

Investment Highlights

- Proprietary insecticide technology based on naturally derived chemistry with a novel mode of action
- Commercial partnership strategy provides multiple opportunities to demonstrate and generate near term value. Current partnerships with:
 - BASF – world's leading chemical company
 - GRDC – Australia's national Grains Research, Development Corporation & extension investment body
 - Clarke – largest vertically integrated company serving the public health mosquito control market
- Expanding efficacy, toxicity and manufacturing data to support international regulatory submissions – excellent safety profile
- Large addressable market of US\$31.1 billion pa where insecticide resistance is a problem
- A\$3.9 million cash at bank (June 2021) ensures working capital needs on budgeted activities are met for over a year

Addressing Global Challenges

Resistant pests

Pests are growing increasingly resistant to the current insecticide chemistry available on the market. As of June 2020 there are more than 16,000 documented cases of insecticide resistance involving more than 600 commercially significant insect and mite species that have developed resistance to at least one insecticide.

Food security

Currently 20-40% of food produced globally is lost to pests, valued at around US\$2000 billion pa. In Australia ~\$20 billion (one third) of agriculture production is directly attributable to the benefits of pesticides. Resistant agricultural pests threaten food security as more food is damaged during either the growing or storage phases. The current 7.7 billion global population is anticipated to reach nearly 10 billion by 2050. This puts pressure on the available arable land and food production resources, threatening food security.

Public health

More than half the world's population is at risk of vector borne diseases, which represent 25% of all infectious diseases – there are over 200 million cases of malaria alone globally every year. At the same time, public health concerns are being raised when higher rates and/or harsher chemistry is needed to control pests that are developing resistance to current chemistry and are vectors for serious diseases.

Toxicity and environmental impact

There is growing pressure on food producers and public health protectors to use 'softer' chemistry and safer solutions to address the increasing impact of insect damage to food production and in managing public health. More transparency is expected on what insecticides are used for food production, or sprayed in public places. Regulators are also placing bans on existing chemistry that impact beneficial insects such as bees, or cause health and off-target impact concerns. The trend is moving away from using synthetic chemicals in favour of naturally derived products.

Limited new commercialised insecticide technology

Currently, the largest of the five major chemistry classes used to control pests, neonicotinoids, has been banned from outdoor use in the EU due to its impact on bees. There is also increasing demand for its ban in other markets. Yet the last significant insecticide with a novel mode of action was commercialised in 2008 – now generating over US\$2.3 billion pa in product sales. New chemistry with a Novel Mode of Action is desperately needed by industry to control pests that have developed resistance to existing products. Bio-Gene's discovery of beta-triketones as capable of being used as an insecticide is effectively a 1 in 140,000+ chance. The company's insecticide is 5000 times less toxic than neonicotinoids to bees, with minimal impact to other beneficial species.

Insecticide Evaluation Programs

Stored grain pest evaluation program

Across global markets up to 70% of grain losses in storage are attributable to pests, representing a substantial market opportunity. The trial program is being conducted in partnership with BASF, GRDC and the Queensland government Department of Agriculture and Fisheries. Combination treatments with Flavocide™ were shown to control the full spectrum of pests known to be resistant to other chemistry. Testing has identified minimum application rates of the combination treatments to be effective against key stored grain pests. The final stage of the program involves a field trial assessing residual efficacy and has commenced with positive 3-month interim efficacy results announced May 2021. Final results are anticipated Q4 CY21. Currently there is no single chemistry that controls all major pests that impact stored grain. Flavocide™ thus has the potential to be developed and marketed in formulations that can enable control of the full range of pests, including pests resistant to other classes of chemistry. The global grain protectant market is valued at A\$1 billion pa.

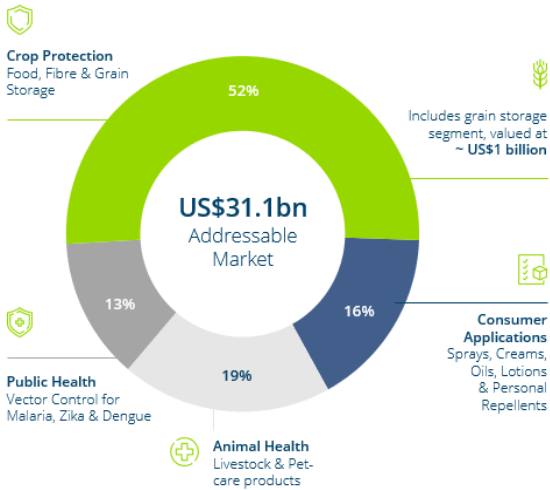
Mosquito evaluation program

The trial is evaluating Flavocide™ and Qcide™ for public health mosquito control in North, South and Central America and is being conducted in partnership with Clarke Mosquito Control, the largest vertically integrated mosquito control company. Testing commenced in September 2020 to assess various solvents as base carriers. Further evaluation will involve field-testing lead formulations on target species. More than half the world's population is at risk of vector-borne diseases – the US mosquito control insecticide market alone is valued at US\$200 million pa. Concurrently, the effectiveness of insecticides on the market continues to diminish due to resistance.

Insecticide Market Commercial Opportunities

Crop protection

Valued at US\$16 billion pa, the crop protection insecticide market is expected to grow to US\$20.8 billion by 2022. To meet needs of the estimated 10 billion global population in 2050, an increase of 60% in yields is required from existing crops. Attacks by a range of pests limit food and fibre plant growth and negatively impact production and quality. Insects and pests destroy an estimated 18-26% of worldwide crop production every year; 13-16% alone is destroyed in the field before harvest. Despite the application of insecticides and control measures, as high as 50% of annual potential production is lost to insects and pests worldwide.



