

PROFESSIONAL PEST MANAGEMENT

ADVION

CONTROL OF ANTS, COCKROACHES & SILVERFISHES

Sievert, Kai, PhD, 20.09.2022



syngenta.

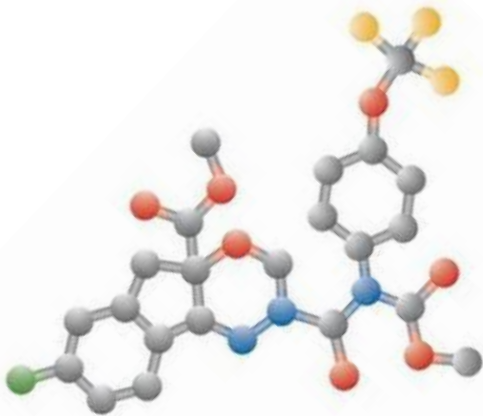
Advion[®] Ant and Advion[®] Cockroach Gel baits



- ▶ Control of key ant species (0.05 % indoxacarb)
- ▶ Control of all major cockroach and silverfish species (0.6% indoxacarb)
- ▶ Bio-activation of the AI by the insects
- ▶ Total control through secondary kill
- ▶ Favorable profile (no warning symbol, no R-phrasé)
- ▶ Gels to be applied on horizontal & vertical surfaces and even underside of horizontal surfaces without running
- ▶ Can be applied on porous surfaces

**UNIQUE
CHEMISTRY
OFFERS SUPERIOR
CONTROL**

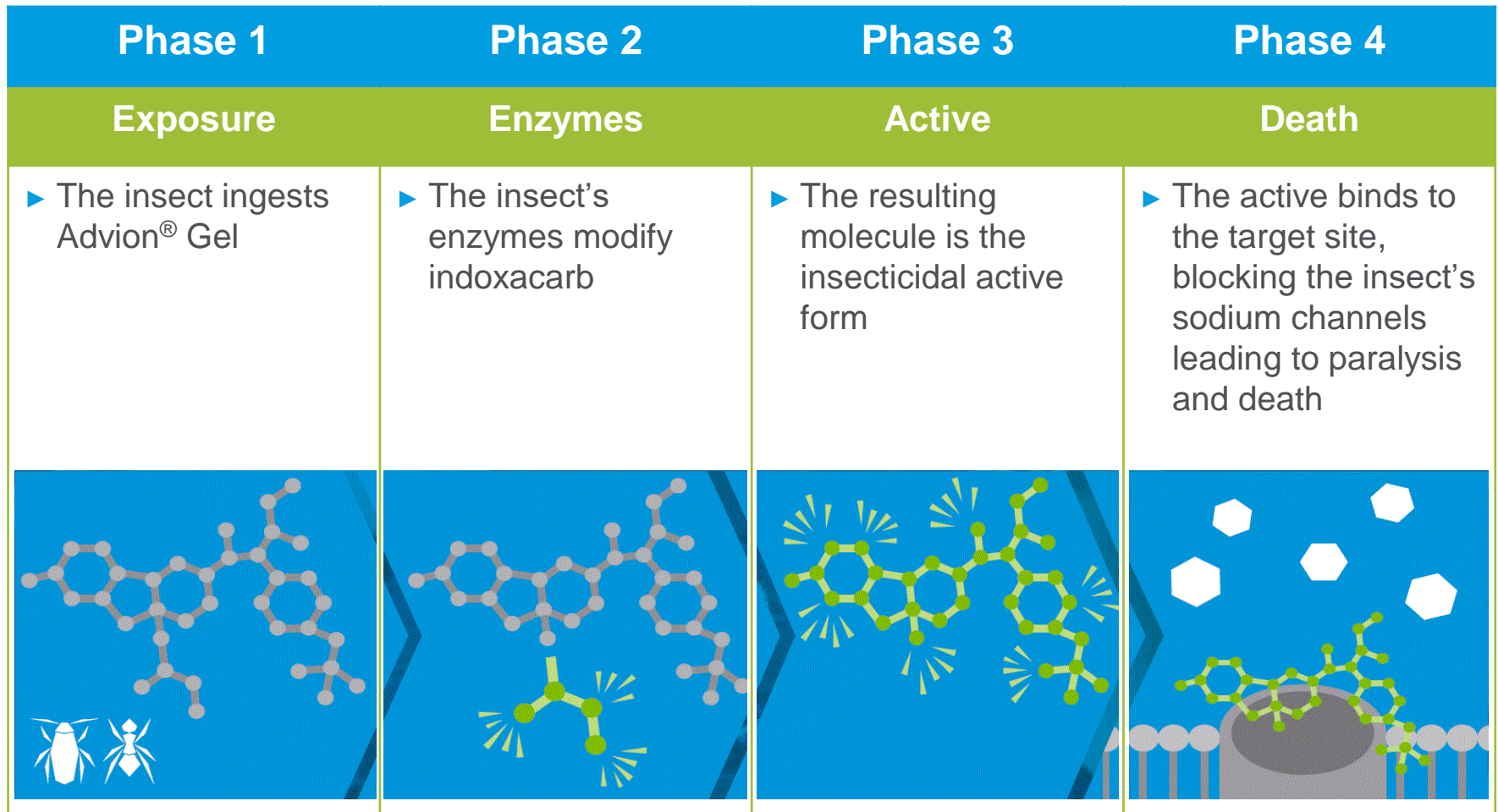
Advion Ant and Cockroach Gels Indoxacarb Profile



Contains Indoxacarb

- ▶ Oxadiazine chemistry - only chemical in its class
- ▶ Non-repellent
- ▶ Different Mode-of-Action than all other AI
- ▶ Requires bio-activation by insect's enzymes to the active form
- ▶ Blocks the sodium channel of the nerves

Indoxacarb: Metabolic Activation (Bioactivation)



Both Advion Baits – Toxicity profile (LD₅₀)

| | Advion® <u>Cockroach</u> gel | Advion® <u>Ant</u> gel |
|----------------------|---------------------------------|---------------------------|
| ▶ Acute rat oral | ▶ >5000 mg/kg | ▶ >5000 mg/kg |
| ▶ Acute rat dermal | ▶ >5000 mg/kg | ▶ >5000 mg/kg |
| ▶ Acute Inhalation | ▶ NA | ▶ NA |
| ▶ Eye Irritation | ▶ Not an irritant | ▶ Not an irritant |
| ▶ Dermal Irritation | ▶ Not an irritant | ▶ Not an irritant |
| ▶ Skin Sensitization | ▶ Not a sensitizer | ▶ Not a sensitizer |



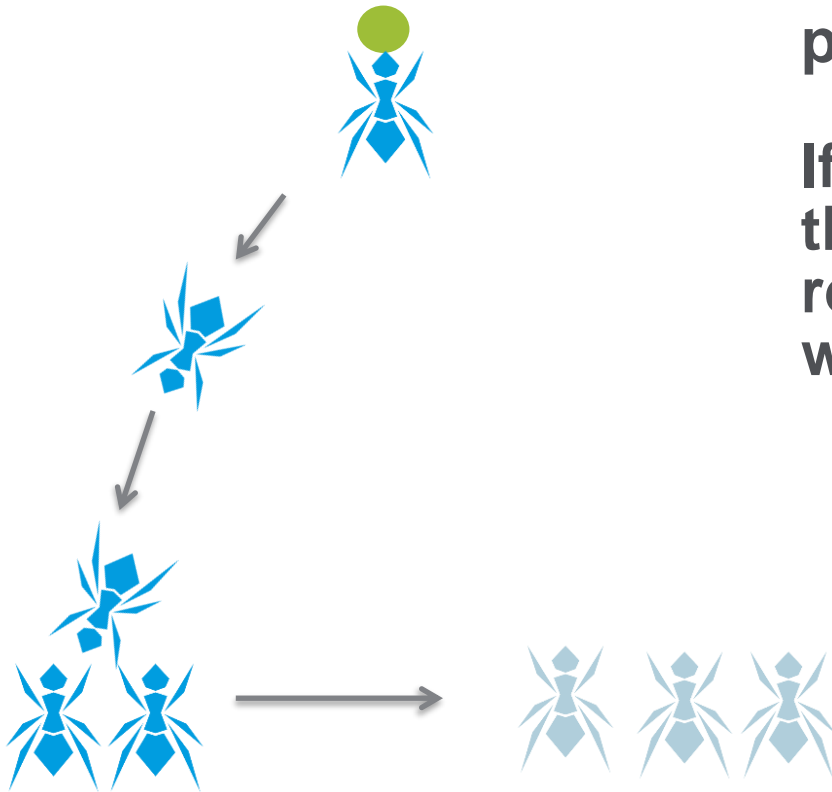
ADVION ANT GEL

EFFICIENT BY
HORIZONTAL
TRANSFER

What is horizontal transfer for ants?

