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FRUITION[®] NATFLAV[®] 500

FRUITION[®] NATFLAV[®] 500 Protein Bait Technology



Fruition[®] Natflav[®] 500 is a premium quality autolysed yeast bait specifically designed to attract and kill immature male and female fruit flies when used as an attractant in a baiting mixture with an insecticide approved for this use. Australian trial work has shown that the addition of xanthan

gum gelatinising agent to Fruition Natflav 500 significantly increases the efficacy of resulting bait sprays against Queensland fruit fly (*Bactrocera tryoni*) compared to those which do not have the gelatinising agent added:

TREATMENT	% MORTALITY		
	2hrs	3 days	6 days
0.005% INSECTICIDE A + 5% NATFLAV 500	37	21	18
0.005% INSECTICIDE A + 5% NATFLAV + 0.5% XANTHAN	95	88	92
0.005% INSECTICIDE B + 5% NATFLAV	39	6	4
0.005% INSECTICIDE B + 5% NATFLAV + 0.5% XANTHAN	98	94	89

This confirms work evaluating the addition of xanthan gum to other yeast autolysate bait products.

WHY USE PROTEIN BAIT?

Protein is a very important component in the diet of tropical fruit flies. After the young flies emerge from the soil they seek out and feed on protein on leaf and fruit surfaces, especially in fruiting host plants. Female fruit flies in particular depend on

protein for growth to sexual maturity and the development of eggs. Consequently, when protein baits are sprayed onto fruiting host plants, a large population can be controlled before females reach the egg-laying stage.

Trial 1 – South East Queensland, 2017 (protein-starved QFF released; both baits mixed with xanthan gum gelatinised water)

TRAP TYPE	NUMBER OF FEMALES KILLED	NUMBER OF MALES KILLED	TOTAL NUMBER QFF KILLED
FRUITION NATFLAV 500 + 0.2% Maldison	126	125	251
FRUIT FLY LURE* Bait + 0.2% Maldison	34	30	64

Trial 2 – South East Queensland, 2017 (protein-starved QFF released; both baits mixed with xanthan gum gelatinised water)

TRAP TYPE	NUMBER OF FEMALES KILLED	NUMBER OF MALES KILLED	TOTAL NUMBER QFF KILLED
FRUITION NATFLAV 500 + 0.2% Maldison	116	79	195
Hym-Lure* + 0.2% Maldison	87	71	158

In these trials, where Fruition Natflav 500 was compared to two commercially available protein baits, Fruition Natflav 500 outperformed the comparison product.

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WHAT IS AN 'AUTOLYSED YEAST BAIT'?

There are two main types of protein bait sprays used in fruit fly control, namely acid hydrolysates and yeast autolysates. Acid hydrolysates generally have a high salt content as a result of their production process and have been largely replaced by yeast autolysate-based baits.

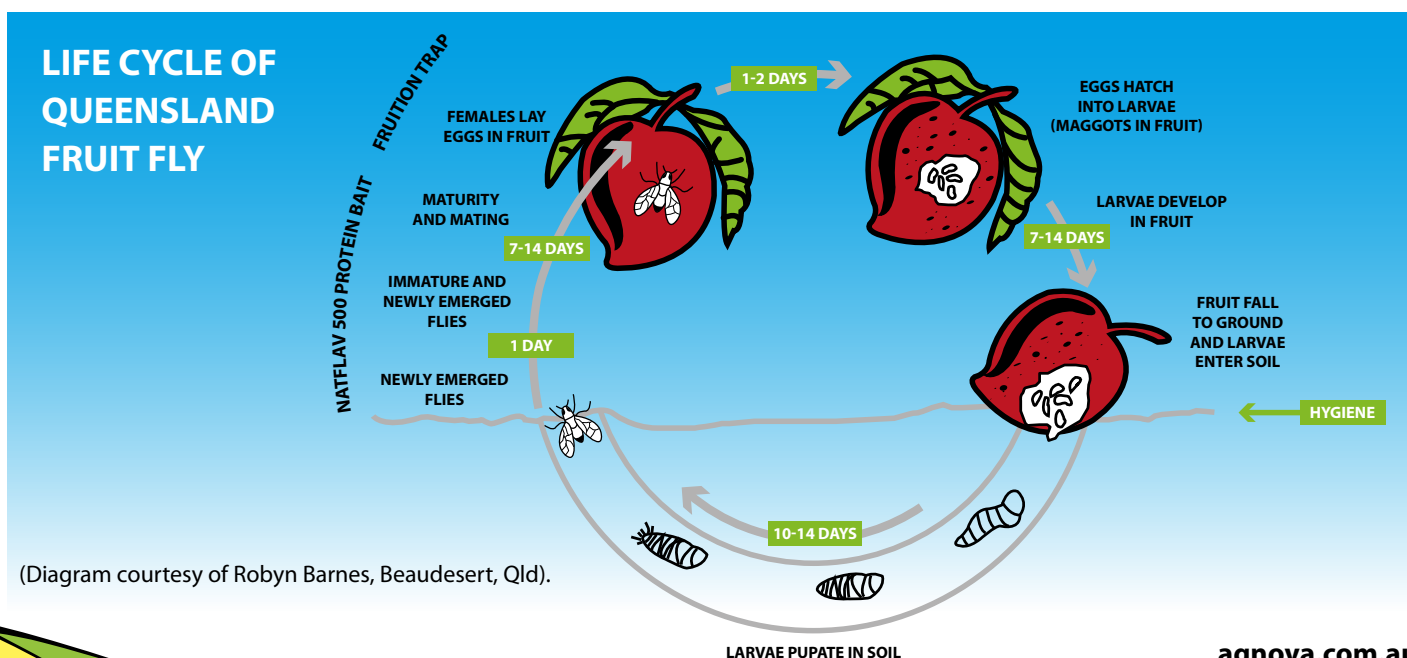
Autolysed yeast baits (yeast autolysates) such as Fruition Natflav 500 are produced by heating then cooling live yeast solutions. This causes the digestion of the proteins in the yeast by enzymes which are also contained in the yeast, giving a product which is lower in salt than acid hydrolysates.

