Smash or Not: Use DNA Barcoding to Identify Whether Seemingly Unfriendly Arthropods Around Households are Beneficial or Pest

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ABSTRACT

Arthropods are usually not welcomed guests in many people's eyes. We drive them away, spray pesticide to them, and smash them with all kinds of tools out of our phobia toward arthropods. But are they really harmful to us? Our goal in this project is to find out the identities of a few species appear frequently in and around buildings using DNA barcoding. With that data, we will be able to study species concerned further, and find out their ecological positions and values. We will also find out if these arthropods are harmful to humans. We can then avoid repelling or killing beneficial or environmentally friendly arthropods.

INTRODUCTION

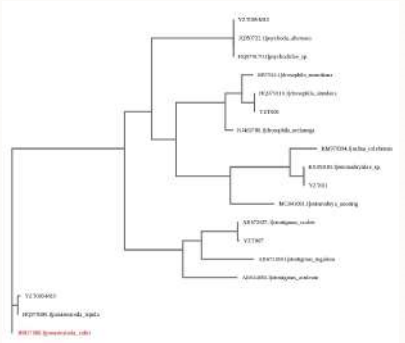
When arthropods appear at households, we found that many people may not be able to identify them. They simply consider them as pests and kill them. However, many of them are harmless, and act as important roles in the ecological system. Killing these arthropods may break the ecological balance, and lead to the increase of real pests. We set the project to identify common arthropods in households using DNA barcoding, and learn whether they are harmful to humans and environment or not base on the barcoding results. We hope that with the barcoding methods, we can make people avoid breaking the balance of the ecological system by mistake.

MATERIALS AND METHODS

We collected over 15 different types of arthropods somewhere at or around our household like flowerpot, drain, corner of the walls and underground parking lot. We used Silica method to isolate DNA and CO1 primer for PCR to amplify the DNA. To confirm that we got the DNA amplified, we gel-electrophoresised the purified DNA and sent it to Genewits for sequencing. Finally, we used DNA subway to identify the sequenced DNA to check what species the DNA we got belongs to.

RESULTS

Although we did 15 samples and 9 of them turned out to be good to be send for sequencing after gel electrophoresis, we only got 5 high-quality DNA sequences back. Spiders and mosquito are the most common arthropods around our households, but most of them in our study seem to be difficult to purify their DNA. Moreover, we are not able to identify 2 of the samples down to the level of species and we assume that their co1 regions are highly-reserved.



DISCUSSION

Not all the arthropods that are common in our home are harmful to humans. Some spiders like Parasteatoda tepidariorums that we collected are not aggressive and even let human's hands approach their nets. When they are disturbed, they prefer avoiding conflict and hide behind obstacles. They feed on pests like flies and mosquitos, so they are actually good for human. Several species like Otostigmus scabers have good vitality and only attack humans when we try to attack them. So, if they appear in our home, just drive them outside with broom so that they will be able to catch the larva of pests like flies and cockroach. Drosophila simulans (fruit fly) seldom carry diseases. Their appearance indicates the decomposition of fruit and you should keep your garbage bin clean and pay attention to your fruit. However, Some arthropods need to be killed when they get in your home. Psychodas live in dirty environment like digestion tank and drainage that contain dirty materials and have a large population. We may catch disease if we do not get rid of them. People should be aware of the consequence of killing all the arthropods around households and learn more about recognition of different arthropods and the effect they have to the whole ecological system.

Parasteatoda tepidariorum

Otostigmus scaber

Drosophila simulans

Psychoda (alternata)

Salina (celebensis)

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