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Bio-Gene Technology (ASX:BGT)

Capital Markets Analysis

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For Professional & Sophisticated Investors Only

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Executive Summary

A natural & safe answer to a rapidly growing global need for new insecticides

Bio-Gene

- An Ag-Tech development company addressing the global issue of insecticide resistance
- A technology platform enabling the next generation of safe insecticides at scale

Valuation Parameters	
Shares on Issue (m)*	106.7
Share Price @ Feb. 2018 ($)	0.135
12 month Range ($)	0.10 - 0.28
Market Cap ($m)*	14.4
Net Cash ($m)	7.7

Unique Offerings

- Test data inferring a Novel Mode of Action in killing resistant pests
- Established IP with patents that protect the use of *'Beta-triketones'* as insecticides
- Trial and test results have shown BGT's compounds to have significant activity against a number of resistant pests

Board & Management

- Strong Board & Management with deep Ag-Chem industry experience
- Building of Scientific Advisory Board underway

Financials

- Well-funded balance sheet with $7m in cash, providing a ~2 year runway

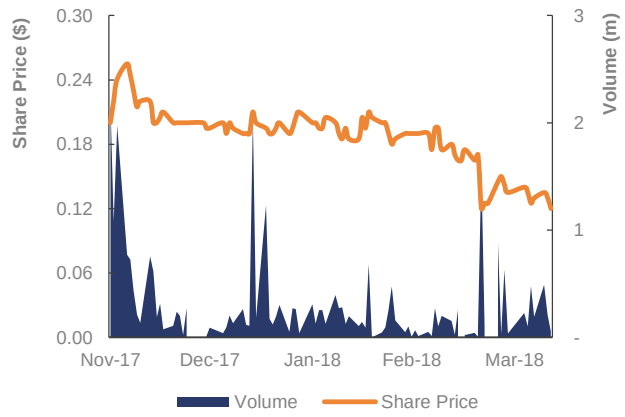
Top Shareholders		Shares	(%)
1	Kevin Rumble	6.6m	5.2%
2	J P Morgan Nominees	4.3m	3.4%
3	Victor Rosenberg	3.3m	2.6%
4	Robert Klupacs	2.9m	2.2%
5	Ray Munro	2.6m	2.0%
Top 10		**30.6m**	**23.9%**
Top 20		**46.0m**	**36.0%**

Strong Demand Dynamics

- Insecticide resistance is a rapidly growing global issue, with ~600 insect species now resistant to at least one class of insecticide
- The insecticide market has a total value of +US$31.1bn, with resistance to remaining insecticidal compounds growing
- The Chemical industry is desperately seeking new compounds to combat this issue

Opportunity

- Extensive pipeline of ongoing trials across key verticals
- Testing partnerships with highly regarded scientific institutions that have a strong domestic and global presence
- A multitude of potential uses and products with a proven business and revenue model



- Early revenue generated through licensing of intellectual property

BGT's Products

BGT is developing two products (one natural & one synthetic) that allow entry into four key verticals

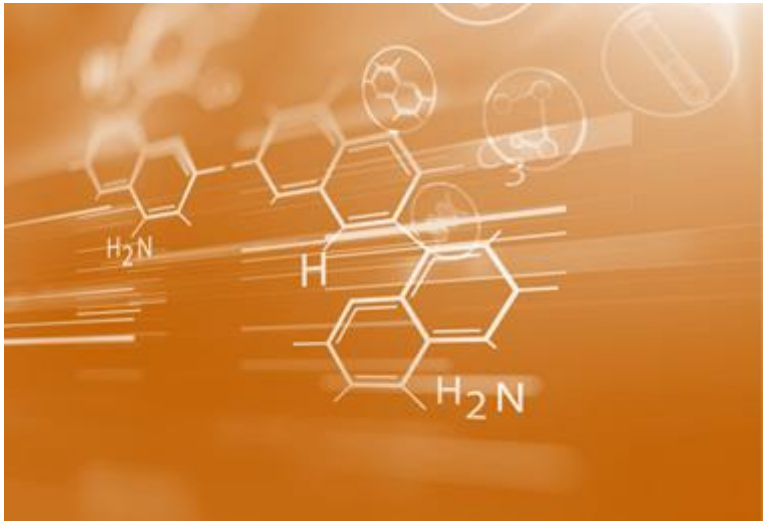
Qcide™

Natural Compound

Consumer Products

- An extract of a specific variety of eucalypt, the Gypmie Messmate
- Trees are farmed in concentration by sub-contractors of BGT in QLD
- An extract of the oil is taken from the leaves known as *Tasmanone,* a natural compound that has shown evidence of working as an insecticide to knock down pests
- Being a natural product Qcide is well suited to applications in consumer products

Flavocide™



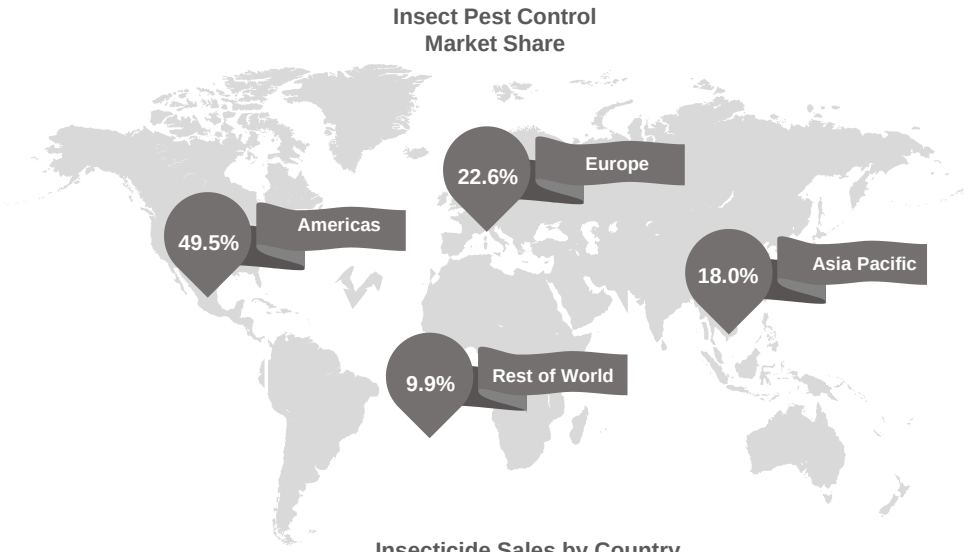
Synthetic Compound

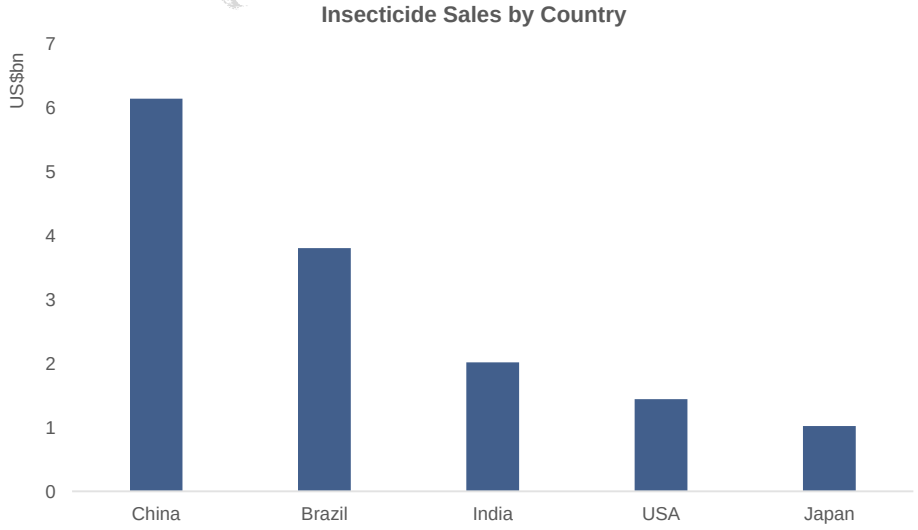
Public Health **Crop Protection** **Animal Health**

- BGT use a chemical process to deliver another *Beta-Triketone* a *nature identical* compound that is able to be produced in mass-scale for commercial insecticide products
- BGT is targeting 3 broader and larger verticals with Flavocide

Insect Control Market

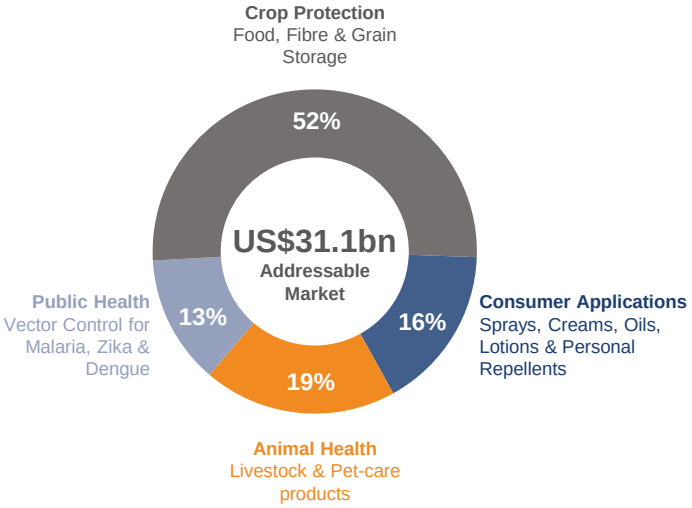
Global pest control is a rapidly growing industry with chemical controls representing the largest opportunity





- Strong demand for public health initiatives, growing human population and increasing food production requirements are driving global market growth
- Globalisation and increased movement of products between countries is causing resident pests to become *global pests*
- There are several methods of pest control, with chemical controls representing the largest and fastest growing of these
- Consensus amongst industry professionals is that there are very few alternatives to new chemistry being discovered and development of new insecticides from this chemistry is the only viable path forward for several decades
- BGTs four major verticals:
  1) Crop Protection
  2) Consumer Applications
  3) Animal Health
  4) Public Health

  collectively deliver an addressable market of +US$31.1bn, with crop protection the largest component