Active ingredients of baits are passed from one ant to another.

If enough insecticide is passed, this horizontal transfer does result in secondary kill of nest workers, larvae, and queen(s)



Horizontal transfer and trophallaxis



© Alex Wild

Ants feed colony members via trophallaxis

- ▶ Social sharing of food
- ▶ Also a means of communication

Insecticide must be slow acting to allow transfer to colony

Only this allows control of the colony

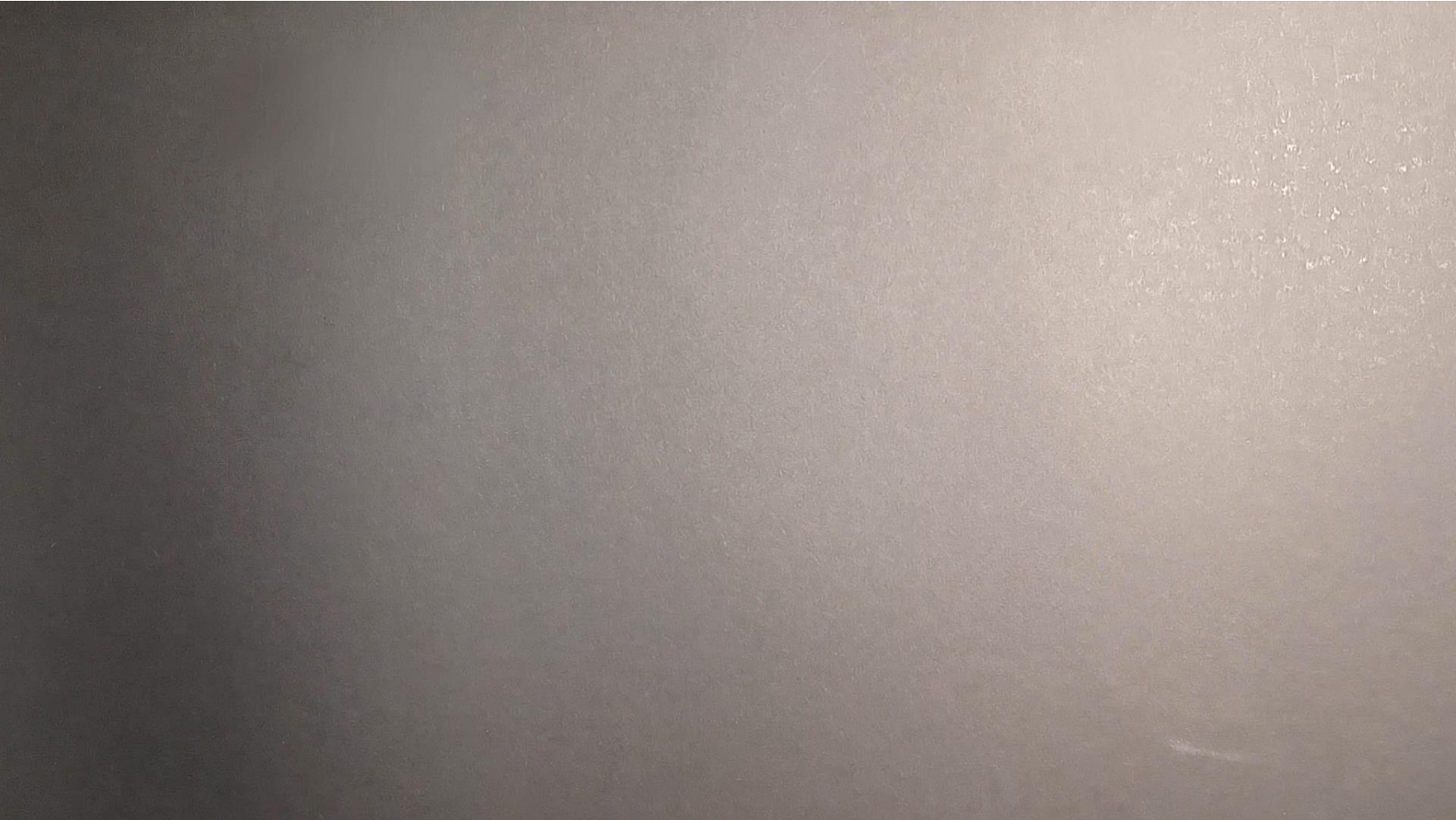
APPLICATION OF ADVION ANT GEL

Advion® Ant Gel has to be applied along the ant trails and at the nest entrances

- ▶ It is crucial to apply near or better directly on the ant trails
- ▶ Don't apply into the nest
- ▶ 1 spot / m² up to 5 spots / m² are recommended
- ▶ 0.5 g bait /m² max.
- ▶ One ant needs to find the baiting spot
- ▶ If it's palatable the ant will place tracking pheromones to the bait
- ▶ Further ant workers may follow this pheromone track and increase the signal
- ▶ Ants can forage also at night i.e. check the next day



Advion Ant gel sticks



Advion® Ant Gel applied on a balcony against black ants *Lasius niger*

- ▶ The more spots applied the higher is the chance of success
- ▶ Spots for ants can generally be bigger as they lay trace pheromones
- ▶ Ants prefer rather protected areas to feed from the bait
- ▶ However, over night all spots will be consumed





- ▶ Advion®Ant Gel applied in the early evening (6PM) attracts the ants immediately - 10min after application.
 - *Note, the cartridge has been opened more than 1 year ago* (Video)

Advion® Ant Gel is also highly attractive to carpenter ants *Camponotus* sp.

- ▶ Advion® Ant Gel applied in a house in Norway attracts the workers within minutes (2017)



EFFICACY STUDIES

In the lab is Advion® Ant Gel bait is 100% effective against different ant species in the lab: *Lasius niger*, *L. brunneus*, *L. neglectus*, *Tetramorium caespitum*

Figure 2: Mortality Rate during the treatment period for the *Lasius niger* for treated trays (%)

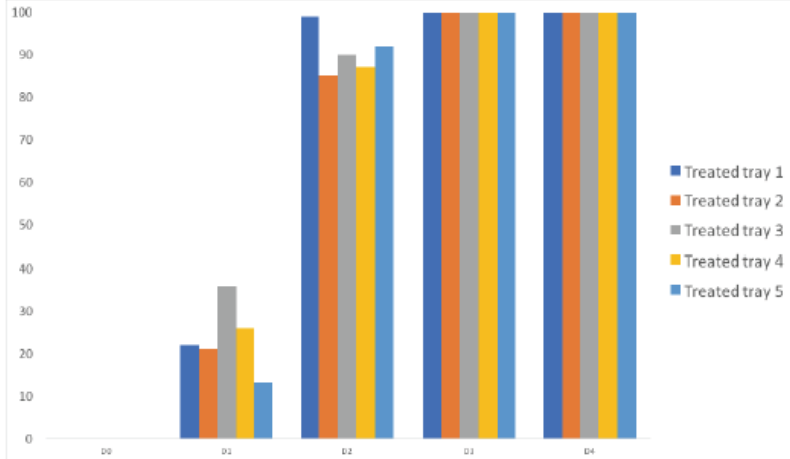


Figure 4: Mortality Rate during the treatment period for the *Lasius brunneus* for treated trays (%)

