Unlocking mints' secrets could advance medicine, spices, more

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Michigan State University has netted a $5.1 million National Science Foundation grant to explore the diverse world of mints.

Mints, or Lamiaceae, is the world's sixth-largest family of flowering plants. If the secrets of this wide-ranging species can be unlocked, mints can be improved and potentially new synthetic molecules and products may be developed.

Mints comprise:

- Spices - basil, oregano, rosemary, sage, savory and thyme
- Medicinal herbs and teas - bee balm, bergamot, hyssop, lavender and skullcap
- Flavor additives - spearmint and peppermint
- Ornamentals - Salvia and Coleus
- Wood - teak
- Feline intoxicants - catnip

"Mints belong to one of the most-fascinating families of plants," said Robin Buell, MSU plant biologist and leader of the grant. "We use them in cooking, for fragrance, for furniture, as ornamentals, for feline intoxicants and as herbal remedies - all because they produce diverse chemicals of interest to humans."

Little is known about mints, however, in comparison to their worldwide

economic value. Just in the United States alone, peppermint and spearmint oil sell for $20-24 per pound and had a total estimated market value of $200 million in 2012.

To fill in that informational void, Buell's research will delve into how the vast chemical diversity in mints arose. Specifically, her team will generate extensive metabolite, expression, genome and phylogenetic data that will shed light on how metabolic pathways naturally evolve in plants leading to rich chemical diversity.

The in-depth study will map mints' genome and identify key genes that drive their diversity. Mapping the genome will allow researchers to identify evolutionary and developmental mechanisms that control growth and reproduction.

It could also lead to the development of synthetic molecules for new uses, such as new medicines, foods, fragrances and oils by mixing genes from different biochemical pathways.

"This research will enable us to design new biochemical pathways and make novel chemicals of use as fragrances and pharmaceuticals," Buell said.

Provided by Michigan State University