US EPA 2017, WHO 2017, Zoetis & Provue Market Research, Markets & Markets

Resistance

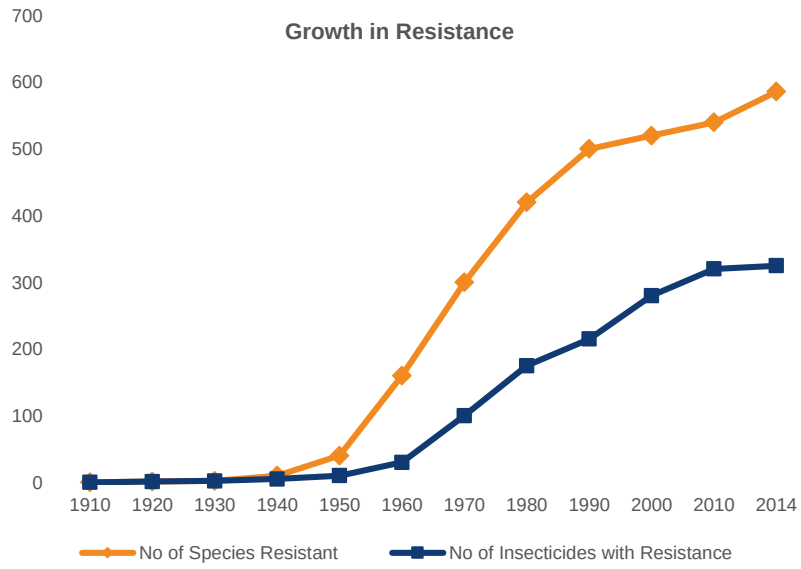
Pests are developing resistance to almost all insecticides at a faster rate than ever before

- Resistance is the change in sensitivity of an insect population to an insecticide, a consequence of overuse and misuse of insecticides
- ~600 insect species are now resistant to at least one class of insecticide
- Resistance has been reported in all existing classes of insecticides
- Once a pest is resistant to one form of insecticide (e.g. one pyrethroid) it then generally becomes resistant to the whole class of insecticides (all pyrethroids).
- Depending on the nature of the resistance, insects may become resistant to another class of insecticides, this is known as *cross-resistance*

12 Key Problem Pests	Instances of Resistance Reported	Bio-Gene Target
Two-spotted spider mite	414	✓
Diamondback moth	576	✓
Green peach aphid	402	✓
House fly	303	✓
Whitefly	555	✓
Colorado potato beetle	279	
Cotton aphid	231	✓
European red mite	197	✓
Cotton bollworm	692	✓
Southern cattle tick	167	✓
German cockroach	219	✓
Mediterranean climbing cutworm	457	

Resistance is developed in four distinct ways:

1. **Metabolic –** Insects rid their bodies of the toxin (most common)
2. **Target Site –** Target site (e.g. calcium channel) genetically modifies to stop the effect of the toxin
3. **Penetration –** Insects absorb the toxin slower than susceptible insects
4. **Behavioural –** Insects detect and avoid the toxin

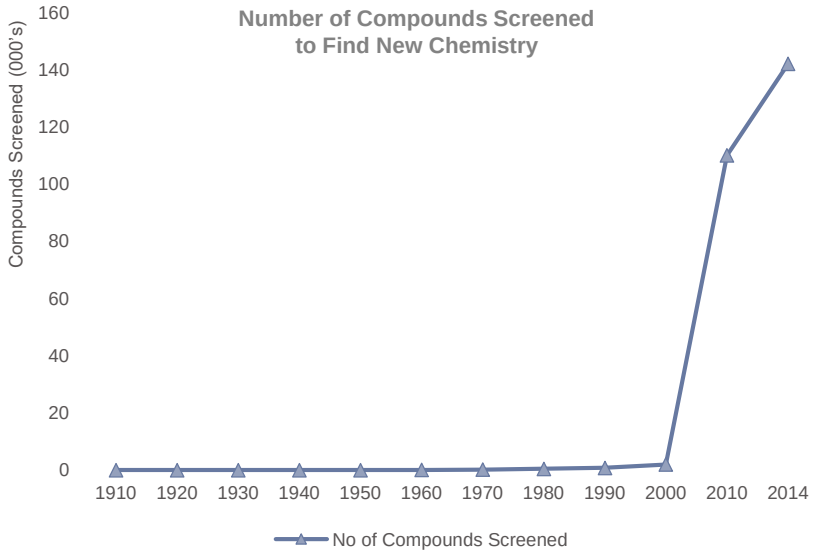


Source: Sparks & Nauan, 2015: IRAC: Mode of action classification & insecticide resistance management

Discovery of New Compounds

The discovery of new compounds for insecticides is *extremely rare* & typically *very valuable*

- Resistance is driving a desperate search to discover new compounds for insecticides
- Currently on average +140,000 molecules are screened to find one new compound, up 7000% since 2000
- The Innovative Vector Control Consortium (IVCC) have now undertaken a high throughput chemical screening process, with 4.5m compounds screened, providing only 9 compounds considered worthwhile pursuing, beyond the discovery phase
- **The discovery of Beta-Triketones as compounds capable of being used as insecticides is effectively a 1 in +140,000 chance, what we understand as being the scientific equivalent of finding a needle in a haystack**



- Resistance has been recorded in some of the largest distributed insecticides

Chemical Subgroup	Discovered	No. of products	Annual Sales (US$m)	Resistance Recorded
Organophosphates	1944	90	1,794	✓
Carbamates	1950	30	667	✓
Pyrethroids & Pyrethrins	1977	30	2,777	✓
Avermectins & Milbemycins	1978	4	1,261	✓
Fiproles	1990	3	801	✓
Neonicotinoids	1990	8	4,650	✓
Diamides	2008	5	1,411	✓

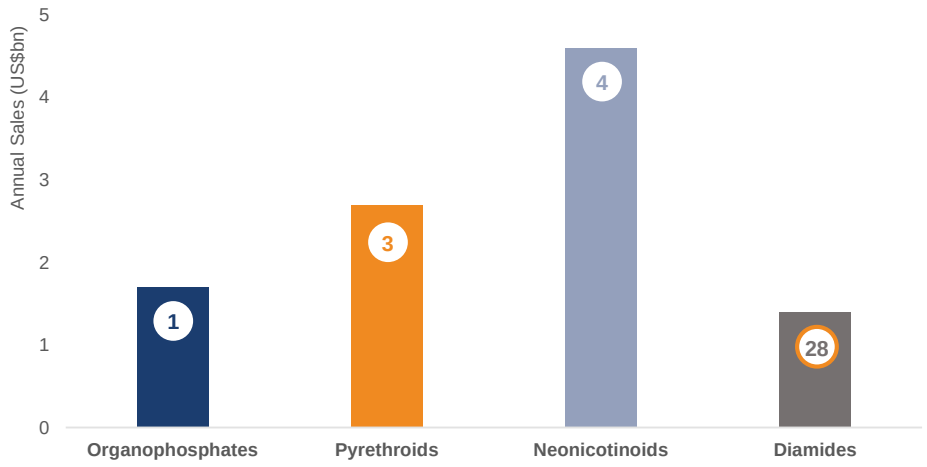
- Continued growth of resistance in these and other insecticides will see the deterioration of significant value, forcing chemical companies to look for ways to slow this process (find new compounds)
- **Should BGT be classified as a novel Mode of Action by IRAC and work either to replace or compliment these chemicals to stem resistance, value generation could be significant**

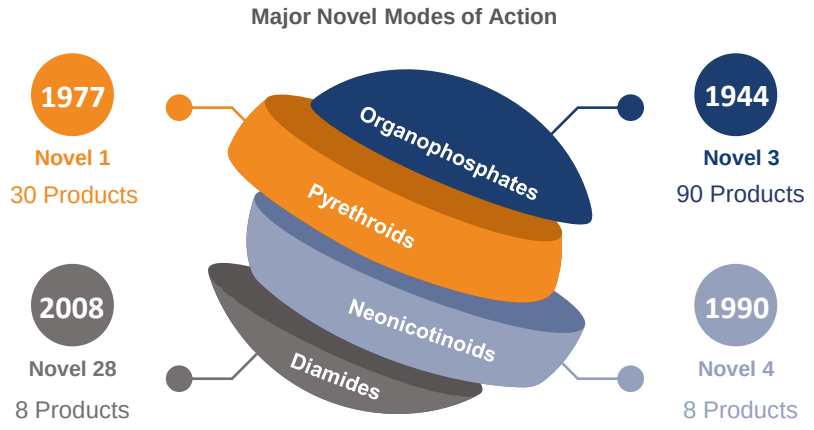
Source: Sparks & Nauan, 2015: IRAC: Mode of action classification and insecticide resistance management

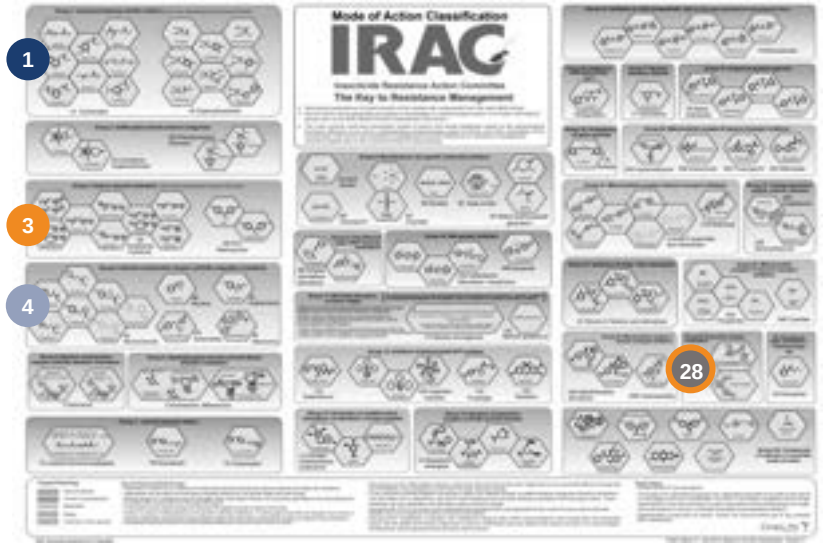
Current Insecticides

Four major insecticide classes makeup the large majority of sales volume globally

- 30 compounds with Novel Modes of Action (MoA's) have been discovered and contain many other sub-groups, although only 4 - 5 are used in significant volumes.
- For simplicity, within this report we focus upon the 4 largest insecticide classes by sales.
- A large portion of the remaining MoA's are generally used in conjunction with these 4, focus specifically on individual pests, or have been made redundant due to toxicity or resistance
- For instance sales of Neonicotinoids have continued to reduce through public pressure and regulatory activity, as evidence of toxicity to bee populations has surfaced
- All 4 compounds generate substantial annuity-type global sales. Organophosphates still generate +$1.7bn p.a. after being discovered and commercialised in 1944
- **Flavocide must first be deemed a Novel MoA by the Insecticide Resistance Action Committee (IRAC)**
- **This would then provide significant product opportunities which have been long-term annuity revenue streams of +US$1bn per-year**