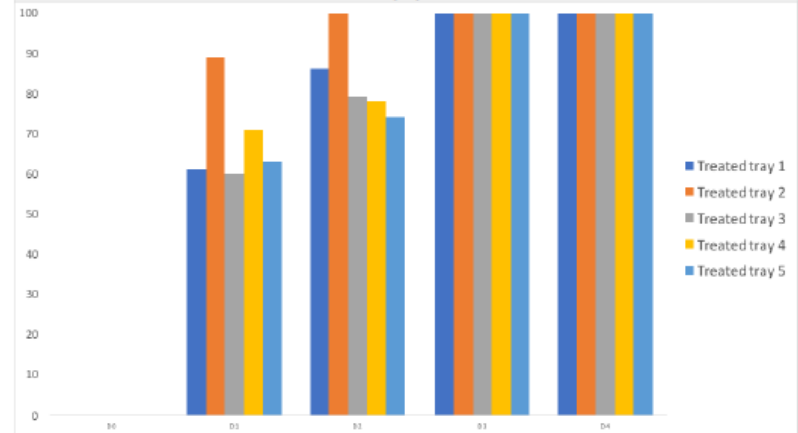


Figure 6: Mortality Rate during the treatment period for the *Lasius neglectus* for treated trays (%)

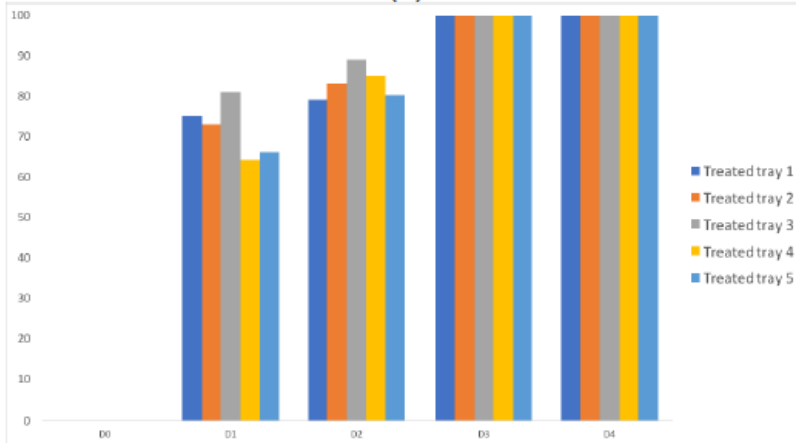
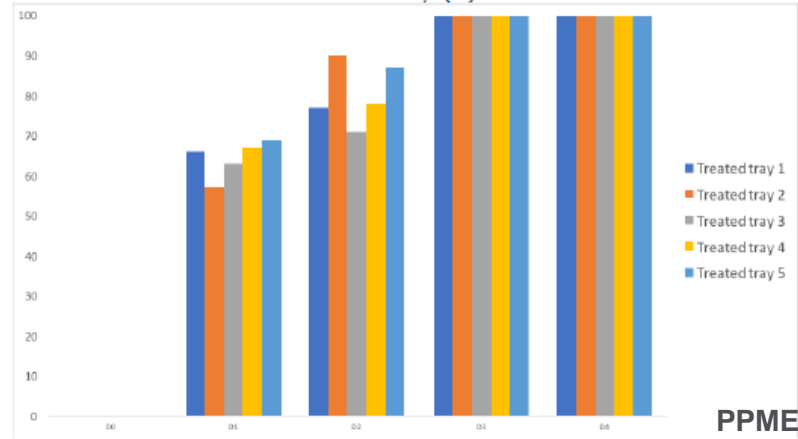
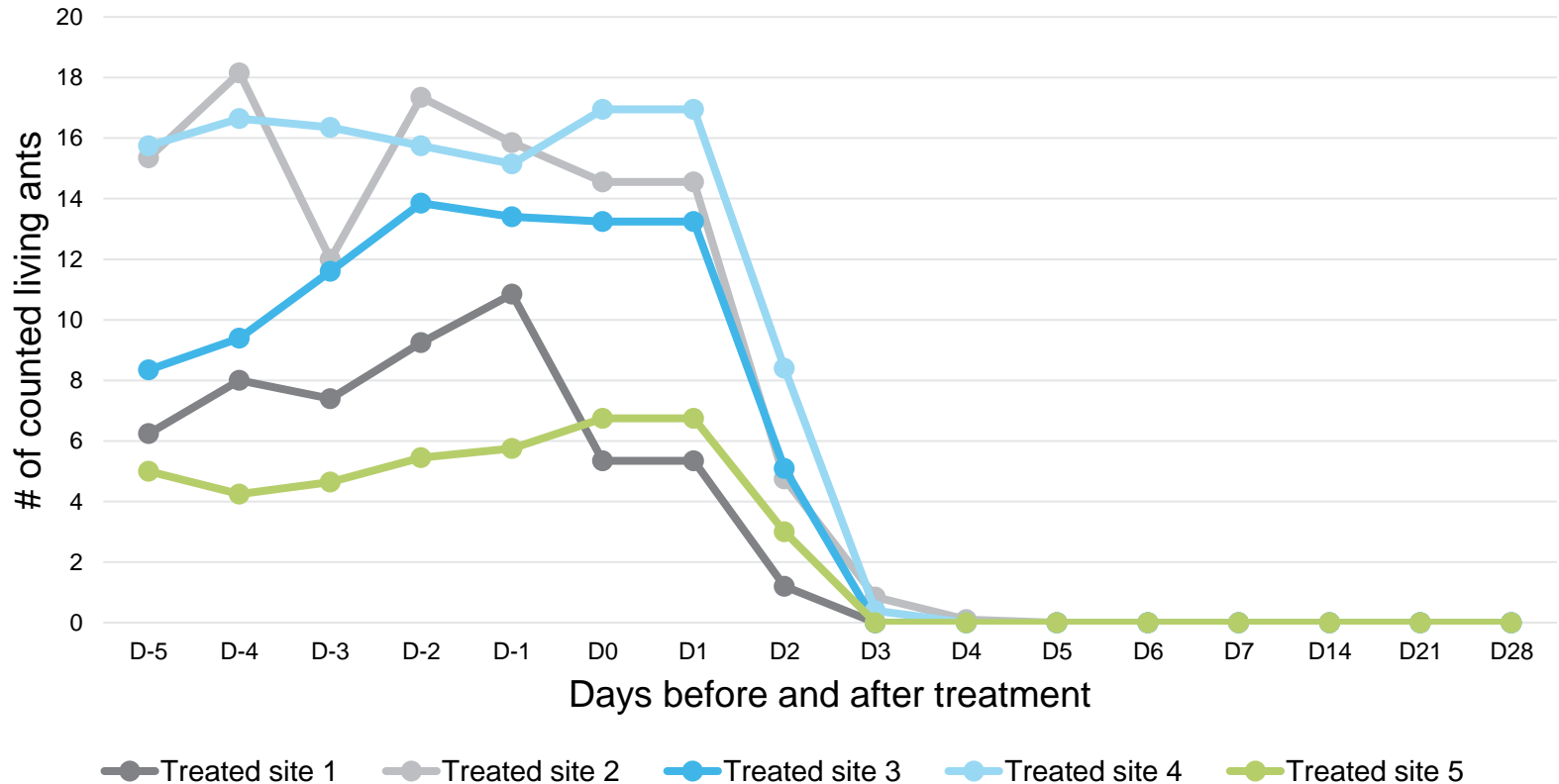


Figure 8: Mortality Rate during the treatment period for the *Tetramorium caespitum* for treated trays (%)



PPME17107

Advion® Ant Gel bait fully controls Black Ant *Lasius niger* colonies in the field



► Within 4 days all 5 field colonies were fully controlled

PPME17109

Advion® Ant Gel applied in the field against black ants *Lasius niger*

- ▶ A small colony of black ants can be fully controlled by one spot of 10 mm in diameter (250 mg)
- ▶ A colony covering a foraging area of e.g. 10 m² may need the allowed maximum of up to 5 g bait (1/6 of a cartridge) for this area as thousands of insects need to be fed and killed
- ▶ A colony which is not fully controlled within days needs more bait as all colony members have to be fed

OUTCAST[®] ANT BAIT STATION

INNOVATIVE TECHNOLOGY FOR ANT CONTROL TO COME



 **Advion[®] Cockroach**
Gel

syngenta.

