

Report to grain growers

Bedstraw Eradication Program 2019/20

Foreword

On behalf of my fellow committee members, I am pleased to present this report outlining the delivery and outcomes of the 2019/20 Bedstraw Eradication Program to the contributors of the Grains, Seeds and Hay Industry Funding Scheme (IFS).

Three-horned bedstraw (*Galium tricornutum*) is a competitive weed that can cause considerable yield loss in crops, and its seeds are contaminants of fodder and grain. The presence of bedstraw requires infested areas to be quarantined whilst a nine-year program is undertaken – six years of herbicide treatments followed by a three-year ‘release phase’.

In 2019/20 the Program reached a major milestone with quarantine restrictions fully lifted from one property and lifted from the arable areas of a second property. This is a major step toward eradicating bedstraw from Western Australia.

I congratulate the landholders and staff from the Department of Primary Industries and Regional Development – their dedication and commitment has been instrumental to this significant achievement.

The success of the Program also highlights the value of the IFS in protecting the biosecurity of Western Australia’s grain/seed/hay industry. Reporting suspicious pests and diseases is critical to the ongoing prosperity of our industry, and the compensation provisions of the IFS regulations mean growers can be confident to report potential biosecurity threats.

The IFS is a valuable arrangement that we, as an industry, can use to safeguard our industry from pests and diseases. The impressive achievements of the Bedstraw Eradication Program are testimony to this, especially given the difficulty of successfully eradicating any weed from the environment.



Rohan Day
Chairman

Grains, Seeds and Hay Industry Funding Scheme Management Committee

30 June 2020



Program Review

The Bedstraw Eradication Program operates under the Biosecurity and Agricultural Management Industry Funding Scheme (Grains) Regulations 2010.

All program milestones have been met and the program has been delivered just over budget.

Approved Plans developed annually for each infested property in consultation with the Grains, Seeds and Hay Industry Management Committee (GSHIMC), the Department of Primary Industries and Regional Development (DPIRD) and the landholders detail management actions, estimated costs and timeframes of agreed actions.

The two infested properties have now ended the final Release Phase of a nine-year eradication program. DPIRD implements the program which includes six consecutive years of winter spray treatments, followed by a three year release protocol and post-eradication monitoring phase. Machinery inspections, quarantining, landholder compliance winter spraying and end of season double-knock herbicide treatments form the key components of the Approved Program.

The GSHIMC believes the current program is delivering the best value for the funding provided and is achieving the project outcomes of containment and eradication.

Achieved milestones

- Both properties completed their final year of the three-year “Release Phase”.
- Thorough ground searching of both properties undertaken, and no plants found in any of the infested paddocks.
- Full release from quarantine restrictions of one property and significant reduction of quarantine area on the other property.
- Cooperation and support by the landholders remains at a high level.
- Grain sampling through Cooperative Bulk Handling (CBH) analysis has greatly enhanced the program surveillance. To date no new infestations have been detected with this technology.



Program expenditure

The total expenditure for the 2019/20 Program was \$422 989 as at 30 June 2020 (Table 1) which was \$6 181 over the budgeted amount of \$416 808. The slight increase in expenditure was due to the late inclusion and extension of the ‘Seed viability’ and the ‘GrainCam’ research development programs that required the appointment of a Technical Officer. There was a significant contingency built into the Approved Program budget for potential spraying and operational activities. Much of this contingency was used to fund the above position.

- Approximately \$368 444 was directed to program support and operational activities such as control treatments, regulation and property surveillance.
- A total of \$54 545 was allocated to CBH grain surveillance.

Table 1 Program expenditure 2019/20

Operational expenditure	
Employee expenses	\$181 930
Vehicles and administration	\$82 153
CBH surveillance	\$54 545
Contractors	\$84 949
Chemicals	\$10 880
Travel expenses	\$7 042
Other expenses	\$1 490
Total expenditure	\$422 989

Program results at a glance

Recent improvements

Improvements in the delivery of the program remain important for ongoing development and effectiveness. Significant operational refinements during 2019 included:

- Seed germination enhancing and destruction techniques by burning identified bush blocks.
- Clearing and tidying bush edges to improve spraying application (e.g. removing overhanging branches and fallen trees), preparing for fencing.
- Fencing off infested bush blocks.
- Levelling rock piles, to remove potential seed storing sites.
- Contingency treatment options to allow for seasonal variations and program needs.

Compliance

Audit and compliance remain a strong focus of the program with strict quarantine protocols in place and maintained by DPIRD officers on both properties to prevent bedstraw spread outside the existing boundaries. This includes clean down processes for the movement of vehicles, machinery and equipment in and out of the quarantined areas and restricting stock access. Quarantine release processes were followed with full landholder and contractor cooperation.

Auditing of all treatments and operations occurred to ensure successful herbicide application and coverage over the whole of the required areas as well as ensuring bush clearing operation requirements are being met.