HOW TO MIX FRUITION NATFLAV 500

- Prepare the required quantity of gelatinised water (i.e., water + xanthan gum powder) the day prior to a planned baiting application by adding xanthan gum powder at the rate of 5 grams per litre of water and agitate thoroughly;
- On the day of spraying, mix the gelatinised water thoroughly until a uniform consistency is achieved;
- Add Fruition Natflav 500 at the rate of 2 to 6 litres per 100 litres of gelatinised water (see Fruition Natflav 500 label for details);
- There are a number of insecticides such as abamectin and maldison which are registered for use in protein bait sprays, or which have APVMA Permits issued for their use in protein bait sprays for the control of fruit flies. (Clothianidin is not approved for use as a bait spray at this point in time).
Please read pesticide labels carefully prior to use to ensure that they can be used in the manner intended, and add to the Fruition Natflav 500 + xanthan mix at the approved rate. Another such insecticide is HY-MAL* INSECTICIDE. Refer to the DIRECTIONS FOR USE table on the insecticide label or relevant Permit for use rates and application timing guidelines;
- Agitation should be maintained throughout the mixing process, and until spraying is completed;
- ONLY PREPARE ENOUGH BAITING MIXTURE FOR USE ON THE DAY OF APPLICATION.

HOW AND WHEN TO APPLY FRUITION NATFLAV 500

- The Fruition Natflav 500 + insecticide baiting mixture when applied to the crop foliage is ingested by immature male and female fruit flies and kills them. Because the bait spray is an attractant, overall coverage of the tree canopy is unnecessary and band or spot spraying has, over many years, proven to be very successful;
- Commence applications of the baiting mixture according to the rates and application timings specified in the DIRECTIONS FOR USE table on the label or in the relevant Permit for the insecticide being used, or earlier if fruit flies are detected in Fruition® Traps;
- In all situations begin protein bait spraying early, before fruit become susceptible to fruit fly infestation, and compliment protein bait spraying with use of Fruition Traps to allow monitoring of fruit fly population dynamics. If numbers of mature egg-laying female fruit flies continue to increase following implementation of a program of Fruition Natflav 500 protein bait sprays and Fruition Traps, cover spraying of an approved insecticide may be required;
- Reapply according to DIRECTIONS FOR USE table on the label or in the relevant Permit for the insecticide being used, and at least every 7 days;
- Reapply the baiting mixture following rainfall;
- Avoid applications of the baiting mixture to fruit or other edible commodities;
- Yeast baits may cause phytotoxicity. Always adhere to the instructions in the DIRECTIONS FOR USE table on the label or in the relevant Permit for the insecticide being used, including instructions as to how to reduce the risk of phytotoxicity;
- Adhere to the withholding period on the label or in the relevant Permit for the insecticide being used.



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INTEGRATED PEST MANAGEMENT (IPM) TOOLS FOR FRUIT FLY CONTROL

Considering the lifecycle of the Queensland fruit fly there are 5 keys to effective IPM of fruit flies: planning, hygiene, monitoring/ trapping, bait spraying and, where possible, cover sprays.

