mixture. Sprinkle cicadas in amongst the rhubarb. Sprinkle with remaining sugar and flour. Dot with small pieces of butter. Cover with top crust.
3. Place pie on lowest rack in oven. Bake for 15 minutes. Reduce oven temperature to 350 degrees F (175 degrees C), and continue baking for 40 to 45 minutes.

Yield:

Makes 1 pie (8 servings).

Chocolate-Chip Trillers

Ingredients:

2-1/4 cups flour
1 tsp. baking soda
1 tsp. salt
1 cup butter, softened
3/4 cup sugar
3/4 cup brown sugar
1 tsp. vanilla
2 eggs
1 12-ounce pkg. chocolate chips
1 cup chopped nuts
1/2 cup dry-roasted chopped cicadas

Directions:

1. Preheat oven to 375 deg F.
2. In small bowl, combine flour, baking soda and salt; set aside.
3. In large bowl, combine butter, sugar, brown sugar and vanilla; beat until creamy. Beat in eggs.
4. Gradually add flour mixture and insects, mix well. Stir in chocolate chips.
5. Drop by rounded measuring teaspoonfuls onto ungreased cookie sheet.
6. Bake for 8-10 minutes.

Yield:

Approximately 3 dozen cookies

Banana Cicada Bread

Ingredients:

1/2 cup shortening
3/4 cup sugar
2 bananas, mashed
2 cups flour
1 teaspoon soda
1 teaspoon salt
1/2 cup chopped nuts
2 eggs
1/4 cup dry-roasted cicadas

Directions:

Mix together all ingredients. Bake in greased loaf pan at 350 deg F for about one hour.

Yield:

1 loaf