Horticulture Innovation Australia

Final Report

Communications Plan for the Australian Onion Industry extension

Lechelle Earl
Onions Australia

Project Number: VN12003

VN12003

This project has been funded by Horticulture Innovation Australia Limited using the onion industry levy and funds from the Australian Government.

ISBN 0 7341 3780 X

Published and distributed by:
Horticulture Innovation Australia Limited
Level 8, 1 Chifley Square
Sydney NSW 2000
Tel: (02) 8295 2300
Fax: (02) 8295 2399

Contents

Summary

Onions Australia has spent the last three years undertaking and now completing the Australian Onion Industry Communications Program VN12003, with extremely successful outcomes.

Communication between all aspects of the Australian onion industry has increased substantially, with a strong ongoing dialogue between levy payers and the Peak Industry Body, extending to HIA and Government.

During the program's contracted period three exceptional Onions Australia magazines have been produced, with the program's mid-term review finding that the magazine was a 4.4/5 in both meeting need/expectation rating and value of the source of information rating.

Similarly the Regional Levy Payer Meetings and Grower Walks rated 4.5 and 4.6, while the website (3.8 and 3.7) and "Layers" Newsletter (3.7 and 3.4) also were found to have met levy payers' needs.

The only shortcoming was the OnionSTAT component, which, despite being delivered by the program, did not reach the intended involvement.

That said, Onions Australia also undertook an extremely successful social media campaign spanning the same period of the program, despite not receiving funding through this program. The social media campaign has laid solid communication foundations with levy payers and Onions Australia hopes that this can continue into the new communications program VN15002. Onions Australia also undertook to produce a monthly electronic newsletter (again not funded through the communication program), which proved extremely popular with levy payers.

The objectives and activities comprised:

- Onion stock survey report (extension of OnionSTAT)

- Information package for use to assist growers/levy payers regarding the importance of the reporting and identifying pests and diseases quickly. (similar to Potato grading chart compiled by DPI Victoria)

- Magazine (1 annually)

- "Layers" Newsletters (January, April and August)

- Regional Levy Payers Minutes, Agendas and relevant information

- Web component consisting of a website that delivers the following:

- General information for the public regarding the quality of Australian onions, safe growing practices etc

- Password secure areas for levy payers.

- R, D & E area to ensure the delivery of project results to industry stakeholders

- Newsletter area for levy payers
- Industry stock data collection system OnionSTAT.
- Continued links to relevant industry information (Levy Payer meetings etc – Onion specific R&D events
- Grower information and historical content
- Strategic Agrichemical Review, Permit information (Minor use)
- Regional and Annual levy payers meetings
- Support component to provide the following:
- Ensure accuracy of information contained in the print and web components
- Production support for print and web components
- Media Talks/releases
- Grower walks
- co-ordination of communications, setting time lines and goals

Keywords

Onion; communication; HIA; Onions Australia; levy-payers; website; OnionSTAT; allium; Layers;

Introduction

The Australian onion industry developed a strategic plan for the industry in 2006, which highlighted the need for the Australian onion industry to continue maintaining and improve its comprehensive communication plan to facilitate improved outcomes for industry and industry investors (Strategic Objective #3.2). The industry's communication project was developed to ensure that industry stakeholders had the capacity to make effective production and marketing decisions whilst enabling the industry to have appropriate resources and strategies in place to function effectively (Strategic Objective #3.3).

Consultation with the Australian onion industry at all levels (growers, levy payers, packers, wholesalers and retailers) originally led to the initiation VN07008, which was followed by VN12003. Consequent discussions indicated that the communication plan should be maintained and extended again using Onions Australia as the vehicle to deliver the plan to industry. The communication extension plan (VN12003) was therefore presented as a project to encompass aspects of communication within the industry to ensure the delivery of objectives and continue to implement appropriate information systems. It was essential that the program be a "living plan" with the capacity to readily adopt new technologies/ideas as they occurred.

Background

The Australian onion industry requires access to quality industry data and information in formats that are readily available and easy to access. This information is required to provide industry stakeholders with market intelligence and technical information to ensure that informed and consequently effective business decisions are made.

Communications within the onion industry was historically haphazard and uncoordinated until the development of Project VN07008, and flowing into VN12003. Communications include magazine, newsletters (print) monthly E-newsletters, events and information updated on website, local and international industry news and regular quarterly general meetings throughout the country. This has proven to be sufficient to provide stakeholders with market intelligence and technical information necessary to make informed business decisions. With improvements in technology the industry has been able to provide up to date information in a timely manner. Discussions have been held at all levels of the value chain over the last few years and there is consensus that more can be done but improvements have been extensive since 2008.

During the review process of the industry strategic plan communications was once again highlighted as an extremely important for the Australian onion industry.

Methodology

While the Onion industry communications project provided an overarching structure, the project itself was broken down into numerous streams to ensure a continuous and wide-ranging delivery of information.

Given the ever-changing fields of communication, it was imperative to spread the message delivery across print, electronic correspondence, website delivery and face to face mediums.

1. Onions Australia Annual Magazine.

Frequency: This is produced and distributed to levy payers in October each year.

Target Audience: Levy payers/growers.

Format: This is a 44 pages hard copy magazine.

A hard copy is mailed to levy payers and a soft (electronic) copy is available on the Onions Australia Website.

Purpose: This magazine serves a number of purposes, such as:

• Being the main avenue of providing updates on the different R & D projects that have been funded with industry levies.