Planning needs to be done prior to the season, taking into account what happened last season: what worked, what didn't, and what needs to be done this season. A plan should be developed to make it clear, well in advance, what strategies will be implemented, and when, to ensure good control of fruit flies. Among the decisions to be taken are: which traps to use, when to start trapping, when to begin protein bait sprays, what insecticide to use in bait sprays, what cover spray options are available, and when to start cover sprays.

Hygiene is a year-round activity, making sure that all steps are taken to interrupt the fruit fly breeding cycle at all stages – reducing carry over fruit on trees or infestations in alternate hosts close by, mulching or removing windfall fruit from the ground to prevent larvae moving from fruit to soil to pupate, cultivating the soil to interrupt pupation, etc.

Monitoring and trapping are critical to any IPM program for fruit fly control. Monitoring provides critical information about what is happening with fruit fly populations in the crop. Fruition Traps are the only traps on the market which specifically monitor population development with mature female Queensland fruit flies – these are the fruit flies which are ready to lay eggs and which cause the economic damage to crops. Other trapping systems monitor male fruit flies or immature males and females – these numbers are used as a proxy to try to estimate what is happening with mature female fly populations, but they are not always accurate because populations of mature females are not necessarily in the crop at the same time as immature male and females. Also mature females can enter the crop from some distance away without immature males and females being present, when they have been fertilised elsewhere.

Fruition Traps have been developed over several years by researchers in Queensland for monitoring and trapping Queensland fruit flies as a part of an overall IPM program. They attract mature female flies due to the colour and shape of the trap, and because of the lure, which has been specifically developed to attract only mature female fruit flies. It is important to start monitoring early in the life of the crop, especially if there are other mature or maturing crops or alternate host plants in the vicinity which might act as sources of infestation. For more information on Fruition Traps please refer to the product label.

Protein bait spraying has become much more important in the last few years because of restrictions placed on the use of cover sprays for fruit fly control. Fruition Natflav 500 attracts immature male and immature female fruit flies and should be applied in a mixture of gelatinised water (water + xanthan gum), plus an insecticide approved for this use. Protein bait sprays are generally applied to the mid-lower part of the canopy of tree crops.

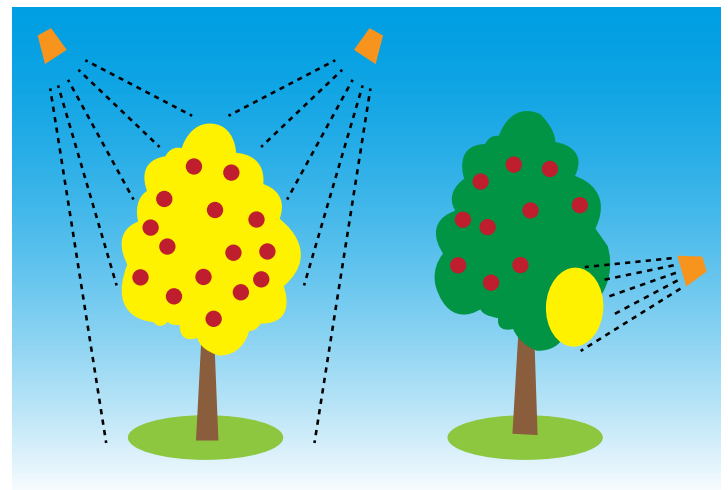
In vegetable crops, sprays are applied to vegetation in the perimeter around the crop rather than directly to the crop canopy itself.

In trellised crops such as grapevines apply protein bait spray to trellis posts as a spot spray.

In berry crops such as blackberries, blueberries and raspberries direct the protein bait spray towards the base of plants where fruit bearing is sparse.

Application of bait sprays should start when young flies begin to emerge, and should be repeated at 7 day intervals according to the label of the insecticide used or sooner if rain falls after application. The mixture should be applied using a coarse band spray, avoiding direct application to edible commodities such as fruit or vegetables, or as spot sprays according to the recommendations on the label of the insecticide being used.

Cover sprays have traditionally given very good control of fruit flies. However, in recent years the range of products available for use as cover sprays has been restricted, and the main management/ control effort is now focused on protein bait spraying. In some situations there are some products available for use as cover sprays, but they only claim partial control of the pests.



Difference in spray patterns when applying cover sprays (on the left) vs bait spraying (on the right) where bait sprays are directed to the trunks or foliage of trees. (Diagram courtesy of Robyn Barnes, Beaudesert, Qld.).

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DIRECTIONS FOR USE:

USE IN COMBINATION WITH AN INSECTICIDE APPROVED FOR THIS USE AS PART OF AN IPM PROGRAM FOR CONTROL OF FRUIT FLIES.