DPIRD assists the landholders with regulatory and operational facets of the program ensuring both the Approved Program and quarantine requirements are being met.



Industry Funding Schemes

The GSHIMC met in February 2019 and approved the programs for the control of skeleton weed and the eradication of three-horned bedstraw on behalf of the WA Grains Industry.

The Committee recommended a contribution rate on grains, seeds and hay be retained at 25 cents per tonne for grain and 12.5 cents per tonne for hay. These funds are used to support the Skeleton weed and Bedstraw Programs, with skeleton weed allocated 90% of the funds collected.

All contributions to the scheme are collected by purchasers of grain and hay and are paid into a GSHIFS Declared Pest Control and Compensation Account, which is managed by DPIRD in consultation with the GSHIMC.

Research

The program has continued to trial new surveillance techniques to detect bedstraw seed and map locations in the field. This included modifications to the GrainCam technology to allow autonomous use and better seed detection. The GrainCam is a device mounted to a combine during harvesting to detect seed and which previously required manual intervention to operate.

The program continued its research into improving bedstraw detection including in lupins, as this is the main crop planted in high risk areas in 2020.

Seed viability testing of 10-year old bedstraw seed was finalised, with seed at this age confirmed dead with no potential to germinate.

Extension and awareness

Neighbouring landholders of both affected properties were provided a status report of the Bedstraw Eradication Program.

An ABC radio interview on the Bedstraw program was delivered highlighting the success and release of one property.

The new three-horned bedstraw factsheet, developed to assist growers and the general public in identification and reporting, was available at agricultural field days such as Mingenew, Dowerin, Newdegate and Wagin Woolorama.

Program results at a glance

Findings

Success of the Program is evident with paddocks on both properties having completed the final year of the Three Year release phase in 2019 and released from quarantine restrictions.

Successful and timely treatments and searches have prevented seed set and exhausted the seed bank. No bedstraw plants were detected during property inspections.

No bedstraw seeds were detected during CBH seed image analysis, providing some level of confidence that bedstraw has been contained to the two known properties and has not been identified in the grain growing areas of WA.

After evaluation of this year results, the Program recommends continued surveillance using seed imagery technology, as the risk of bedstraw incursions into WA is ever-present. Early detection is the best strategy to quickly eliminate infestations at a minimal cost.

Infested properties

There are currently two properties in WA known to be infested with three-horned bedstraw:

West Arthur: This property has eight paddocks equating to 280 hectares under quarantine. In 2019, six of the eight quarantined paddocks completed the final year of the three year release phase and were formally released from quarantine restrictions in February 2020. The remaining two arable quarantine areas proceeded to the final year of the three year release phase.

Several small bush areas within the released quarantine paddocks still remain under various stages of the eradication phase. These have been fenced to exclude stock and will continue receiving full chemical eradication treatments.

Merredin: This property has one paddock of 48 hectares under quarantine. In 2019 the paddock completed year three of the three year release phase and was formally released from quarantine restrictions in November 2019.

Area searched

Whole of paddock searches were conducted during September by DPIRD search teams on both properties.

This included all quarantine paddocks, all bush areas within the quarantine boundaries as well as non-quarantine areas (an estimated 330 hectares). Continuous monitoring of known hotspots also occurred throughout the season.

CBH Grain surveillance

The eradication activities were complemented by a passive surveillance program funded by the GSHIFS in partnership with CBH.

CBH screening technology employed for commercial grading of grain and assessment of bedstraw seed contamination was used on 7 372 grain samples from the 2019 harvest collected from targeted CBH sites throughout the state. All samples that were reported as “suspect” were visually inspected to confirm that no bedstraw was present.

Infested area

West Arthur: No bedstraw plants were found in both arable and bush areas during the 2019 season (approximately 9 hectares of bush area within the quarantined paddocks are known to be actively infested).

Merredin: No bedstraw plants have been detected since 2014.

Control treatments

Timely and successful treatments were applied to all quarantined areas with both properties receiving a double knock treatment at the end of the season, including those paddocks in the release phase. This provides confidence that any undetected bedstraw will not survive to produce seed. The West Arthur property also received treatment to designated bush blocks.

All operations were audited by DPIRD officers for treatment effectiveness.



Planned improvements to the program in 2020/21

A meeting with each landholder and DPIRD staff was held at the end of the 2019 Approved Program activities season, to review the program and look at what is working well and identify areas for improvement. Meetings were also held at the beginning of the 2020 season to discuss and finalise the 2020 Approved Program activities for the West Arthur property and post eradication monitoring activities for both properties.

Main items discussed and recommendations:

- Clearing and tidying bush edges and rock heaps was successful in improving spray application in designated locations and the burning of leaf litter in designated bush areas.

Continue bush/debris pile burning operations at identified locations as these assisted the program to manage bedstraw by promoting germination and destroying any potential seed.

- Erosion in the quarantine paddocks due to the eradication treatments and restrictions applied. Paddock surfaces are mostly bare of vegetation and are prone to wind and/or water erosion.

