

Fire-wise Hakea's invest in larger, fewer seeds

July 27 2015, by Narelle Towie



There are 150 different species of Hakea plants, with more than 100 types in the south-west. Credit: David Clarke

Some of the south-west's iconic Hakea plants that are able to survive bushfires are more likely to have bigger, fewer seeds than those killed by flames, researchers have discovered.

Curtin University plant evolutionary biologist Sh-hoob Mohamed El-

ahmir compared 82 species of the native Hakea for seed and [fruit size](#), plant height, seed count and fire survival abilities.

Studies have shown that in fire-prone areas, such as Australia's south-west, fire significantly shapes [plants'](#) evolutionary traits.

Mr El-ahmir and his team spent a year statistically analysing and comparing Hakea data sets and discovered that shrubs able to re-sprout after a bushfire use a different strategy for seed production.

"They [plants killed by fire] will use more [seeds](#) and smaller seeds to avoid the fires, but other plants would not need to avoid fires because they avoid fires by being able to re-sprout," Mr El-ahmir says.

The fire-killed plants produced many small seeds that can more easily travel longer distances, Mr El-ahmir says.

"This answers questions about the ecosystem that Hakea lives in," he says.

There are 150 different species of Hakea plants, with more than 100 types in Australia's south-west.

The plant is renowned for having wide-ranging seed sizes between different species.

Australia's south-west suffers through hot, dry summers frequently affected by fire and plagued by nutrient-poor soils.

Storage devices protect fruits and seeds

According to the research, plants that resprout after fire tend to invest less in fruits and seeds, and more in storage organs—such as

tubers—which helps them quickly re-establish after a blaze.

Conversely, species for which a bushfire is a death sentence invest more in numerous small fruits and seeds to give themselves the best chance that at least some of their seeds will travel or germinate after a fire.

The trade-off is that these smaller seeds are less resilient to drought, scientists say.

The study also shows that the larger, heavier Hakea plant seeds able to re-establish after a fire germinate earlier and are protected by larger fruits.

Previous studies have investigated the relationship between seed size and traits such as fruit size and post-fire regeneration but until now, it was unclear how those traits evolved to interact in a fire-prone ecosystem, the researchers say.

"These results demonstrate that fruit size, fecundity and evolutionary history have had most control over seed size variation among Hakea species, the researchers say.

More information: "Seed Size, Fecundity and Postfire Regeneration Strategy Are Interdependent in Hakea." *PLoS ONE* 10(6): e0129027.
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