SITUATION	PEST	RATE	CRITICAL COMMENTS
Crops susceptible to fruit fly attack	For example: Queensland fruit fly (<i>Bactrocera tryoni</i>), Lesser Queensland fruit fly (<i>Bactrocera neohumeralis</i>), Jarvis' fly (<i>Bactrocera jarvisi</i>), Cucumber fly (<i>Bactrocera cucumis</i>)	Fruition Natflav 500: 2-6 L/ 100 L gelatinised water, PLUS Recommended rate of approved insecticide.	The following recommendations are provided as a general guide. Always adhere to the approved insecticide label for specific directions for use. Yeast autolysate protein products can cause crop phytotoxicity. Always adhere to the approved insecticide label directions to reduce the risk of crop phytotoxicity. Follow the withholding period provided on the label of the insecticide being used. Protein bait sprays attract and kill immature male and female fruit flies both of which require protein to reach sexual maturity. Higher use rates of Fruition Natflav 500 will increase bait attractiveness. Apply 50-100 mL of gelatinised Fruition Natflav 500 plus insecticide baiting mixture per tree as a coarse spray. For optimal control of fruit flies gelatinised Fruition Natflav 500 plus insecticide bait applications should commence well before the fruit becomes attractive to mature egg-laying female fruit flies i.e., from the early stages of fruit set, when fruit is still hard and green. Fruition Natflav 500 must ALWAYS be applied using gelatinised water for maximum efficacy and increased bait resistance to weathering. Repeat applications as per the instructions on the label of the insecticide being mixed with Fruition Natflav 500, and at least every 7 days. Rainfall will wash the baiting mixture off the crop: it will be necessary to reapply the baiting mixture following rainfall. Avoid application of the baiting mixture to fruit or other edible commodities.
Citrus – additional instructions			Directions as above. Apply as above OR at 15-20 L/ha total volume as a 30 cm band at skirt level of trees for area wide control.
Vegetables and berry crops			Directions as above. Do not apply directly to crop. Spray perimeter vegetation around the outside of the crop. Where Queensland fruit fly is specifically being targeted apply the spray at a height of 1.5-2 m onto the perimeter vegetation; where cucumber fly is being targeted, apply the spray at a height of 0.5-1.0 m onto the perimeter vegetation.
Crops susceptible to fruit fly attack	Mediterranean fruit fly (<i>Ceratitis capitata</i>)		The following recommendations are provided as a general guide. Always adhere to the approved insecticide label for specific directions for use. Yeast autolysate protein products can cause crop phytotoxicity. Always adhere to the approved insecticide label directions to reduce the risk of crop phytotoxicity. Follow the withholding period provided on the label of the insecticide being used. Protein bait sprays attract and kill immature male and female fruit flies both of which require protein to reach sexual maturity. Commence weekly bait spraying when fruit is half size. Where Mediterranean fruit fly pressure is expected to be high, begin bait spraying at fruit set. SPOT APPLICATION: Apply 50-100 mL of bait mixture in coarse droplets (4-6 mm in size) to foliage. Apply to every tree in a row; alternate the sides treated at each application. BAND SPRAY: apply as a band spray to each tree in a row or, with a spray rig set up to spray both sides of a row, travel up and down every second row so that trees are not being double sprayed. It is recommended to continue bait spray applications for at least 4 weeks after harvest to ensure that flies emerging from the soil are controlled. Continue treating any citrus trees while fruit remains on other trees as citrus are favoured resting places for Mediterranean fruit fly. Bait spraying in Autumn is recommended as Mediterranean fruit flies present at this time are the source of infestation in the following spring. Avoid application of the baiting mixture to fruit or other edible commodities.

PREPARATION

The day prior to spraying the baiting mixture, prepare gelatinised water by adding Fruition Xanthan Gum powder to water at a rate of 5 g/L and agitate thoroughly.

On the day of application, mix the gelatinised water thoroughly until a uniform consistency is achieved. Prepare the baiting mixture by adding Fruition Natflav 500 at a rate of 2 to 6 L/100L of gelatinised water in combination with HY-MAL® INSECTICIDE or an alternative insecticide approved for this use according to the DIRECTIONS FOR USE table on the insecticide label.

Agitation should be maintained throughout the mixing process and until application is completed. Only prepare enough baiting mixture for use on the day of application

FRUITION TRAPS AND FRUITION NATFLAV 500:

Fruition Natflav 500 should be used in conjunction with Fruition Traps as part of an IPM control program. Fruition Traps can be used for both population monitoring and as part of an IPM control program when susceptible crops are fruiting.

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Always refer to the product label for full direction for use.