Sparks & Nauen (2015), IRAC & Company Announcements

Mode of Action

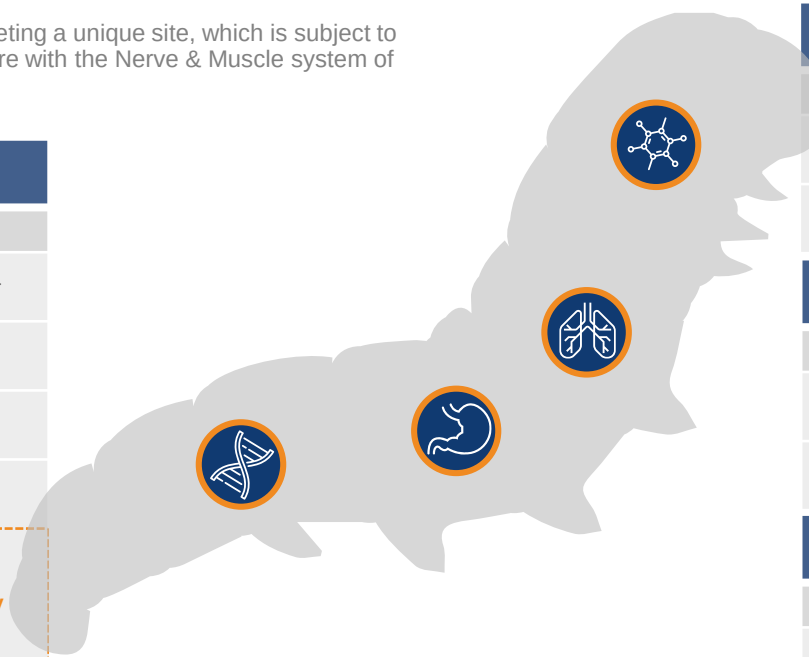
A mode of action refers to the distinct way in which an insecticide kills a pest

- Each chemical class identified by IRAC attack pests in different ways (Novel Modes of Action)
- Of these 30 compounds they attack 4 broad areas:
  1) Nerve & Muscle
  2) Respiration
  3) Growth Capabilities
  4) Mid-Gut
- For instance, of the Nerve & Muscle targeting compounds:
  - **Diamides** close the calcium channel preventing calcium ions being supplied to the pest
  - **Pyrethroids** prevent the sodium channel from closing, causing uncontrolled nerve firing
- **Beta-Triketones** have shown evidence of targeting a unique site, which is subject to proprietary confidentiality, but appear to interfere with the Nerve & Muscle system of pests

- Details on Beta-Triketones' MoA have not been fully disclosed, however recent tests conducted by Purdue University and Neuro Solutions have shown it killed in different ways to both Synthetic Pyrethroids and Organophosphates, with strong evidence of a completely different MoA
- We do not expect BGT to release exact details of Qcide and Flavocide's MoA until it builds out a robust intellectual property strategy, protecting it's MoA
- Testing is subject to IP filings, which once completed will form the background of a major scientific paper
- **Establishing that Beta-Triketones hold a Novel MoA is a significant step in developing and commercialising Flavocide and Qcide**

1. Nerve & Muscle

Compound	Mode of Action
Diamides	Ryanodine Receptor Modulator
Pyrethroids	Sodium Channel Modulator
Neonicotinoids	nAChR Receptor Modulator
Organophosphates	AchE Channel Inhibitor
Beta-Triketones	**Interfere with the nervous system in a way that is suspected to be a completely different MoA to any other compound**



2. Respiration

Compound	Mode of Action
Bifenazate	Electron Transport Inhibitor
Phosphides	Electron Transport Inhibitor

3. Growth Capabilities

Compound	Mode of Action
Fenoxycarb	Juvenile Hormone Mimics
Buprofezin	Chitin Biosynthesis Inhibitor

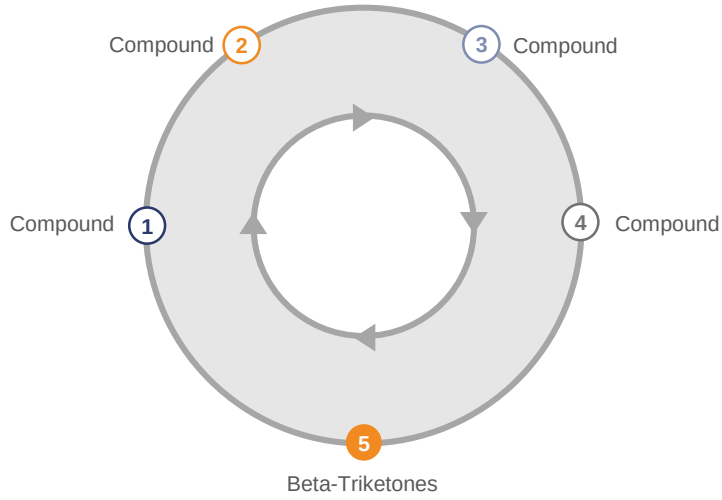
4. Mid-Gut

Compound	Mode of Action
Bacillus Sphaericus	Disrupt Midgut Membrane

Rotation Strategy

Resistance will be countered by discovery of new MoA's & rotation of these compounds

- IRAC has two MoA rotation strategies
  1) The first ensures that each generation of pest is not exposed to the same MoA, preventing *selection pressure* within each generation
  2) The second ensures that each generation is exposed to more than one MoA, and the second generation is not exposed to an MoA that the previous generation was exposed to. This is the most effective rotation strategy but is not always practicable
- MoA's are commonly used in combinations to ensure any resistant pests are exposed to multiple compounds
- Should Beta-Triketones become another major MoA used as an insecticide they would provide increased rotation capabilities, further mitigating **all MoA's**
- Additional MoA's being discovered and introduced into rotation do not present a competitive threat to BGT's compound, but a mechanism that extends the longevity of all MoA's, curtailing resistance
- **Industry is therefore likely to recommend the use of Flavocide if it is proven to have a Novel MoA, ultimately driving sales**



	Year 1		Year 2		Year 3		Year 4	
	First Generation	Second Generation	First Generation	Second Generation	First Generation	Second Generation	First Generation	Second Generation
Generational Rotation	1 1	2 2	1 1	2 2	1 1	2 2	1 1	2 2
Rotation Within & Between Generations	1 2	3 4	1 2	3 4	1 2	3 4	1 2	3 4
Additional Compound Introduced	1 2	3 4	5 1	2 3	4 5	1 2	3 4	5 1
Combinations	1 2 4 5	1 2 4 5	1 2 4 5	1 2 4 5	1 2 4 5	1 2 4 5	1 2 4 5	1 2 4 5

IRAC MoA Classification Process

Beta-Triketones must be officially classified by IRAC as holding an MoA

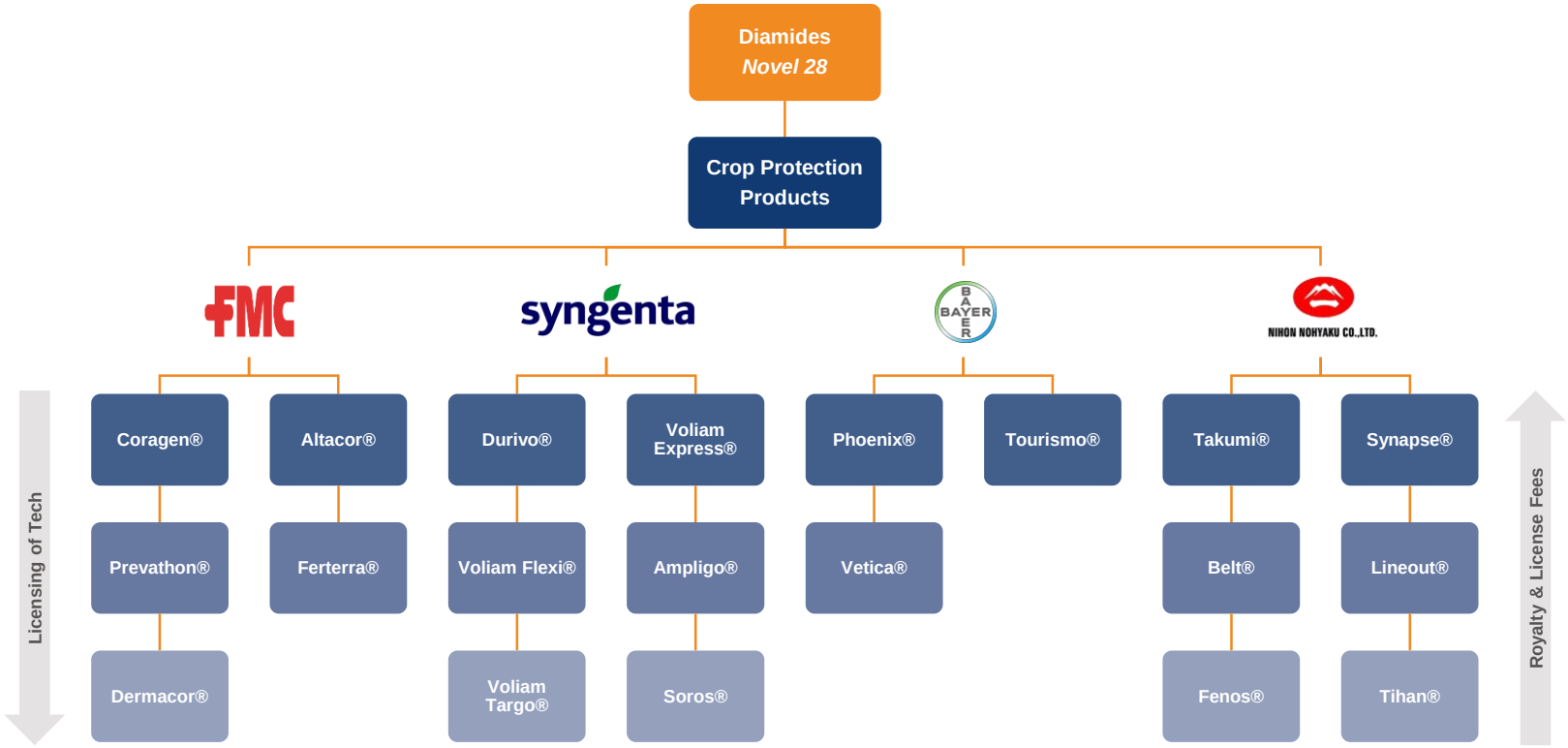
- The Insect Resistance Action Committee (IRAC) has two core goals:
  1) Facilitate communication and education on insecticide and traits resistance
  2) Promote and develop implementation of insecticide resistance management strategies to support sustainable agriculture and improved public health
- IRAC's MoA Team comprises technical representatives of the member companies (large chemical company's) with expertise in insect toxicology, pharmacology or biochemistry
- This group meets regularly to asses changes to the scheme, with a new version released approximately once per-year
- **BGT must go through the following process to have Beta-triketones registered as Novel MoA's: which will be a key value accretion point for the Company**

Platform Technology

BGT will replicate the success of Nihon's platform technology developed for the diamides insecticide class

- Novel MoA's being used in scale is extremely rare, the last being commercialised in 2008 by Japanese Company Nihon Nohyaku: Diamides (Novel 28)
- By 2013 (5-years after first use) Diamides recorded global sales of +US$1.4bn, which it has maintained annually, hence once discovered Novel MoA's have the potential to be extremely valuable
- Diamides are used in conjunction with a number of other chemicals and insecticides across all 4 of BGT's targeted verticals

