

Too many relatives ruining your picnic? Be glad the flies don't invite their cousins

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The problem with tracking fly evolution is that every so often, a species of fly will branch into two different species, and then those two will split again, and again and so forth, said Gregory Courtney, professor of entomology. If a series of these branches occurs over a brief period of time, the result will be a rapid radiation of new flies and an evolutionary tree that may look more like a bush. Credit: ISU photo by Bob Elbert

When your family members gather at a picnic in your backyard, there may be 10 to 20 people -- maybe more -- enjoying your barbecue.

When flies visit your party, be glad they don't bring their entire family.

Houseflies have more than 152,000 cousins. And those are just the ones we know about.

An Iowa State University researcher is one of a team of scientists who have recently researched the fly [family tree](#) -- one of the most complicated in the animal world.

"It really isn't a tree, it's sort of a bush," said Gregory Courtney, professor of [entomology](#), explaining the complex relationships between fly relatives.

"Because of this, and because the history of flies extends more than 260 million years, it's difficult figuring out the relationships between this branch and that branch," he added.

The problem with tracking fly evolution is that every so often, a species of fly will branch into two different species, and then those two will split again, and again and so forth, he said.

If a series of these branches or dichotomous splits occurs over a brief period of time, the result will be a rapid radiation of new flies and an evolutionary tree that may look more like a bush.

Based on the research of Courtney and his colleagues, at least three episodes of rapid radiation have occurred in the history of flies.

"[The fly family tree] probably involves dichotomous splits," said Courtney. "But we can't always resolve these when there are lots of dichotomous splits going on at the same time."

"One of the nice results of this research was confirmation that a number

of episodic radiations may have occurred. That explains some of the difficulty we've had in resolving relationships of different types of flies," he added.

One of Courtney's favorite flies is a group called mountain midges (Deuterophlebia), which the current study suggests is the oldest group of flies, and is positioned near the base of the fly family tree.

He is also an expert on the anatomy, or morphology, of different groups of flies.

That background made him a good choice to help the team decipher the relationships among flies.

"Morphology is just one piece of information that we use to try to figure out relationships," he said. "We looked at a whole suite of morphological characteristics – about 400 characteristics for this analysis."

From its beginning, the fly family tree has been continuously evolving. Courtney says there are now more than 152,000 species of flies that have been described and named, and least that many more haven't yet been discovered and described.

More information: Courtney was a co-investigator on the five-year study recently published in the journal *Proceedings of the National Academy of Sciences*.

Provided by Iowa State University

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