Excellent palatability of Outcast Ant Bait Station in the field





PROFESSIONAL PEST MANAGEMENT

ADVION® COCKROACH GEL

SUPERIOR
FORMULATION
FOR TOTAL
COCKROACH AND
SILVERFISH CONTROL

Technical presentation



Advion® Cockroach
Gel

syngenta.

TM

Cockroach biology



Order: Blattodea

Species:

Approx. 5,000 species, however only 3 main species are normally associated with humans as a pest globally:

- ▶ German cockroach (*Blatella germanica*)
- ▶ American cockroach (*Periplaneta americana*)
- ▶ Oriental cockroach (*Blatta orientalis*)

- ▶ Brown banded cockroach (*Supella longipalpa*)

COCKROACHES

HORIZONTAL TRANSFER AND SECONDARY KILL



What means horizontal transfer for cockroaches?

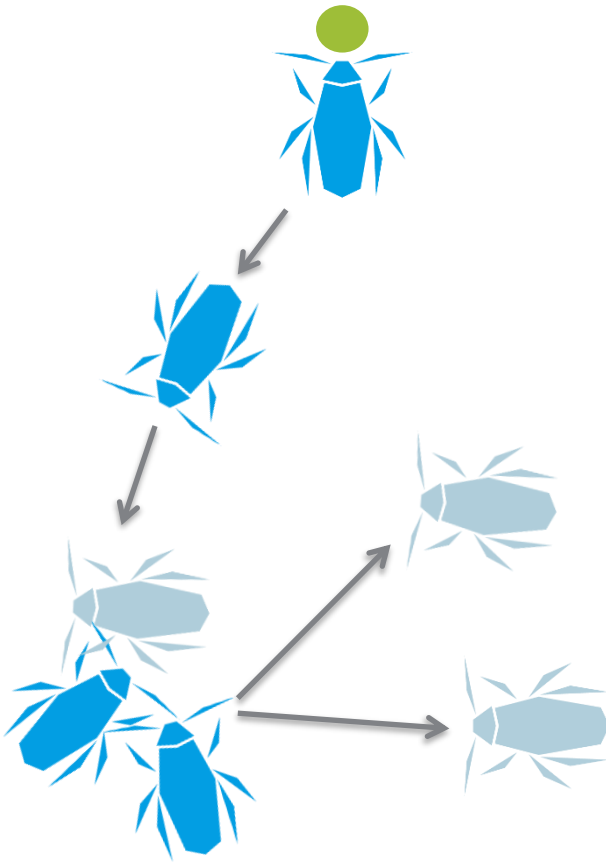
Active ingredients of baits are passed from one individual to another.

If enough insecticide is passed, horizontal transfer may result in secondary kill.

Cockroaches don't do trophallaxis – **different to ants!**

Gravid females tend to stay in harborages and seldom feed

Young nymphs are less mobile too and do not forage for food



Which behaviours in cockroach populations lead to the horizontal transfer of insecticides?



Coprophagy

- ▶ Ingestion of feces



Emetophagy

- ▶ Ingestion of regurgitates and secretions



Necrophagy

- ▶ Cannibalization of dead cockroaches

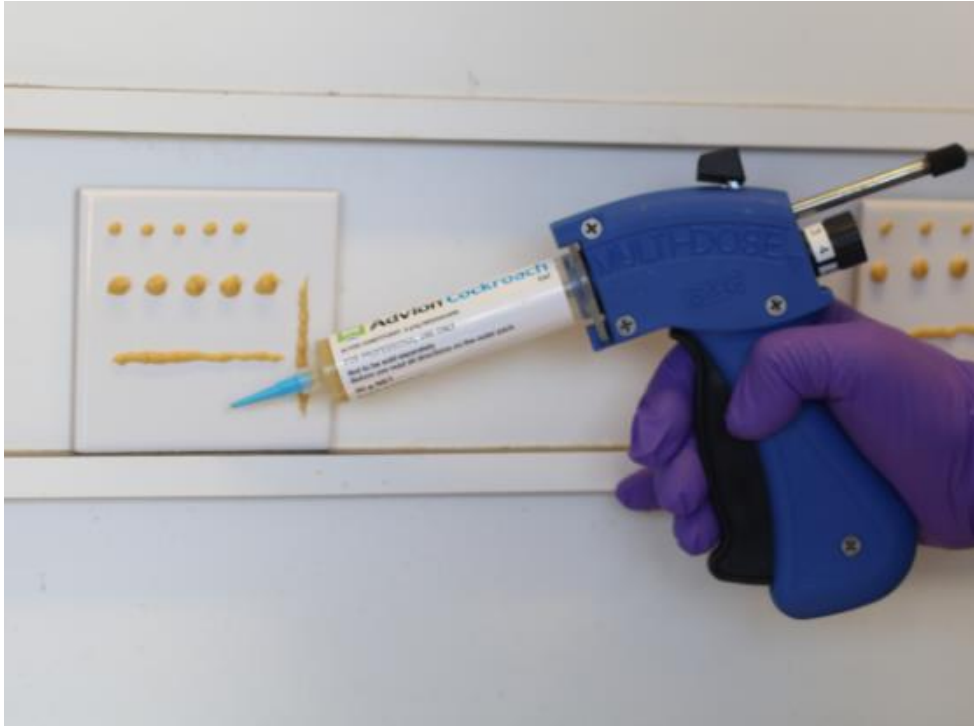
Necrophagy



German cockroach nymphs feeding on a dead adult

APPLICATION OF ADVION COCKROACH GEL

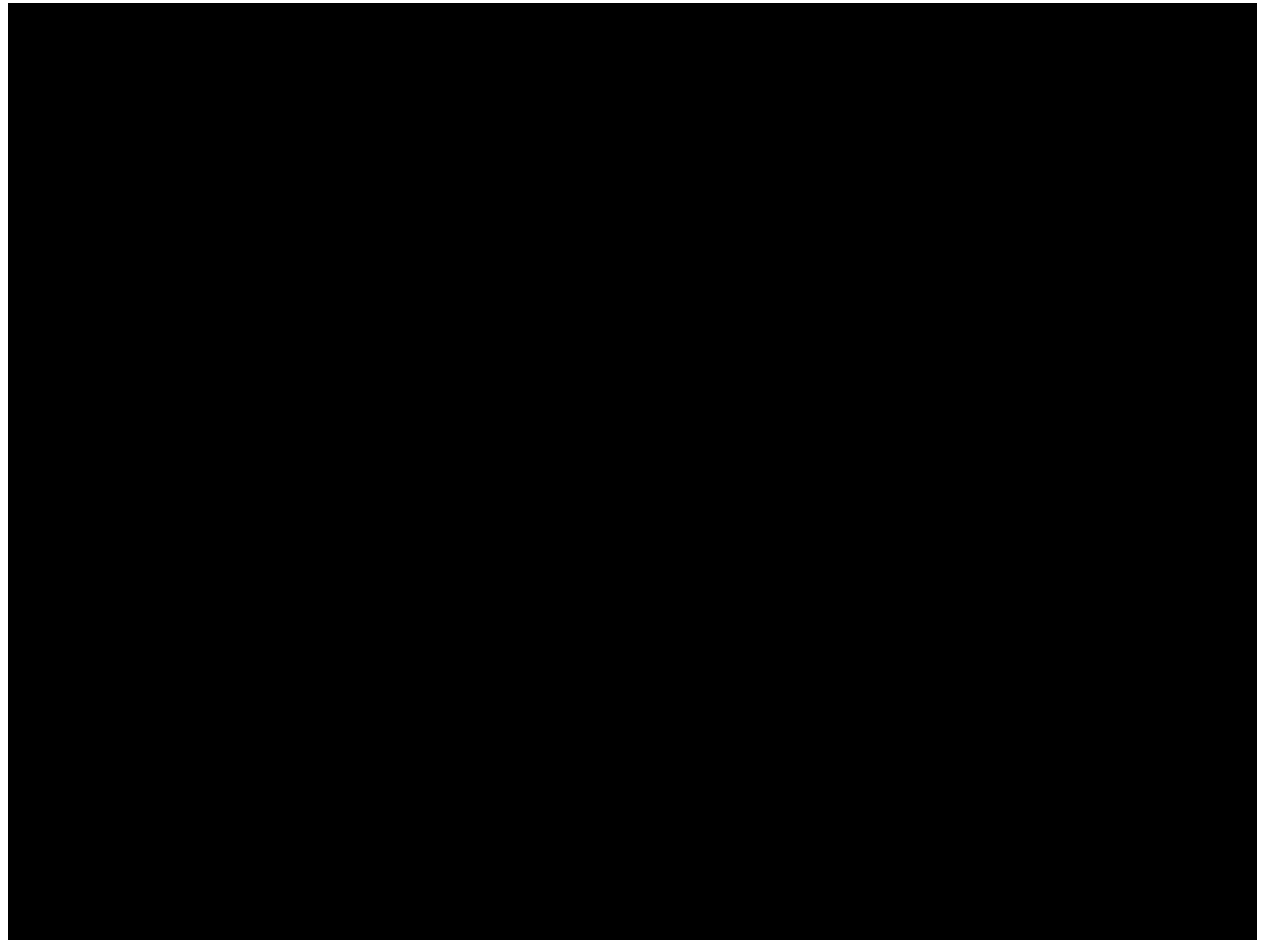
Advion® Cockroach and Ant Gels: how to apply