- **New technology will support existing products and product distributors, not compete with it**
- Diamides sits at the top of the platform, chemical manufacturers then fund the R&D and manufacturing of specific products
- Royalty and license fees flow back to the top of the platform, BGT aims to replicate this revenue and business model across all four of its key verticals



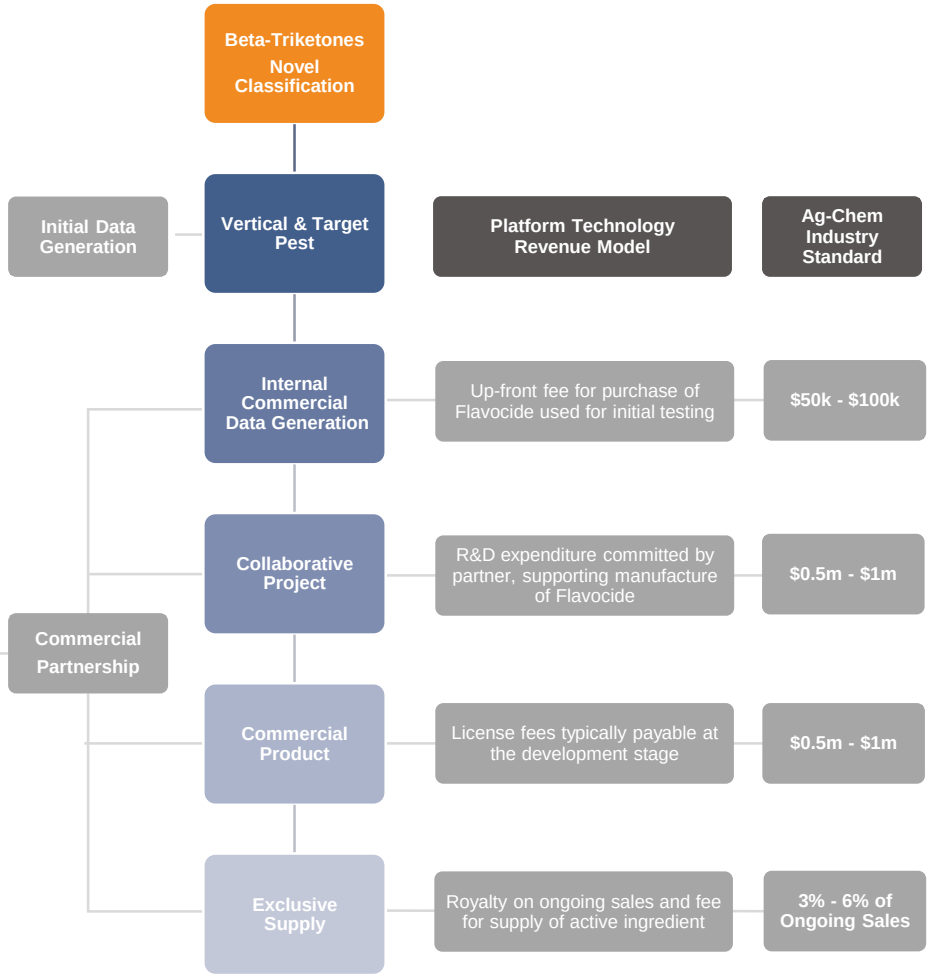
BGT Revenue Model

BGT is continuing to build a suite of data to support commercial partnerships in the future

- BGT aims to develop a platform to facilitate partnerships with established Ag-Chem companies, to deliver Flavocide into its various targeted verticals
- De-risking model using development funding from partners to advance various verticals
- Each vertical encompasses specific pests which require individual products and a separate partnership and revenue stream for BGT
- We expect initial testing results and data generated by its 7 current research partners to provide the foundation for these commercial partnerships
- Large Ag-Chem companies then conduct further testing and data generation, which is typically funded internally

Potential Commercial Partners

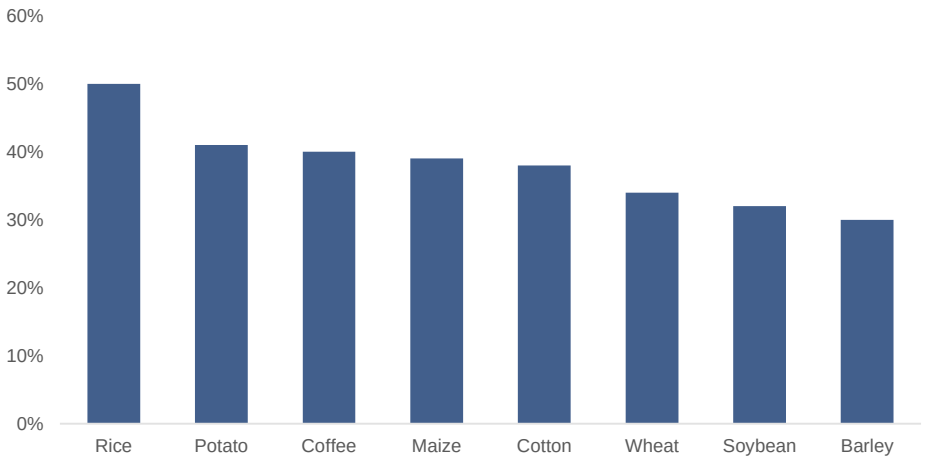
BASF We create chemistry · Mitsui Chemicals · FMC · DOW · DUPONT · Nufarm · SINOCHEM GROUP · CHEMCHINA · BAYER Bayer CropScience · SUMITOMO



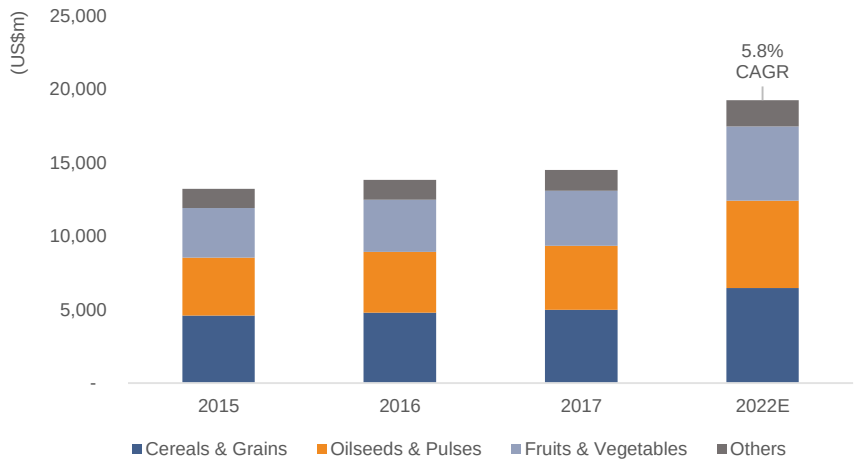
Vertical Number 1: Crop Protection

Crop Protection insecticides represent a substantial opportunity for BGT

Estimated Worldwide Loss in Crops to Insects



Global Insecticde Market by Crop Type



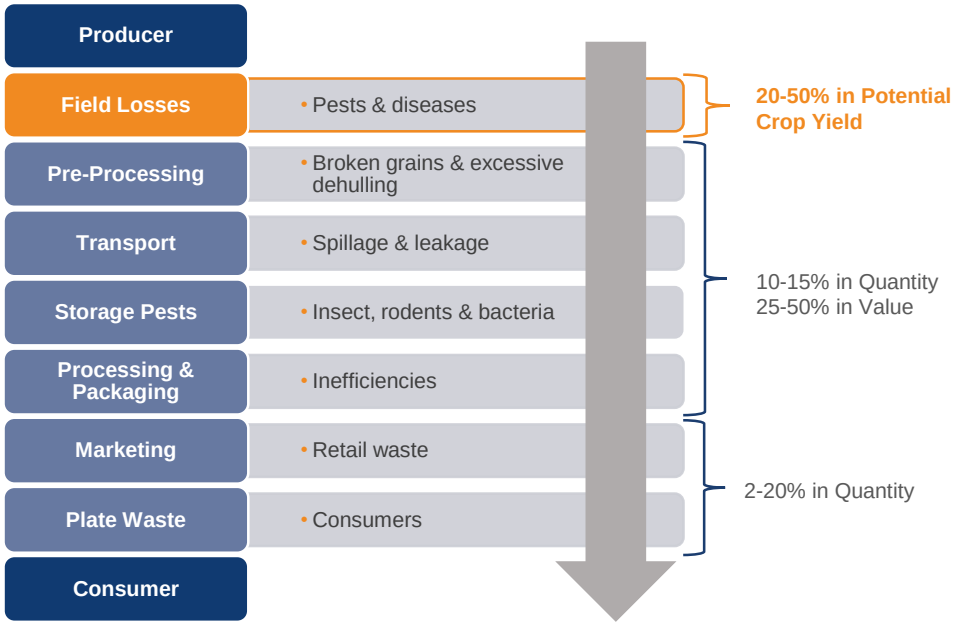
- Crop Protection represents a substantial portion of the insecticide market, at ~US$16bn but products are typically lower margin with competition high
- Pests have a significant impact on the production capabilities of a number of key agricultural crops
- Growing populations are driving increased production of food, with 1.4% more grain needed to be produced every year and a 59% decrease in arable land since 1950
- This is expected to deliver substantial growth in crop focussed insecticide expenditure, with estimates of 5.8% CAGR YoY to ~US$19bn by 2022
- Resistant strains of multiple pests have been recorded globally, with initial testing of Flavocide showing promising results as an alternative insecticide

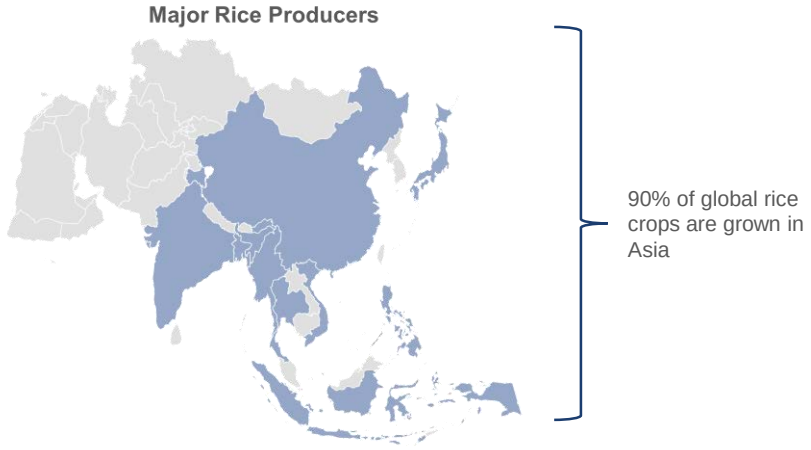
Insect	Testing Entity	Testing Committed	Initial Testing Completed	Secondary Testing Phase
Mites	Cesar		✓	
Beneficials	Cesar	✓		
Grain Storage Pests	QDAF		✓	✓
Aphids	Cesar		✓	
Diamond Backed Moth	Cesar	✓		
Cotton Bollworm	Cesar	✓		
Brown Plant Hopper	Eurofins		✓	
Silverleaf Whitefly	Eurofins	✓		

Agronomy for Sustainable Development, Jozsef Popp, Markets & Markets

Crop Protection: Field Losses

BGT are conducting several studies and trials of Flavocides efficacy in multiple crop pests





Brown Planthopper

- A pest that feeds on rice crops resulting in up to 60% yield losses, with rice being the major staple food for ~50% of the worlds population
- US$3.7bn is spent on rice insecticides globally, with the Planthopper accounting for a large portion of this

Flavocide

- Recorded resistance to organophosphate, carbamate and organochlorine's, neonicotinoid and phenylpyrazole
- Field trials completed with Eurofins showed Flavocide was effective in controlling adult Planthoppers and their larvae

Russian Wheat Aphid (RWA)

- Rapidly spreading cereal crop pest, causing ~75% yield losses and up to 100% loss in barley and grasses. A$980m spent annually on cereal crop insecticides, with RWA's representing a large portion of this.