Grain storage

The stored grain insecticide market is expected to reach US\$907 million in 2026, growing at an annual rate of 5.7%. Target pests are mainly insects (beetles, weevils, moths, mites) but also include rodents, birds and fungal species. Estimates suggest that between one quarter and one third of global grain crop is lost each year to insects during storage. This represents a major economic impact.

Public health

Mosquito control products comprise a significant part of the US\$4 billion public health segment. Major consumers include governments, NGOs and aid organisations. Malaria, the zika virus and dengue fever are some of the prevalent mosquito-borne vector diseases. In particular, malaria is the largest existing disease with 212 million cases pa across 87 countries, which caused over 435,000 deaths in 2017 alone. In the same year a total of US\$3.1 billion was invested in malaria control and elimination activities. The mosquito control market is growing at 6% compound annual growth. Chemical interventions represent the largest defence technique.

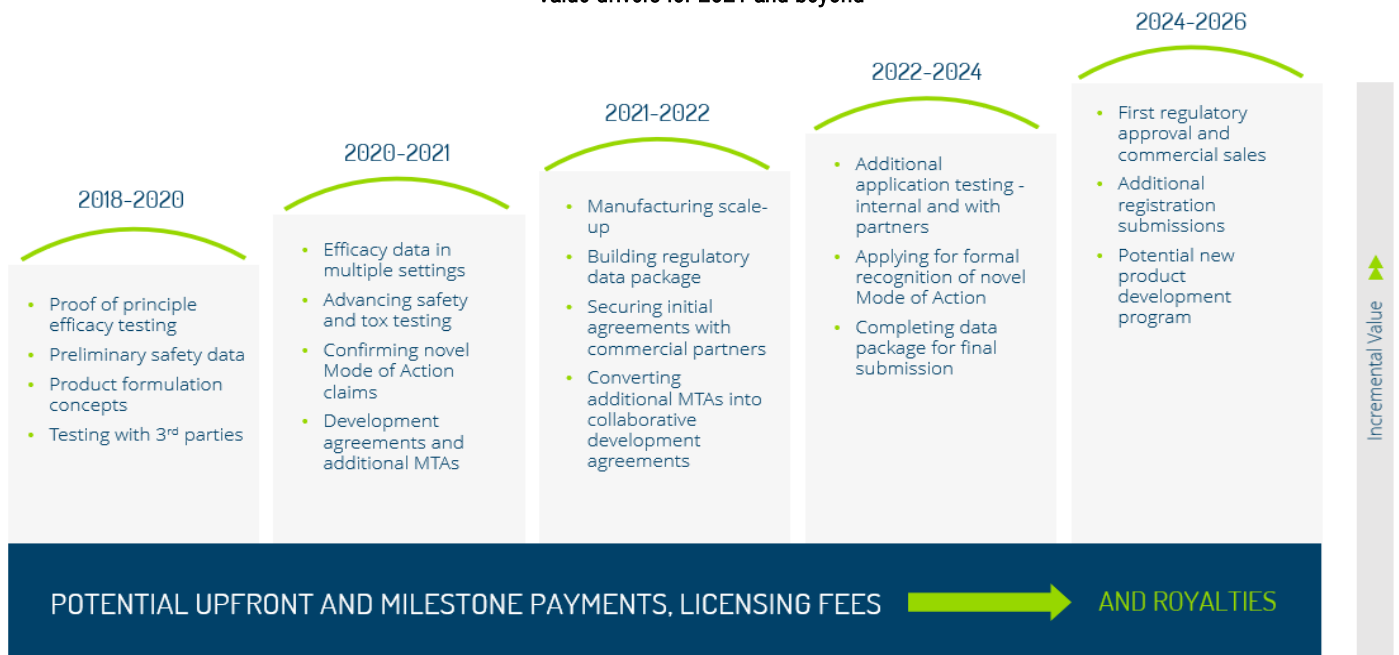
Consumer applications

Rise in population densities in urban and surrounding areas has led to increased pest infestations. Vector borne diseases within domestic settings are becoming more prevalent. Salmonella, cholera and gastroenteritis are some of the diseases spread by houseflies and cockroaches. In 2018 the global household insecticide market was US\$5 billion, projected to grow at a compound rate of 5.5% to reach US\$7 billion by 2024. Increasing consumer awareness has led to a demand in products that are safer and more environmentally friendly. Driven by consumer awareness and legislation requirements, the biopesticides market grew 24% from 2014 to 2016 to over US\$1.8 billion. Consumer products represent 16% of Bio-Gene's total addressable market.

Animal health

Insecticides account for ~US\$6 billion of the US\$30 billion animal health industry. Animals include livestock and production animals as well as pets and companion animals. Target parasites are lice, ticks and flies. Treatment of parasites in livestock and production animals are essential to maintain animal health and reduce economic loss. While a wide array of parasiticides to control external parasites are available, a reliance on products based on similar chemistry has led to problems in achieving acceptable control.

Value drivers for 2021 and beyond



Board and Management

Robert Klupacs – Non-Executive Chairman
 Dr Peter Beetham – Non-Executive Director
 Andrew Guthrie – Non-Executive Director
 Roger McPherson – CFO & Company Secretary

Richard Jagger – CEO & Managing Director
 James Joughin – Non-Executive Director
 Peter May – Executive Director Research & Development
 Dr James Wade – Program Manager

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