- ▶ A plunger and 4 tips in each package of 4 cartridges (30gr each)
- ▶ Cartridges compatible with all standard application bait guns
- ▶ 0.5gr / m²
- ▶ Apply in spots of 5 mm (50mg) or 10mm (250mg). Or even lines of ~5cm (350mg).
- ▶ Sticks on every vertical and smooth surfaces

Application of Advion Cockroach in an apartment

- ▶ Apply where signs of infestation are detected:
 - Brown fecal spots of 1-3mm show a high infestation
 - Shed skins (“exuviae” or the remains of the exoskeletons)
 - Living roaches



(Video)

ADVION COCKROACH

PALATABILITY AND EFFICACY STUDIES

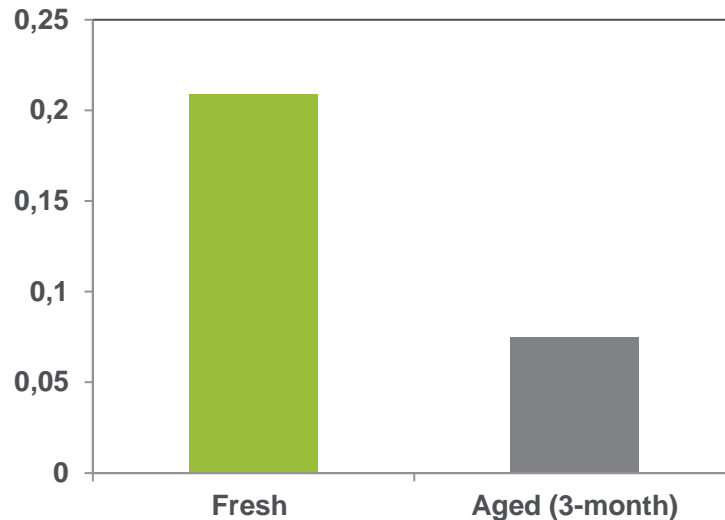
Advion® Cockroach Gel is much more palatable than e.g. this Clothianidin (1%) based bait

- ▶ No other commercial gel in these tests was more attractive than Advion® Cockroach Gel bait