Flavocide

- Cesar pilot lab trial showed Flavocide was effective in controlling RWA's

Redlegged Earth Mites

- An introduced pasture and crop pest to Australia, leading to ~$200m in lost production and has the capacity to completely destroy newly sewn pastures

Flavocide

- Commonly controlled using insecticides, with strong levels of resistance recorded
- Cesar have conducted preliminary testing, showing Flavocide is successful at controlling resistant populations

Green Peach Aphid

- Pest that damage a range of crops with recorded resistance to carbamates, pyrethroids, organophosphates and neonicotinoids

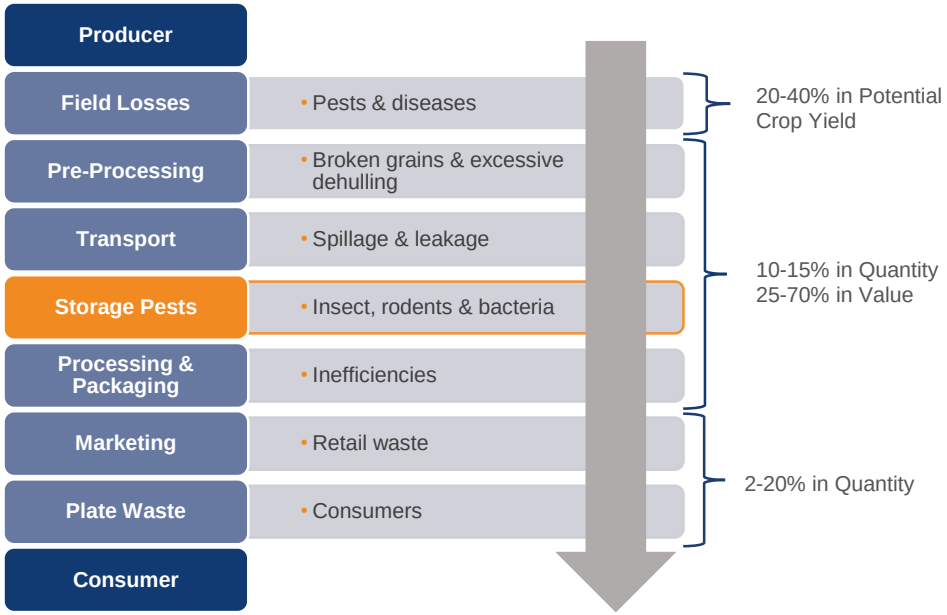
Flavocide

- Cesar is currently conducting preliminary testing on resistant strains to determine the efficacy of Flavocide in controlling this pest

IRAC, QDAF, Herbiguide – 'Redlegged Earth Mite', CSIRO

Crop Protection: Storage Pests

Storage pests can significantly reduce crop quality and quantity

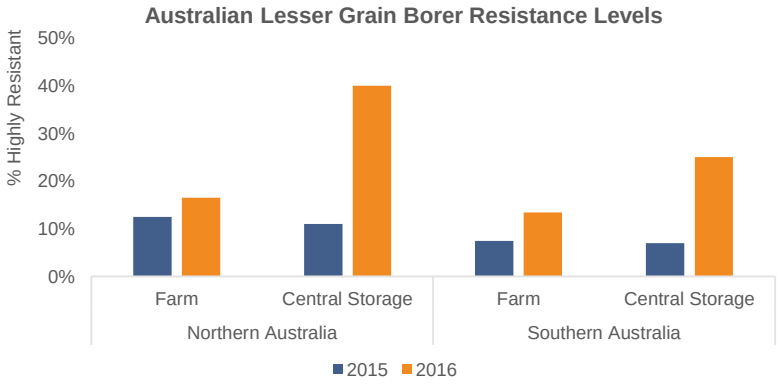


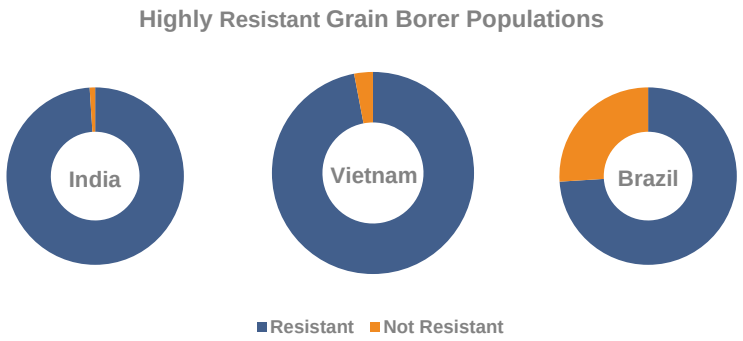
Lesser Grain Borer

- A beetle which destroys stored grain and cereal products such as wheat, barley, rice, nuts, dried meat and cocoa beans, boring into kernels reducing them to hollow husks, damaging up to 70% of stored product
- The Australian grain industry exports ~$7bn worth of grain annually
- There are 2 methods of delivering insecticides for grain storage:
  1. **Fumigants** - filling a silo with pesticide gasses
  2. **Protectant Surface Coating** – coating the stored grain with insecticide (likely use of Flavocide)

Resistance

- Lesser Grain Borer have displayed resistance to Phosphine, which is the most widely-used stored grain fumigant
- Australian grain borers have been recorded to have generated a 600-fold resistance level compared to non-resistant insects, with substantial acceleration of resistance recorded between 2015 and 2016
- Internationally Phosphine resistance is significantly worse:





Flavocide

- QDAF led studies have shown Flavocide is effective on resistant populations of Lesser Grain Borers
- **We view grain storage as a key market for BGT to deliver Flavocide based products into**

IRAC, FAO, PwC Aus Grain Industry, Grains Research & Development Corporation (GRDC) & QDAF

Vertical Number 2: Public Health

Vector born diseases account for ~17% of all infectious diseases globally

No new public health insecticides have been developed for mainstream economic control in disease endemic countries for 30-years

Public Health represents a key vertical market for BGT, with an estimated value of ~US$4bn, being driven by the treatment of resistant populations of mosquitos and other vectors that transmit infectious diseases

- Vector-borne diseases kill ~0.7m people annually, responsible for ~17% of illness and disability worldwide and 25% of all emerging infectious diseases
- 3.9bn people in 128 countries are at risk of contracting dengue fever, with 96m cases reported per-year and a 30% increase in incidence in the past 50 years
- Malaria causes +400k deaths per-annum, most of them children under the age of 5

- Mosquitos have become increasingly resistant to various insecticides, with BGT now at advanced stages of testing on three of the most problematic species
- The mosquito control market is growing at 6% CAGR YoY to ~US$2.7bn with chemical interventions representing the largest defense technique

Social & Economic Impact

- The collective impact of vectors and the disease they spread is immeasurable:
  - 58m cases of dengue, with a total annual cost of US$8bn
  - Social and economic costs of Zika totaled US$7-18 billion between 2015 - 2017
  - 212m new cases of malaria and 429,000 deaths from malaria in 2015 alone
  - US$2.9bn invested in malaria control and elimination in 2015

**Click links to launch Articles*

WHO – 'Global Vector Control', WHO – 'World Malaria Report 2016'; UNICEF; WHO – 'Dengue and Severe Dengue', Break Dengue; UN Development Programme; Science Daily; Markets & Markets

Public Health: Resistant Mosquitos

Resistant mosquitos pose a significant threat to public health globally, with new insecticides demanded

Resistance

- Resistance levels are very high and growing, mandating the discovery and implementation of new effective insecticides, as products such as Synthetic Pyrethroids, Carbamates, Organochlorines and Organophosphates rapidly lose their effectiveness

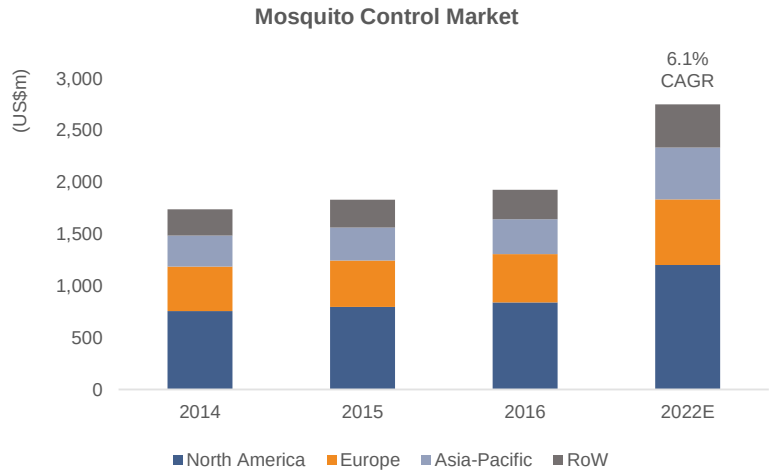
Flavocide Results

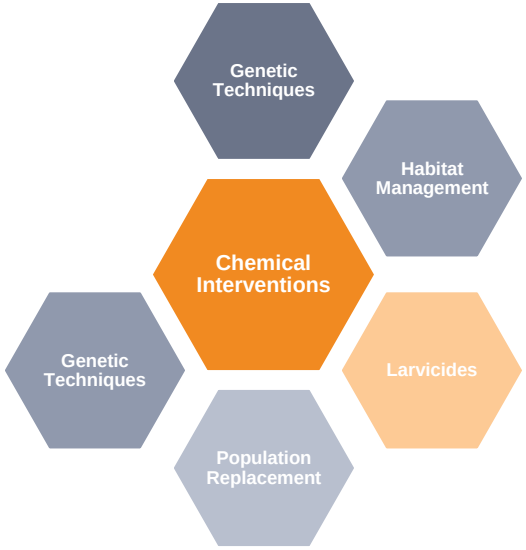
- BGT through various testing partners have delivered strong evidence that Flavocide is effective in killing resistant populations of mosquitos

