

AGILENT BRAVO SUCCESS STORY

HOW PLANTS SURVIVE AGILENT BRAVO PLATFORM AIDS PROTEOMIC RESEARCH



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On a spring day in Western Australia's wheatbelt, it can be frosty in the morning, scorching in the afternoon.

Even so, farmers are able to grow wheat here.

Nicolas Taylor, a research scientist at The University of Western Australia, finds that remarkable.

"During the course of the day, the temperature those plants are exposed to will vary by 35 degrees Celsius, yet they're able to survive," Dr. Taylor observes. "Biochemically, that's a really interesting process."

Especially when one considers how that kind of variation in core temperature would kill a human being.

"Plus or minus four degrees and we're in real trouble," he says. "It starts to mess us up completely."

Adapting to Change

Taylor and his colleagues in Perth (and elsewhere) are studying the molecular mechanisms that enable plants to survive harsh conditions.

"We're a proteomics lab, and we're focused on identifying proteins that change under varying environmental conditions," Taylor says. "Ultimately what we want to do is understand the ways in which plants adapt to changes in their environment, so that we can breed plants that are more adaptable."

Salty soil is also a key concern in Australia and other crop-growing regions around the world. In Western Australia the problem is dryland salinity, caused by a rising water table, while in other areas decades of irrigation has resulted in trace amounts of salts from the water building up in the soil.



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"We're doing this in the hope that in the future, as the climate varies and conditions get more extreme, we've got a knowledge base to help us think about how to improve those plants, breeding for certain traits so they can still survive in a more dynamic environment," Taylor explains.

Seeing Results

It's a complex undertaking, but the team has had encouraging results.

"In the salinity work, we've started to identify a couple of key proteins which we believe have a role in providing protection to metabolic processes that go on inside the energy-producing parts of the plant. That is, inside the mitochondria. We've identified some different isoforms of a particular enzyme that we think might be important for the protection of plants," Taylor says.

"On the temperature side, what we've found is that the mitochondrial electron transport chain—which up to now was thought to be quite stable under varying temperatures—actually varies quite significantly, and we think this is how the plants are able to adapt their metabolism to maintain production of adenosine triphosphate, or ATP, and survive."

Working Together

The team does its research using cutting-edge mass spectrometers from Agilent (including two quadrupole time-of-flight and two triple quadrupole systems) and the Agilent Bravo Automated Liquid Handling Platform.

"The Bravo platform was quite simple to set up and the software is easy to understand. We were quite quickly able to begin establishing lab-specific protocols. It carries out our application brilliantly. Fast, accurate, reproducible pipetting are the key benefits for us. A robot is of course faster and more accurate at loading plates than any human can be, and our researchers no longer have to spend hours in the cold room loading plates. We now have a great deal more confidence in the results we are obtaining from our analysis. Plus, we have been able to begin planning a number of other applications where it can improve our workflow," Taylor says.

"I've been using Agilent equipment since about 2006, when I came back from The University of Oxford to work here in Australia. Over this period we've had really good interactions with Agilent. The company's whole staff has been very interested in what we're doing and the ideas we have, and they have been very keen to help us accelerate our research. Having that network of people you can rely on to get information from is quite important. It's been very successful for us."

To learn more about the Agilent Bravo Platform and how other researchers use it, visit www.agilent.com/lifesciences/Bravo

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