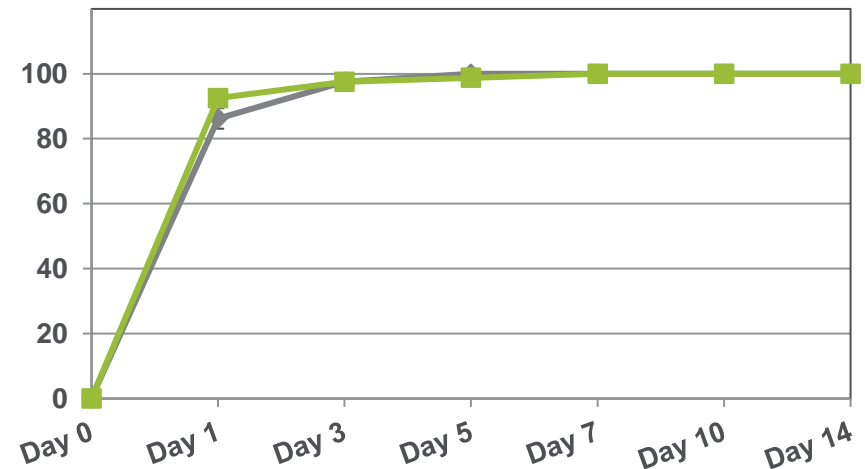


Advion® Cockroach Gel stays palatable and effective for three months

Bait consumption (g) in the first 2h of the assay



Mortality in %

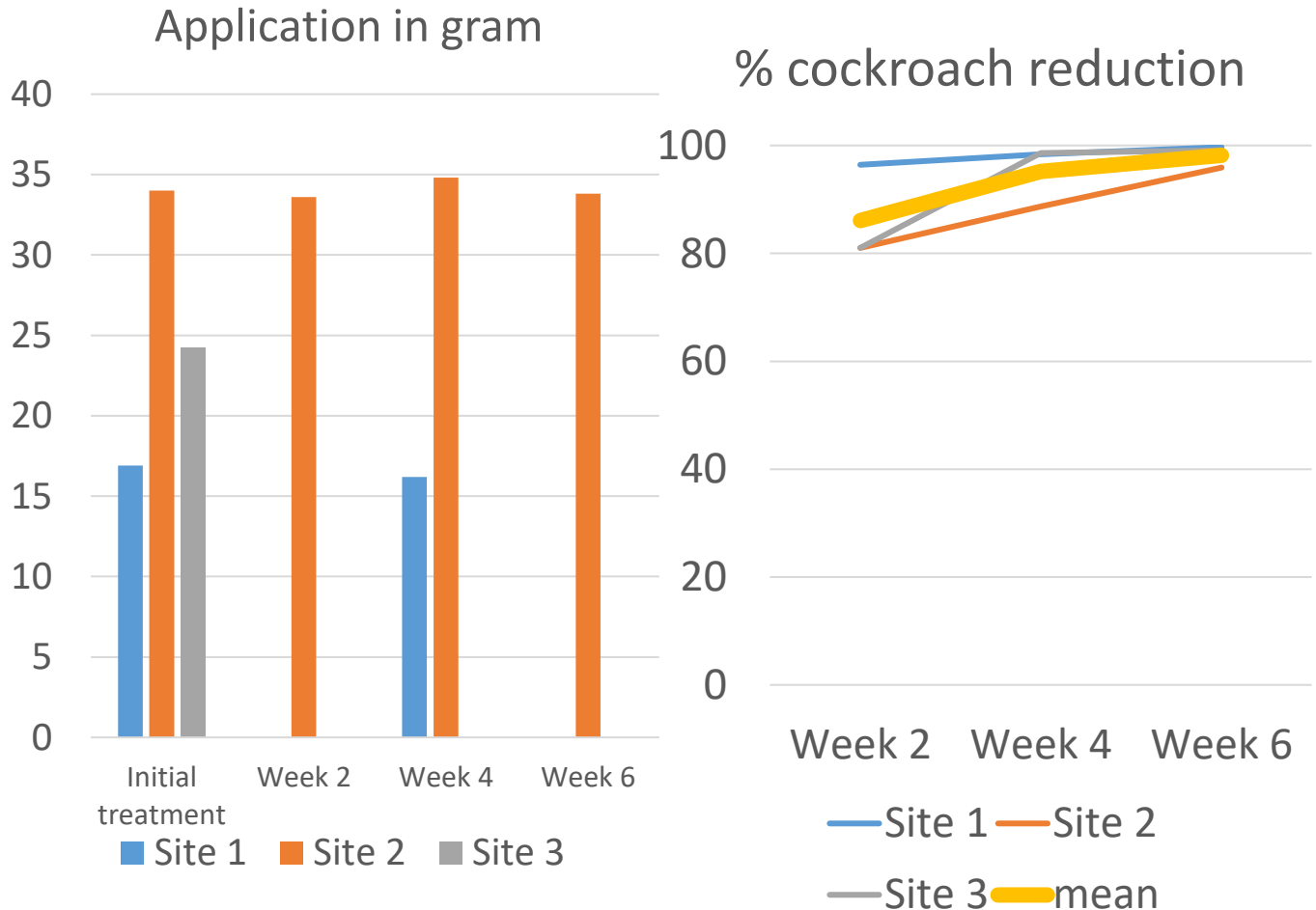


- ▶ Advion® Cockroach Gel demonstrated still 100% mortality three months after application.
- ▶ No difference in mortality to fresh bait
- ▶ The aged bait showed a lower consumption rate in the first two hours (right) but the high mortality remains (left)
 - Note: the aged bait lost weight (moisture) i.e. Indoxacarb is higher concentrated in the bait and the cockroaches have to eat less to get killed

PPM15532, Purdue University, Gondhalekar A.

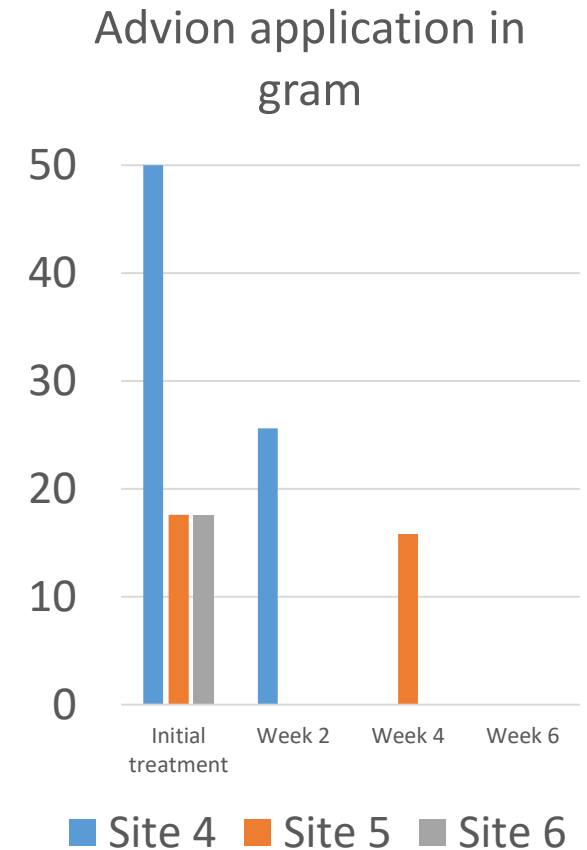
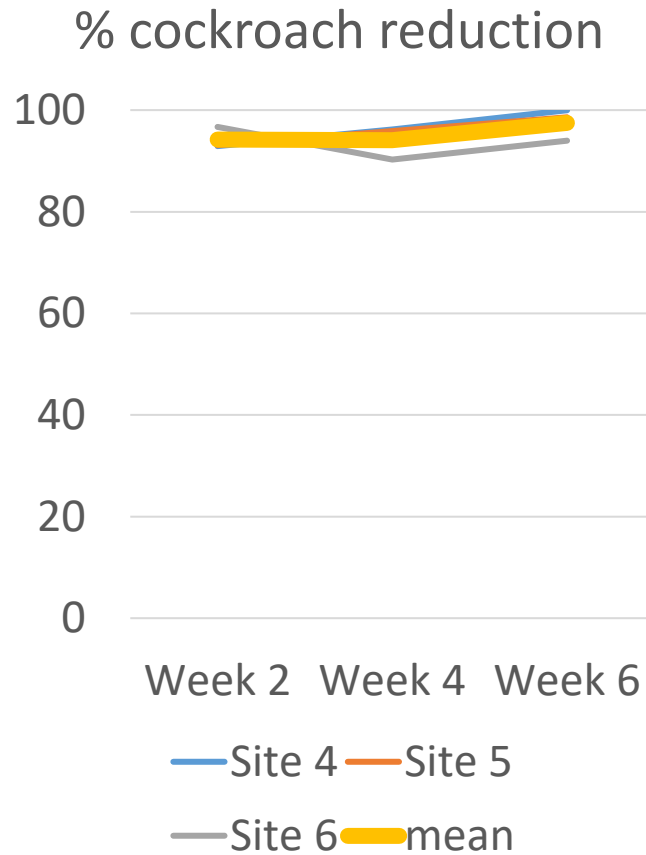
Amount of gel applied in 3 apartments and % reduction of the cockroaches and cracks-and-crevice

- ▶ Depending on the initial infestation level one (site 3, 50m²), two (site 1, 35m²), or even four (site 2, 68m²) applications were needed.
- ▶ Excellent reduction on all 3 sites w/i 6 weeks



% reduction of the cockroaches and amount of gel applied in 3 apartments (bait stations)

- ▶ Excellent reduction on all 3 sites w/i 6 weeks
- ▶ On site 4 and 5 one re-application was necessary



PROFESSIONAL PEST MANAGEMENT

**ADVION®
COCKROACH GEL
AGAINST LONG-
TAILED SILVERFISH
*C.LONGICAUDATA***

 **Advion® Cockroach**
Gel

syngenta.

TM

Silverfish is still a problem in Norway and a growing problem all over Europe



PORTEN VG LIVE TV-GUIDE VG+ TIPS OSS

ks Utenriks Meringer Nyhetsdøgnet

annonse

KJØP VG FINN GULL

Ny stoner av gullpremier fra Mestergull hver dag.

Få inspirasjon fra Mestergull

VELKOMMEN TIL SMYKKENES VERDEN

Mestergull

FAKULHET OG KVALITET TIL RIKTIG PRIS

SMERTEFULLT: Her står Anney Niyokindi foran kjellerisigheten hvor hun fikk den vonde opplevelsen av et insekt i øret. Foto: Privat

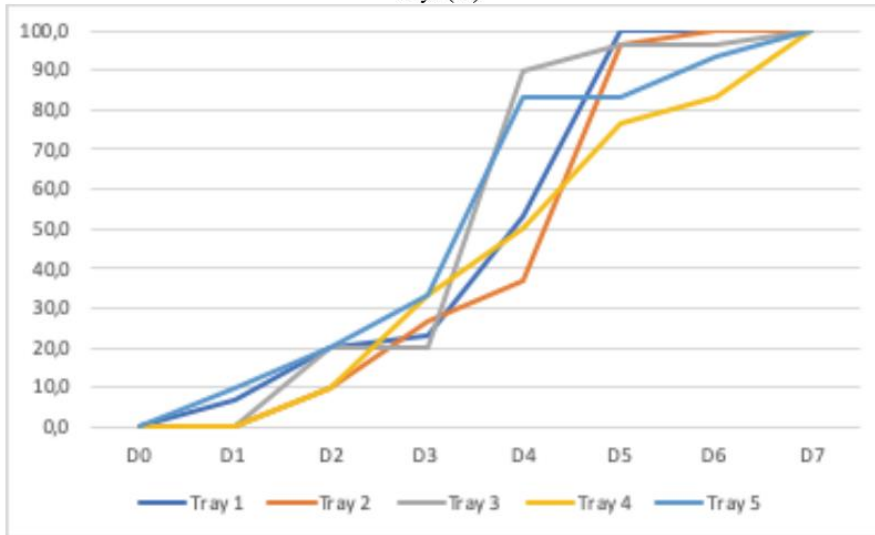
Våknet av skjeggkre i øret: – Så vondt at du nesten blir gal

Anney Niyokindi trodde det var håret som vekket henne og irriterte. Der tok hun smertelig feil. I flere timer jobbet hun med å få et insekt ut av øret.