Insect	Initial Testing Completed	Secondary Testing Phase
Aedes Aegypti Mosquito	✓	✓
Culex Mosquito	✓	✓
Anopheles Mosquito	✓	✓

Solution

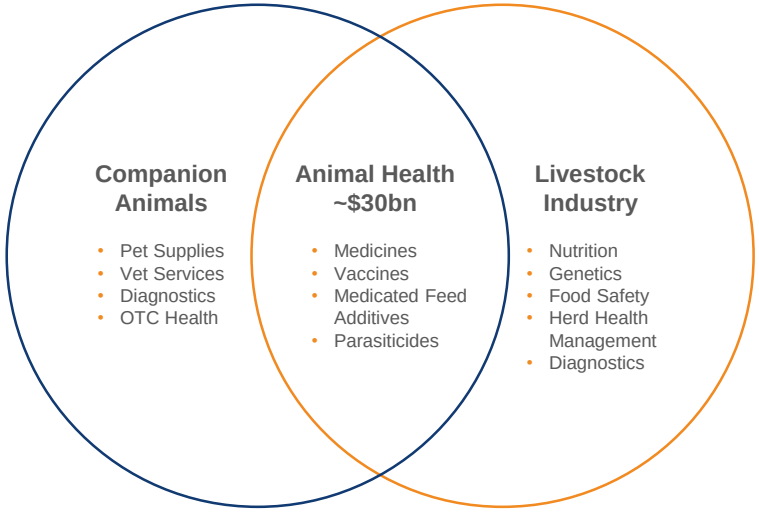
- Once further data is collected BGT will then move to commercialisation of specific products by partnering with Chem producers and potentially large NGOs, delivering ongoing licensing and royalty fees
- Professor Catherine Hill of Purdue University has recently joined BGT's Scientific Advisory Board, with relationships and advisory roles in key authorities on mosquito control, which could prove valuable for BGT in expediting mosquito control product development

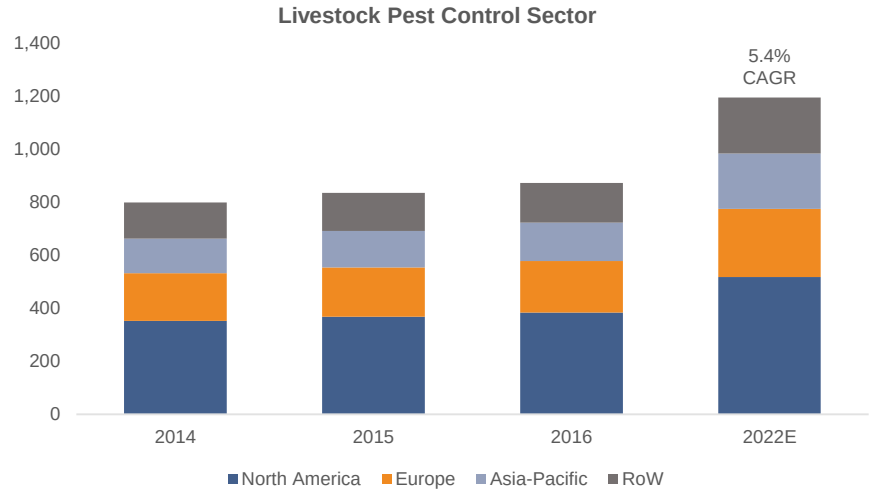




Vertical Number 3: Animal Health

Increased cattle production is driving higher demand for Animal Health products





- Animal health represents a $30bn global market with insecticides accounting for ~$6bn of this
- BGT is currently focussing on cattle ticks with several others expected
- Each pest represents an opportunity for Flavocide to either:
  - Form an alternative to current pest control formulations; or
  - Be used in combination with existing insecticides
- The largest market for livestock pest control is the US, with the global industry benefiting from increasing demand for cattle production and subsequent insecticide treatments
- Purdue continue to work on various Animal Health pests (including Flies and Cattle Ticks) to work towards a product in this vertical

Insect	Testing	Initial Testing Completed	Secondary Testing Phase
Animal Health			
Cattle Tick	Purdue	✓	✓

OECD-FAO Agricultural Outlook, Company Announcements & Zoetis

Animal Health: Cattle Tick

Cattle Tick's represent a major expense to the livestock industry

- ~80% of cattle worldwide are exposed to Cattle Ticks. The Cattle Tick transmits organisms which cause:
  - Significant reduction in weight and milk production, reducing the value of hides by 25-30%
  - Tick Fever: Cattle Ticks transmit 3 blood-borne tick fever organisms (Babesia bovis, B. bigemina and Anaplasma marginale) which cause tick fever
  - Commonly results in the death of cattle
- When infestation is fully controlled, cattle can be up to 25 kg heavier through a reproductive cycle, have conception rates up to 30% higher and wean calves up to 24 kg heavier
- The estimated cost of treatment to the Australian cattle industry alone +A$175m a year, with India spending ~US$499m annually
- Without control mechanisms it has been estimated the US cattle industry's losses would amount to ~US$1bn annually, with global losses estimated to be between US$13.9-19.7bn annually

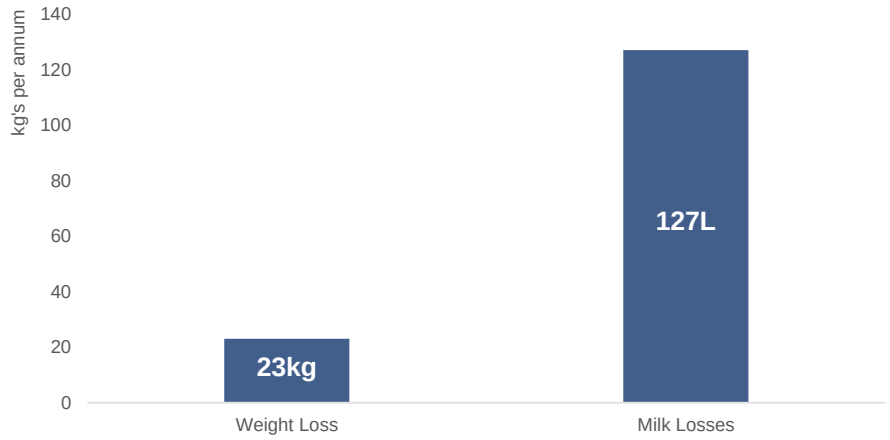
Treatment & resistance

- Amitraz resistance is seen in ~20% of Australian tick populations and more than 50% of North American ticks
- Increasing resistance is being recorded to ivermectin and pyrethroids

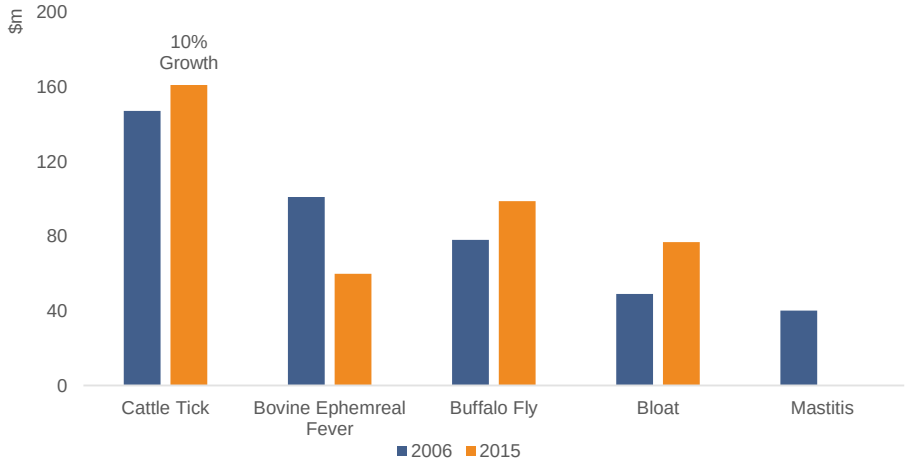
Flavocide

- Work undertaken by Purdue University continues to evaluate the efficacy of Flavocide in ticks and has generated favorable evidence of Flavocide being active against resistant ticks
- The Company entered an initial evaluation agreement with Virbac, which was ceased by Virbac after their field trial did not show Flavocide to be more effective than common incumbents
- Whilst this was no doubt disappointing for BGT we understand that the tests included a very high-level (non-scientific) process and did not conclude Flavocide was not effective against resistant ticks

Australian Cow Weight Loss Due to Cattle Tick



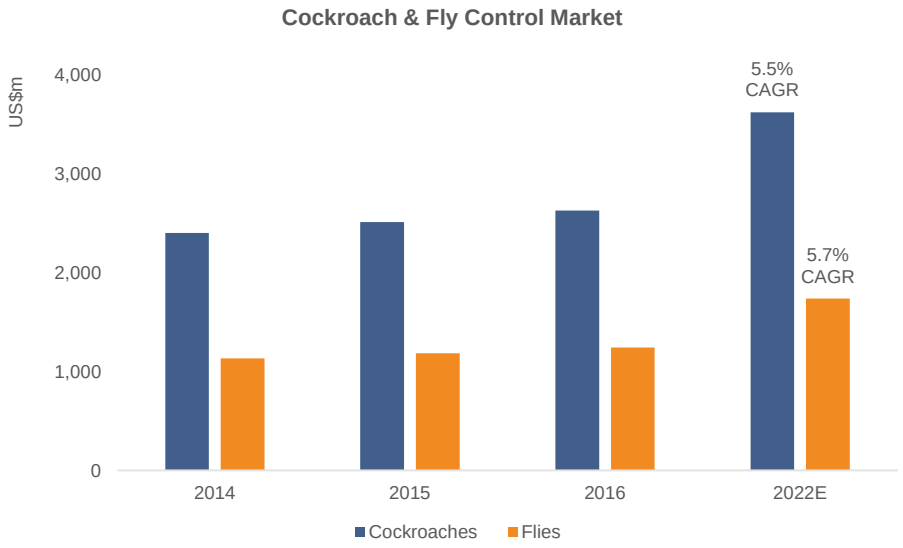
Cost of Diseases to Australian Livestock Industry



Science Daily; Qld Dept of Agriculture and Fisheries – 'Cattle Tick'; Zoeits – 'Cattle Tick'; Qld Alliance for Agriculture and Food Innovation; Journal of Vector Borne Diseases; Meat & Livestock Australia; Animal and Plant Health Inspection Service;

Vertical Number 4: Consumer Products (Qcide)

Consumer products will be driven by growing resistance & rising demand for natural products



- Consumer products represent 16% or ~US$5bn of BGTs addressable market
- Domestic house flies and cockroaches are vectors of +100 human and animal diseases including:
  - Cholera
  - Tuberculosis
  - Salmonella
  - Gastroenteritis