Incorporate optional light cultivation (scarifying) of arable areas in quarantine paddocks in the Release Phase to help manage potential erosion for the 2020 Approved Programs.

- The remaining arable areas on the West Arthur property will be released from quarantine pending a clear search this year.
- Post eradication monitoring of newly released quarantine areas.

All historical infested paddocks released from quarantine, will continue to be inspected to ensure bedstraw has not re-established, as part of the ongoing (post eradication) monitoring program.

All newly released paddocks placed in crop will be searched during harvesting using GrainCam technology as well as grain sample collection for seed contamination screening to provide an added measure of surveillance on these paddocks.

- Ongoing awareness raising of bedstraw, its identification and reporting is important to the grains industry and other relevant stakeholders.

Continue enhancing education and awareness by including bedstraw and skeleton weed information and awareness raising activities at field days, farmer events, and the DPIRD website.



Three-horned bedstraw
Published August 2019

What you should know about three-horned bedstraw
Three-horned bedstraw (*Galium tricornutum*) is a weedy member of the Rubiaceae (madder family) and closely related to cleavers (*Galium aparine*). It originated in eastern Europe and is a major weed of crops in parts of south-eastern Australia. Its potential as a weed in Western Australia has been assessed and as a result it has been declared a prohibited organism under the Biosecurity and Agriculture Management Act 2007. It may not be imported and any plants found in Western Australia must be eradicated.

Why three-horned bedstraw matters
Three-horned bedstraw is a competitive climbing plant that forms dense masses of tangled vegetation in crops, along fence lines and in wasteland. There are a number of effective herbicides that can be used for control in cereals and grass pastures. In legume based pastures, pulses and canola there are fewer options. The size of the seed makes it difficult to separate from canola during seed cleaning. Small hooked stems on the seed make it difficult to remove from other crops using conventional seed cleaning equipment.

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What you should look for
Three-horned bedstraw plants are straggly, scrambling or climbing, with weak branched stems up to 1.5 metres long. The whole plant feels sticky, caused by the leaves and stems being covered with tiny hooked prickles.



Three-horned bedstraw is a straggly, scrambling or climbing plant with leaves in whorfs.

The stems are square in cross section with ridges at the corners and are often hollow. Tiny backward pointing hooked spines run along the four ridges on the stem.

The leaves are formed in whorls of six to eight at nodes on the stems. They have no leaf-stalk (sessile). They are covered with hooked hairs on the upper leaf surface and have tiny backward pointing prickles on the margins and on the underside midrib.


The flowers are small and about 2mm in diameter with four white petals. Each flower is attached to a small stalk (pedicel) that is initially straight but becomes curved as the fruit forms. Groups of three flowers are attached to a straight stalk (peduncle) that is attached to the stem at the leaf axil or the end of the stem. The pedicel and the peduncle both have tiny backward pointing prickles.

The seeds consist of a pair of nutlets each about the size of a canola seed. They are hairless, but covered with minute warty bumps. Three-horned bedstraw closely resembles cleavers. Cleavers has straight rather than curved seed stalks (pedicels) and has hooked hairs on the seed rather than tiny, dimply warts.

Why three-horned bedstraw might prosper in Western Australia
Three-horned bedstraw is an annual plant germinating in late autumn to early spring. It is spread by seed. It can be dispersed by wind, water on the plant, people or animals.



Three-horned bedstraw leaves are in whorfs at the nodes on the square stems. The white flowers are in groups of three, on curved stalks that also arise from the nodes; leaves, stems and flower stalks are covered with hairs and tiny hooked prickles.



The seeds of three-horned bedstraw develop as pairs of nutlets that are covered with warty bumps.

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However, in Western Australia the majority of the spread appears to be by movement in grain or by agricultural machinery and particularly by harvesters.

Its seeds normally survive in the soil for three to five years but can survive longer in non-wetting soils.

Three-horned bedstraw prefers heavier alkaline soils, but may grow under less favorable conditions and on other soil types.

What you can do about it
We need to find and eradicate any plants of three-horned bedstraw that exist in Western Australia. Search suspect paddocks and carry out prescribed control measures.

Further information
For further information on three-horned bedstraw visit: agric.wa.gov.au/bedstraw/three-horned-bedstraw-declared-pest



Three-horned bedstraw seeds are about the same size as canola seeds, making it difficult to separate them from canola during seed cleaning.

Report three-horned bedstraw finds

- Your local Department of Primary Industries and Regional Development office.
- MyPostGuide reporter app or web tool agric.wa.gov.au/mypostguide - select 'Send report: MyWeedWatcher'
- Pest and Disease Information Service (PDIS) +61 (0)8 9398 3080 or pdis@dpird.wa.gov.au

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Department of Primary Industries and Regional Development
3 Baron-Hay Court, South Perth WA 6151
+61 1300 374 73 | enquiries@dpird.wa.gov.au | dpird.wa.gov.au
ISBN: 18 951 843 745

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