Av VEMUND ANKE GARDEN
27. april

Successful lab tests against the two major silverfish species: 100% control

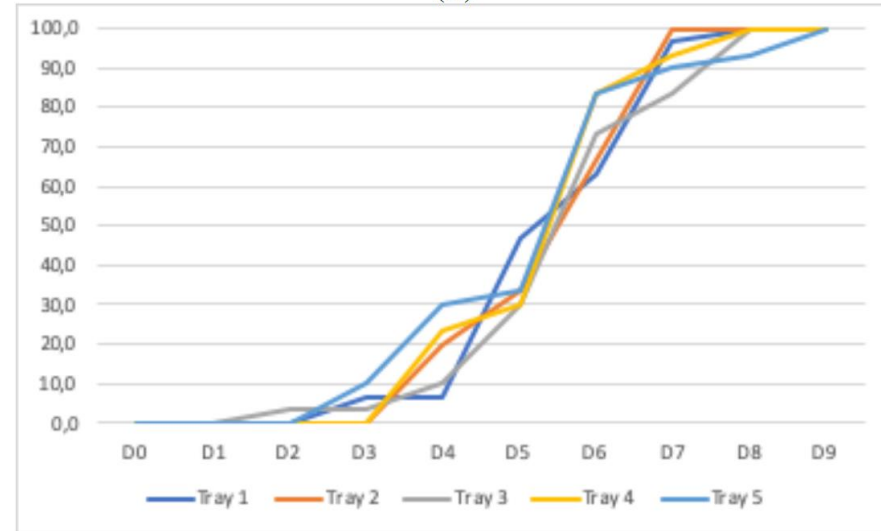
Figure 2: Mortality Rate during the treatment period for the long-tailed silverfish in treated trays (%)



ADVION®COCKROACH GEL AS FREE DROPS
ON **LONG-TAILED SILVERFISH**
(*CTENOLEPISMA LONGICAUDATA*)
SIMULATED-USE TRIAL

FRANCE, 2019, PPME19513

Figure 2: Mortality Rate during the treatment period the common silverfish for treated trays (%)

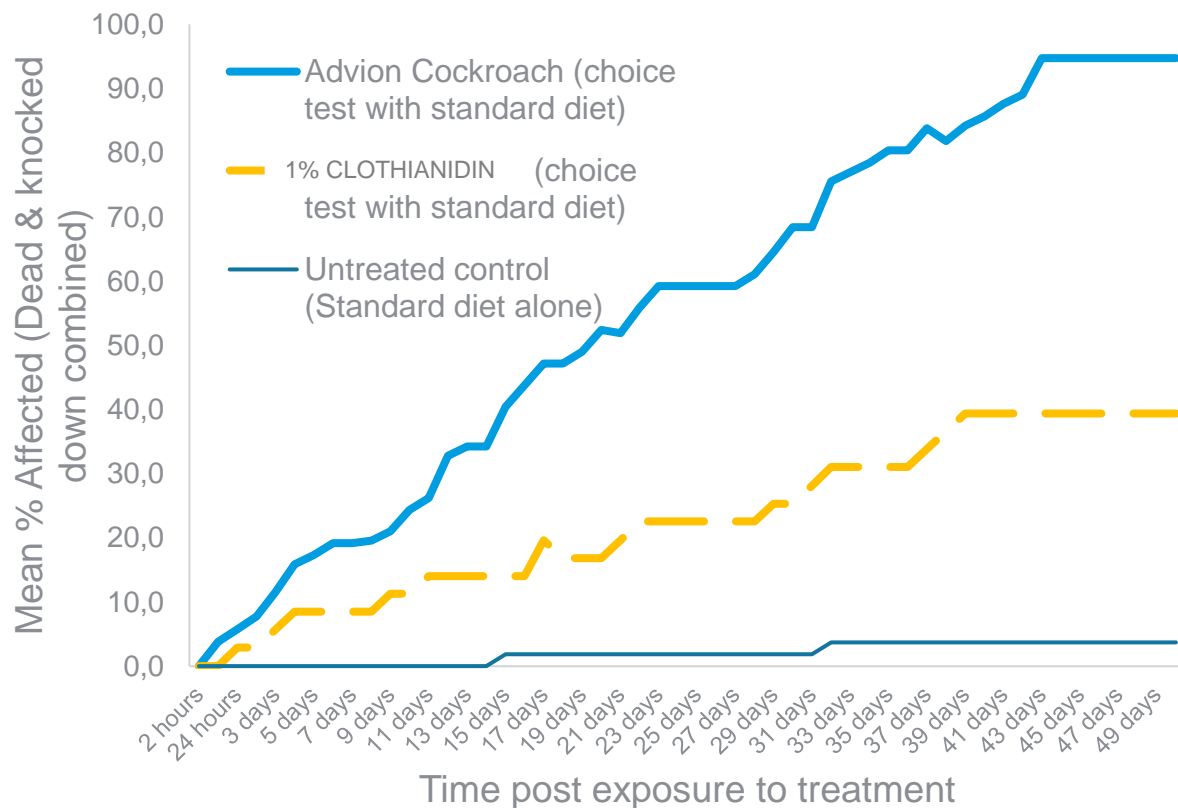


ADVION®COCKROACH GEL AS FREE DROPS
ON **COMMON SILVERFISH**
(*LEPISMA SACCHARINA*)
SIMULATED-USE TRIAL:

FRANCE, 2019, PPME19512

Advion Cockroach is much more effective than the Clothianidin containing competitor bait

- ▶ Advion CRB and the competitor bait were exposed to **common silverfish *Lepisma saccharina*** in a choice test with lab diet (choice test)
- ▶ Advion was twice as effective as the competition

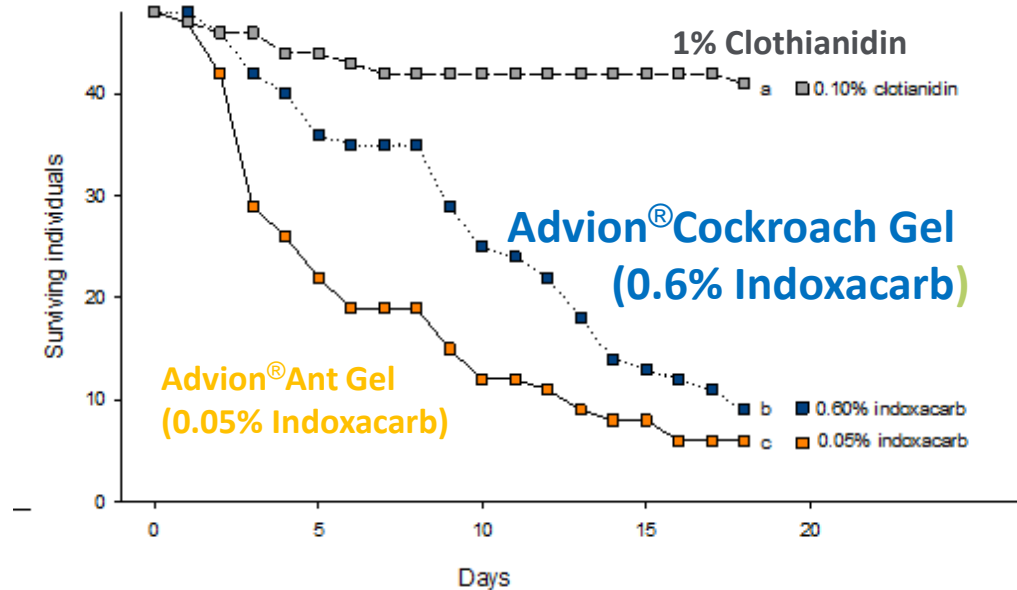


i2L, UK, 2020, PPME19500

Advion® causes excellent secondary poisoning or horizontal transfer at the long-tailed silverfish («Domino effect»)

- ▶ After placing 7-8 killed silverfishes to healthy insects (6 adults and 6 juvenile) in a fresh arena more than 75% of them are killed w/i 18 days
- ▶ Killed insects are eaten by other silverfishes
- ▶ This multiplies the efficacy of Advion

- ▶ Competitor Cockroach gel (1% CLOT) was hardly active in this experiment!