Resistance

- Houseflies' rapid lifecycle and almost constant exposure to insecticides has led to widespread resistance
- Cockroaches have shown strong resistance to multiple insecticides
- Tests are currently being carried out by University of Technology Sydney to determine whether Qcide is more effective in killing and repelling houseflies and mosquitos

- BGT are testing for opportunities within two potential products:
  1) Personal Repellant
  2) Insect Sprays

Natural Products Driver

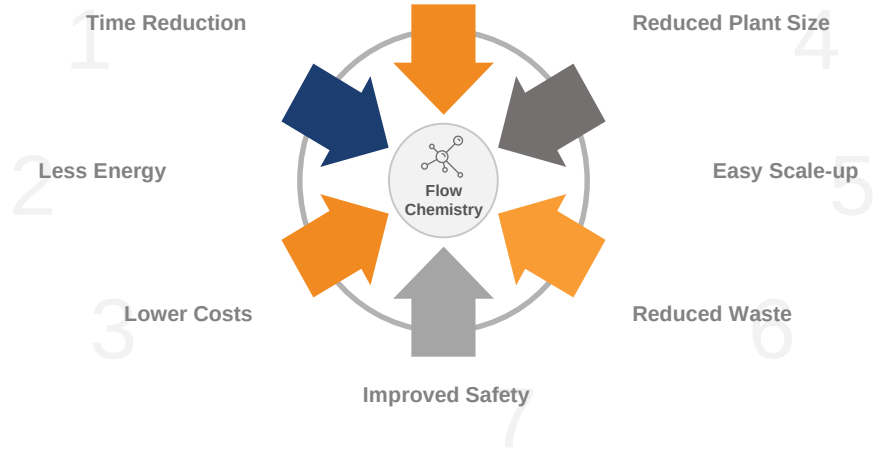
- Consumers are continuing to demand natural products to replace artificial products:
  - Bunnings were forced to pull neonicotinoid insecticide products from shelves due to consumer concerns on their effect on bee populations
  - Public outcry led to the banning of DDT in agriculture in the early 1970's
  - Mortein uses Pyrethroids as its major insecticide ingredient, exposure to which has been linked to development of ADHD in young males & abnormal estrogen levels in females
- The biopesticides market grew 24% between 2014 and 2016, to +US$1.8bn, driven by consumer awareness of safety and subsequent legislative requirements
- Qcide is a naturally occurring product and if proven to be effective should deliver a natural / biological replacement for many consumer products, giving producers of consumer goods an ability to claim to have a 'green product'

IRAC, Markets & Markets, Kline Research, The FASEB Journal (Richardson et al, 2015); Melissa Kaplan – 'Pyrethroids'

CSIRO Partnership & Manufacture

CSIRO are assisting in improving manufacturing & IP protection

- BGT has a collaboration agreement with CSIRO aimed at improving the manufacturing process of both Qcide and Flavocide
- Since Mar-17, this relationship has resulted in:
  - +50% yield improvement
  - +50% indicative cost-reductions
  - $50k kick-start grant
  - Development of specific manufacture IP that is owned by BGT
- The partnership will continue for the next 6-12-months, to improve yield and mitigate costs of raw materials



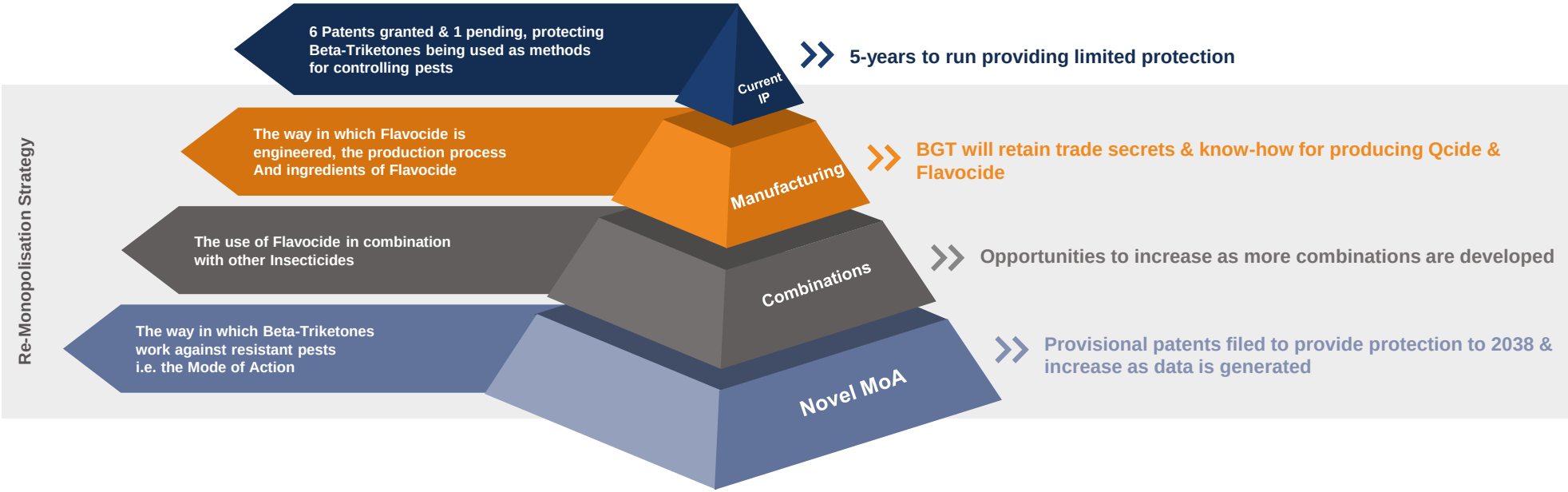
Manufacture

- **Batch chemistry** is a standard manufacturing process where Flavocide would be produced on a needs basis (in batches)
- **Continuous Flow Chemistry** is the process of performing chemical reactions in a tube or pipe on a continuous basis, meaning it can be switched on or off
- Flow chemistry allows for much cheaper plant setup and operation. We expect BGT to use components of both to generate Flavocide but aim to implement as much flow chemistry as possible
- The production process and combination of key ingredients are patentable IP and CSIRO is in the process of advising BGT on this

Click to launch hyperlinks

Intellectual Property

BGT holds a group of patents across key territories, protecting the use of Beta-triketones as insecticides



- BGTs patent's were first lodged in 2002 and the majority will expire in 2022
- Led by practicing patent attorney Robert Klupacs (Former CEO now NED) BGT is continually building its IP base across 3 core layers
- The Company is using the 3 broad categories:
  1) Manufacturing
  2) Combinations
  3) Novel Mode of Action

  to build data capable of securing IP against
- BGT's IP position has already allowed for a licensing opportunity with a New Zealand based manuka oil manufacturer making Beta-triketone insecticidal activity claims

APVMA Certification

BGT must satisfy the Australian Pesticides & Veterinary Medicines Authority (APVMA) process for Ag-Chem Products

Application Lodged → **Preliminary Assessment** → **Evaluation** → **Decision** → **Approval & Registration Granted**

Finalisation	• All data is compiled and evaluated by the APVMA and approval granted provided clarification is not required
Efficacy & Safety	• Effectiveness of the product as per label claims and that its application will not cause any unintended adverse effect
Environment	• Whether the product has any unintended effects that are harmful to animals, plants or the environment
Occupational Safety	• Risks to people's health and safety in being exposed to the product (to an acceptable level)
Residues	• The level at which residues occur in edible crops, fodder, animal tissues, milk and eggs
Toxicology	• Potential human health hazards, including acceptable daily intakes to set directions for the safe use of the product
Chemistry & Manufacture	• Approval of an active constituent (biologically active ingredient i.e. Flavocide) the registration of the agricultural chemical product • The manufacturing process, quality controls, storage stability, packaging and labelling of the product

- Timeframes and costs for the APVMA applications vary significantly as different requirements are set for different types of products
  - A crop protection product may result in a total project cost of +$3.8m
  - A consumer garden or fly spray may only cost $600 – 700k
  - The time to produce this data can vary from 1 – 4-years depending on results of initial tests
- Each module may require the same test be conducted over different time frames, to generate data on short, medium and longer-term effects (ranging from 3 to 13-months)
- The results of initial tests help govern which tests must take place, making exact timeframes uncertain
- Different modules of testing are able to be conducted simultaneously (i.e. toxicology, efficacy & safety and environment)
- Once Flavocide and Qcide go through this process any subsequent product (formulation) that they are included in must then go through the same testing process again
- We expect the full duration of the APVMA process to be ~1.5 – 4-years for each compound (Flavocide and Qcide)

Testing Partners

BGT's testing partners are all highly regarded scientific institutions, with strong domestic & global reputations

- An independent organisation providing world leading science, technology and research into agriculture, pest control and wildlife conservation
- Expertise in agricultural entomology, genetics and wildlife ecology, backed by a team of specialist scientific consultants

- Public research university and global leader in insecticides and resistance, established to focus on technology and agriculture
- U.S. News & World Report ranked Purdue the 9th most innovative school in the USA
- Catherine Hill, a Professor of Entomology at Purdue University, leads an internationally recognised research program focused on the control of insects and ticks of medical and veterinary importance

- Founded in 1988, UTS is one of Australia's leading universities of technology, supporting innovation in research
- Strong history in resistance focussed research study programs

- An independent agency of the Australian Federal Government, for scientific research
- The largest patent holder in the nation, which have led to more than 150 spin-off companies
- Employs +5,000 scientific experts

- QLD Department for Agriculture & Fisheries focused on a sustainable and innovative agriculture, fisheries and forestry
- A world leader in evaluating agents to control grain storage pests
- Operating in 92 locations across QLD

- An international group of laboratories, headquartered in Brussels, Belgium
- One of the global independent market leaders in testing and laboratory services for agro-science, genomics, discovery pharmacology and clinical studies support
- Operates several pesticide testing laboratories within its global network, employing +30,000 people across 375 laboratories in 41 countries, with ~A$4.7bn in annual revenues

- Contract research organisation specialising in biotechnology based in the UK
- Established in 2001 NeuroSolutions is now considered a leading global contract research organisation

Takeover Potential

M&A activity has steadily grown in the global chemical industry, with Ag-Chem amounting to ~10% of deal Volume