Aak et al. 2020: submitted to Journal of Pest Science

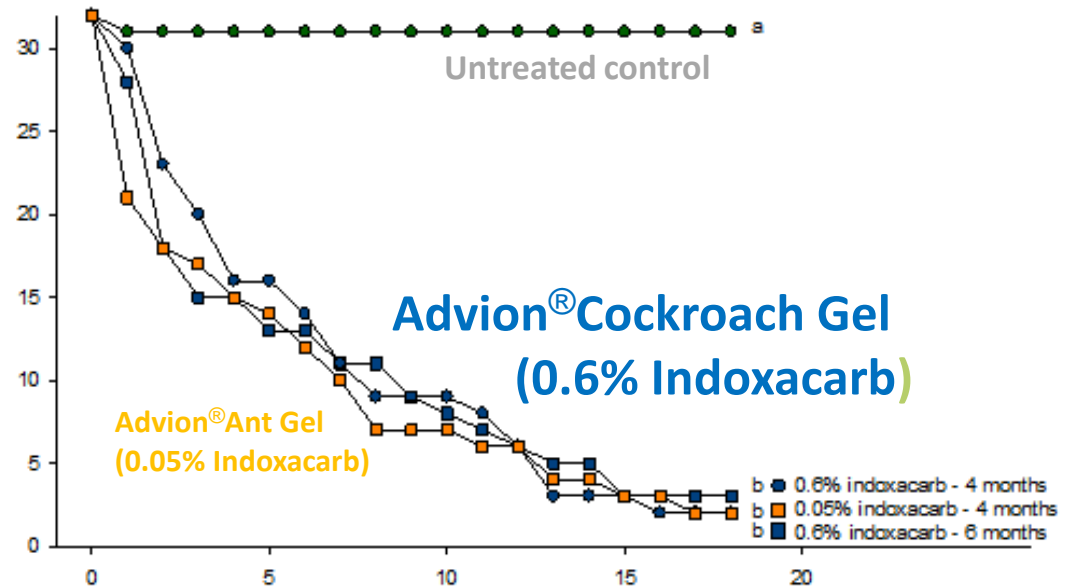
Aak et al. 2019: <https://www.fhi.no/en/op/skadedyrveilederen/other-insects/long-tailed-silverfish/>



Norwegian Institute of Public Health

Advion[®] gel drops have a very long-lasting activity of (at least) 4-6 months against the long-tailed silverfish

- ▶ Advion gel drops were collected 4 and 6 months after application in the field
- ▶ 4x8 silverfishes were exposed in 4 arenas to 2 drops (à 8mg) each in a non-choice test
- ▶ More than 90% of the insects died after 18 days whereas hardly any silverfish died in the untreated controls



Aak et al. 2020: submitted to Journal of Pest Science

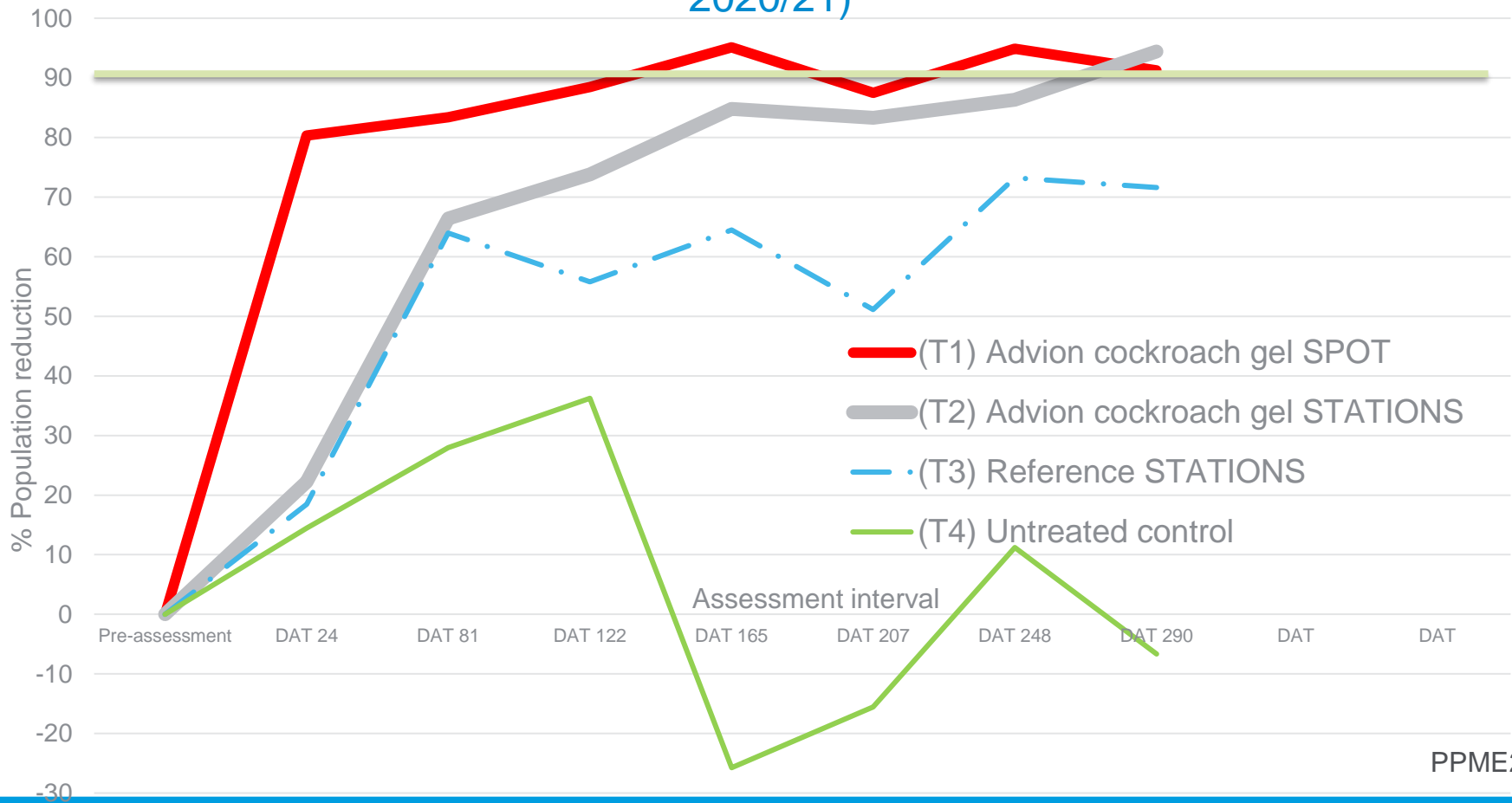


Norwegian Institute of Public Health

Advion® Cockroach Gel acts faster and better than the competitor gel against Long-tailed silverfish

(one of two LT-silverfish field trials in European museums; 290 days

2020/21)



PPME20509

Advion® Cockroach Gel: key messages



- ▶ Extremely attractive formulation, no bait aversion
- ▶ Active ingredient Indoxacarb is bio-activated by the cockroach and silverfish
- ▶ The only bait to perform secondary and tertiary kill
- ▶ Long-lasting after application (months)
- ▶ Complete control of all key cockroach species
- ▶ Perfect to control the long-tailed silverfish and the common silverfish



PROFESSIONAL PEST MANAGEMENT

FOR LIFE UNINTERRUPTED™

 **Advion® Cockroach**
Gel

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