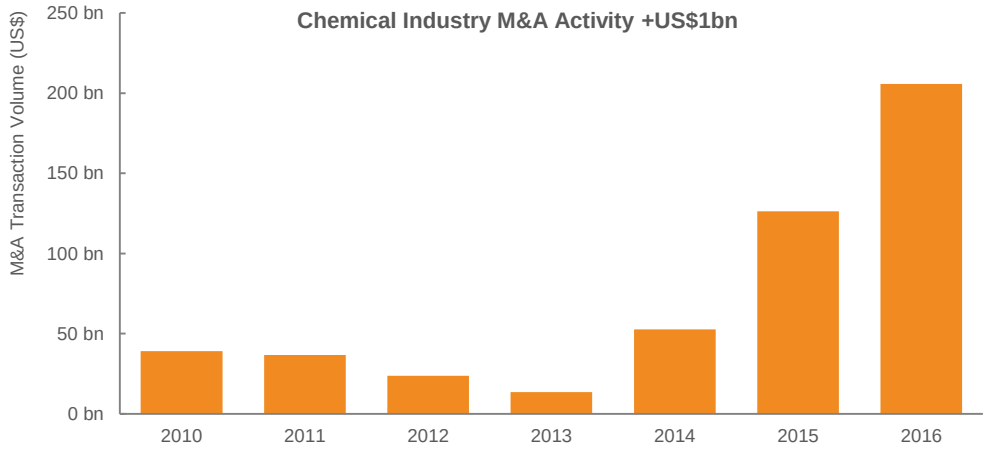
EV (AUD)	$234.4bn	$141.8bn	$130.1bn	$76.4bn	$74.7bn	$60.6bn	$18.1bn	$13.3bn	$8.3bn	$3.7bn	$2.4bn
Transactions[1]	46	74	25	8	27	61	10	17	15	18	8

Large Cap Dynamics

- Market consolidation has reached all time highs, with large chemical conglomerates in the past few years. We expect this to continue with Bayer winning EU approval for a $62.5bn purchase of Monsanto in late March-18
- Anti-trust rules have required a number of products, associated IP and R&D facilities be divested
- Large Ag-Chem companies are increasingly favouring acquisitions of proven and commercialising technologies, rather than completing internal greenfield R&D

Recent Comparable Transactions

- BASF recently acquired a group of Ag-chem assets from Bayer, including herbicide tolerance and field crop seed products and R&D facilities totalling $8.9bn. Media speculation has noted BASFs continued appetite for acquiring pesticide and insecticide businesses
- In 2015 Sichuan Hebang acquired a 50% interest in Israel based Stockton for $123m, a natural fungicide plant extract targeted at pest management and bacterial crop diseases
- In Nov-17 Sumitomo acquired 83% of Australian Pyrethrin company Botanical resources, for a total of $177m
- Nufarm recently acquired Adama's Agricultural Solutions and Syngentas Crop Production $661m, after purchasing a herbicide portfolio from FMC in Feb-18 for $110m. The former portfolio is expected to generate $250m in Revenue and ~$95m in EBITDA, implying Revenue and EBITDA transaction multiples of 2.6x and 6.9x
- **If BGT continues to build proof of a Novel MoA and efficacy in killing resistant species we see it as very likely that the company will become an attractive acquisition target**



Date	Target	Acquirer	Value	EV / Revenue	EV / EBITDA
May-16	Monsanto	Bayer AG	$65.1bn	4.8x	17.3x
Feb-16	Syngenta	ChemChina	$46.5bn	3.4x	16.4x
Dec-15	DuPont	Dow Chemical	$72.8bn	2.1x	12.4x
Average Multiple				**3.4x**	**15.4x**

CapIQ & Deloitte Research

[1] Transactions (Acquisition & Divestments) completed & proceeding dated back to 2008

Board & Management

Strong & experienced management team with aligned equity ownership

	Shares & Options	(%)
Don Brumley (Non-Executive Chairman)	1.1m	0.9%

- +25 years as a senior partner and leader of Ernst & Young (Oceania)
- Background in IPO's transactions and audit, assisting strategic growth

Richard Jagger (Executive Director & CEO)	0.7m	0.5%

- +20 years experience in Agriculture sector
- Previously employed as Managing Director of Sinochem Australia
- Spent 15+ years at Monsanto in various management roles

Peter May (Executive Director, Research & Development)	0.8m	0.6%

- +20 years experience in crop protection market with companies Orica & Crop Care
- Founded Xavca and Former CEO of BioProspect

Robert Klupacs (Executive Director)	3.4m	2.7%

- +30 years corporate experience in international tech development
- Previously served as MD and CEO of ASX-listed Circadian Technologies Ltd, and as MD & CEO of ES Cell International Pty Ltd

Kevin Rumble (Non-Executive Director)	8.7m	6.8%

- Founding Director of Bio-Gene, with extensive experience in new plant propagation, farming and live plant transportation techniques

	Shares & Options	(%)
Roger McPherson (CFO & Company Secretary)	0.1m	0.1%

- +15 years experience as CFO and Company Secretary across both listed and unlisted companies, including TPI Enterprises (ASX:TPI)
- Experience in the Pharma Manufacturing, Biotech, Biopharma industries

Doug Rathbone (Advisor to the Board)	1.0m	0.8%

- +40 years experience in agriculture
- Served as Managing Director of Nufarm, a position he held for 15+ years

Catherine Hill (Scientific Advisory Board)	n/a	n/a

- Professor in the Agriculture Faculty of Purdue University whose lifework has centred on insecticides and resistance
- Advisor to the Centre for Disease control for the US Government

Neil Anderson (Consultant for Chemistry & Manufacturing)	n/a	n/a

- Industrial chemist with +40 year career with Monsanto
- A specialist in formulation development, production and process management, manufacturing plant audits, quality and environmental management

Total Equity Ownership	**15.8m**	**12.4%**

Progress & Goals

BGT continues to build a suite of research data across a number of pests and verticals

		Partner Committed	Initial Testing	Follow Up Testing	Commercial Partnership	Product Development
Crop Protection	Beneficial Arthropods	■	□			
	Lesser Grain Borer	■	■	□		
	Other Grain Storage Pests	■	□			
	Russian Wheat Aphid	■	■			
	Green Peach Aphid	■	□			
	Diamond Backed Moth	■	□			
	Cotton Bollworm	■	□			
	Brown Planthopper	■	■			
	Silverleaf Whitefly	■	□			
	Red legged Earthmite	■	■	□		
	Two Spotted Mite	■	□			
Public Health	Aedes Aegypti Mosquito	■	■	□		
	Culex Mosquito	■	■	□		
	Anopheles Mosquito	■	■	□		
Consumer	Mosquito	■	□			
	Housefly	■	□			
	Crawling Pests	■				
Animal Health	Cattle Tick	■	■	□		
	Buffalo Fly	■				

Legend:

■ Complete

□ Underway / Agreed Upon

Progress & Goals

BGT view manufacturing and APVMA testing as staged processes

Manufacturing	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
CSIRO (Flavocide)	Evaluation of existing process	Exploring & trailing alternative processes	Further refinement & scale-up synthesis of Molecule	Pilot scale-up for proof of process	Scale-up to commercial quantity production
Qcide Manufacturing	Initial pilot planting of trees	Identify key individual trees with high oil content	Tissue culture & cloning protocol development	Scale-up of plantation	Managing commercial plantation

Legend:

- Complete
- Underway / Agreed Upon

Manufacturing

- **Flavocide -** BGT and CSIRO are in the process of developing two specific ways in which to manufacture Flavocide, which involves a trial and error process, exploring the most efficient and cost effective inputs and production methods.
- **Qcide -** The Company are now working to improve oil yield through tissue culture and cloning processes. We expect the oil extraction process to be continually improved throughout the above process. BGT are also likely to look to establish a second plantation, to de-risk supply.

APVMA Testing	Stage 1	Stage 2	Stage 3	Stage 4
Toxicity	Acute	7 Day	28 Day	90 Day
Chemistry & Manufacture	Demonstrate ability to manufacture product	Refinement of process	Development of batch analysis data	
Residues				
Occupational Safety	Initial requirement complete (through tox)			
Environment	Protocols agreed upon			
Efficacy & Safety	Ongoing, drawing on data from all other modules			

APVMA (Regulatory Approval)

- BGT will focus largely on completing the APVMA Toxicity module, which will then help determine the path it must take (and tests it must conduct) for the latter modules.
- For instance, the Efficacy & Safety module takes components of results from other modules.

Appendix

Risks

There are several risks associated with an investment in BGT

	Risk	Description
High Risk	**Revenue & profitability**	The Company's ability to generate future revenue and profitability will be dependent on BGT's ability to successfully complete development of its products, obtain regulatory approvals and commercialise products, delivering consistent revenue streams
	Cash Burn	Should the Company take longer than planned to commercialise additional capital will be required and if funded via equity would result in dilution of the current register
	IP	General patents extend for a further 5-years, if the Company's pending and prospective patents are not successful it may lose its IP ownership of Flavocide
	Negative Test Results	We do not expect Flavocide or Qcide to be effective against all pests and anticipate that some results may be negative. Should the market interpret this as a failure in the efficacy of the product more broadly (as we believe it did at the announcement of the end of the Virbac trial) the share price will likely suffer
Medium Risk	**Resistance**	Insect populations develop resistance to new technologies over time, including BGT's products Flavocide and Qcide. Future products developed by BGT to address resistance may also be less effective. If competitors develop and commercialise products with similar compounds to those contained in BGT's products, this may increase resistance in the insect population and potentially reduce or nullify the effectiveness of BGT's products as insecticides
Low Risk	**Novel MoA**	Despite encouraging data it is still possible that Flavocide may not use a Novel MoA, this would inhibit IP but more importantly Flavocide's effectiveness against resistant pests
	APVMA	Despite being derived from a natural plant it is possible that Flavocide may fail one of the testing components which would prevent it from achieving regulatory approval
	Raw material supply (Qcide®)	BGT's product Qcide is extracted from leaves of a rare sub-set of Eucalyptus trees, which poses numerous agricultural risks that could adversely affect the supply of the raw material from which Qcide is sourced.

Financials & Capital Structure

Well-funded balance sheet post-IPO in November 2017

	Balance Sheet	Jun - 2017	Dec - 2017
CA's	Cash & cash equivalents	2.9	7.7
	Trade & other receivables	0.2	0.2
	Other assets	-	0.1
	Total Current Assets	**3.0**	**8.0**
NCA's	Property, plant and equipment	0.0	0.0
	Intangible assets	0.5	0.4
	Total non-current assets	0.5	0.5
	Total Assets	**3.5**	**8.5**
CL's	Trade & other payables	0.2	0.3
	Financial liabilities	0.2	-
	Total current liabilities	**0.4**	**0.3**
	Financial liabilities	0.2	0.2
	Net assets	**2.9**	**8.1**
Equity	Contributed equity	5.2	11.8
	Reserves	0.4	0.5
	Accumulated losses	(2.7)	(4.2)
	Total Equity	**2.9**	**8.1**

Equity Structure		
Opening shares on issue (m)	**106.7**	
+ Restricted Shares	**21.0**	A combination of seed, pre-IPO and management stock
+ Unlisted Options	**2.0**	$0.20 exercisable 30 Nov '19
+ Loyalty Options	**25.1**	$0.20 exercisable 4 Dec '18
Fully Diluted Shares on Issue (m)	**127.7**	
Assuming Options Exercised (m)	**154.8**	

- BGT sits in a strong cash position post raising $7m in its October IPO. This should give it a runway of ~2-years at the current burn rate (assuming no revenue)

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