• Provide information on how the growers' funds are being spent and how they are helping develop the industry;

• Cover educational and general industry information;

• Provide an overview of what is happening with plantings;

• Highlight any advancement that is occurring with chemical treatments;

• Provide growers with information on that year's winner of the Reg Miller Award, which recognizes the outstanding contribution to the Australian Onion industry.

Production Responsibility:

The office of Onions Australia manages the production of this magazine. The process takes approximately 6 months from planning to distribution. Lechelle Earl, CEO of Onions Australia has a strong journalist background and takes full editorial responsibility of this magazine. Onions Australia uses a combination of in-house and external journalists to gather and write the articles that are being published.

Lechelle is in close communication with the researchers regarding their projects, who are willing contributors to provide project reports.

Onions Australia takes the scientific information in these reports and writes articles that are easy to read, to ensure best understanding of the information.

There are 250-300 copies of the magazine printed, with an estimated readership of in excess of 3000.

2. Layers – Newsletter

Frequency: the newsletter is produced and sent out in January, April and August.

Target audience: the primary target is levy payers.

Format: the newsletter is in an A4 format and contains 4 pages. A hard copy is produced and mailed to levy payers, while it is also available to download from the Onions Australia website.

Purpose: The newsletter has been written to focus on keeping levy payers up to date with the current industry issues and is written in a more conversational format to provide general industry information.

Production Responsibility: The production and editorial responsibility of Layers resides within Onions Australia, specifically with the CEO. Lechelle draws on constant communication with levy payers and the OA Executive Committee to identify topical issues to provide information on:

• Overseas market and R&D updates including statistics;

• Update from either the Onions Australia Chair or CEO;

• Chemical updates;

• Industry summary;

• Upcoming onion industry events.

There are 250-300 copies of the newsletter printed each edition, with an estimated readership in excess of 3000.

3. Website

Frequency: Information on the website is available at all times.

Target audience: The site is available to the public, while also housing a secure log-in area for levy payers, where they can source information like previous R&D information and industry newsletters, along with more than 30 years of residue testing data.

Format: the website provides information under a drop down menu comprising: About Onions, Growers and Levy Payers, About Onions Australia, Association Members, Biosecurity and Agrichemical, News and Events, OnionSTAT, Contact Page.

Purpose: The website is available 24/7 in an easy to read format, and features up to date information at the touch of a button. The website averages 1294 views per week, with approximately 40 levy payers logging in to the secure area every month.

Production Responsibility: Onions Australia oversees the content management of the website and updates the website every second day, with technical support from the website developer L-cubed.

4. OnionSTAT

Frequency: Two reports produced annually, released March/April and September/October.

Target Audience: the report is targeted for levy payers, and send only to those growers who contribute information which is used to generate an industry overview.

Format: Information is collected from those growers who participate and then collated, with a hard copy report sent to those growers.

Purpose: The reports are designed to provide growers with information about both the current level of production and supply, as well as forecasted plantings.

Production Responsibility: Growers/packers are contacted twice a year prior to data collation to provide their data on the monthly planting of their crops. Onions Australia staff have used different methods to source this information, included direct phone calls, emails and faxes.

5. Regional Levy Payer Meetings

Frequency: Two Regional Levy Payer Meetings are held annually, predominantly in major onion producing regions, or somewhere of particular interest to the onion industry.

Target Audience: Levy payers.

Format: The meetings feature speakers including researchers who update those attending on the latest progress of their onion industry research projects, chemical representatives, seed company workers and other industry related representatives. Overseas industry personnel have also spoken at the meetings to update those attending on international onion news.

Purpose: The meetings provide a way of disseminating latest industry information to levy payers who are then able to ask further questions and undertake discussions in an informal gathering. The meetings also feature state round ups of growing regions, including current seasonal information and harvest forecasts.

Production Responsibility: Onions Australia staff are responsible for organizing, promoting and running the meetings, including sourcing speakers and venues and handling inquiries.

On average around 50 people attend the meetings, with about two-thirds being growers/levy payers. In 2013 the meetings were held in Melbourne (Vic) and Mannum (SA), in 2014 Devonport (Tas) and Lockyer Valley (Qld), in 2015 Bordertown (SA) and Melbourne (Vic).

6. Grower walks/Field Days

Frequency: There are 2 days of grower walks held per year, in conjunction with Regional Levy Payer Meetings.

Target Audience: Levy payers

Format: the grower walks are designed as physical visits to farms and other onion industry related sites, such as packhouses, wholesale markets, vegetable processors, seed factories, machinery manufacturers and research trial sites.

Purpose: The grower walks are held to give levy payers the opportunity to see the trials being funded with levy funds and discuss the findings with researchers, as well as to follow the progress of their onions once they leave the farm gate. There is also the ability to inspect new industry-specific machinery and seed collection, as well as to discuss the outcomes of new farming techniques on-farm with other growers.

Production Responsibility: Onions Australia coordinates the grower walks, tying them in with the Regional Levy Payer Meetings.

Outputs

Regional Levy Payers Meetings/Grower Walks

The Regional Levy Payer Meetings and Grower Walks were extremely successful, with an average of 40 levy payers attending each session, with the numbers reaching 65 at one of the days.

Project researchers attended Levy Payer Meetings to update those attending about the progress of their work, which provided excellent communication between growers and researchers. Excellent feedback was received from both sides.

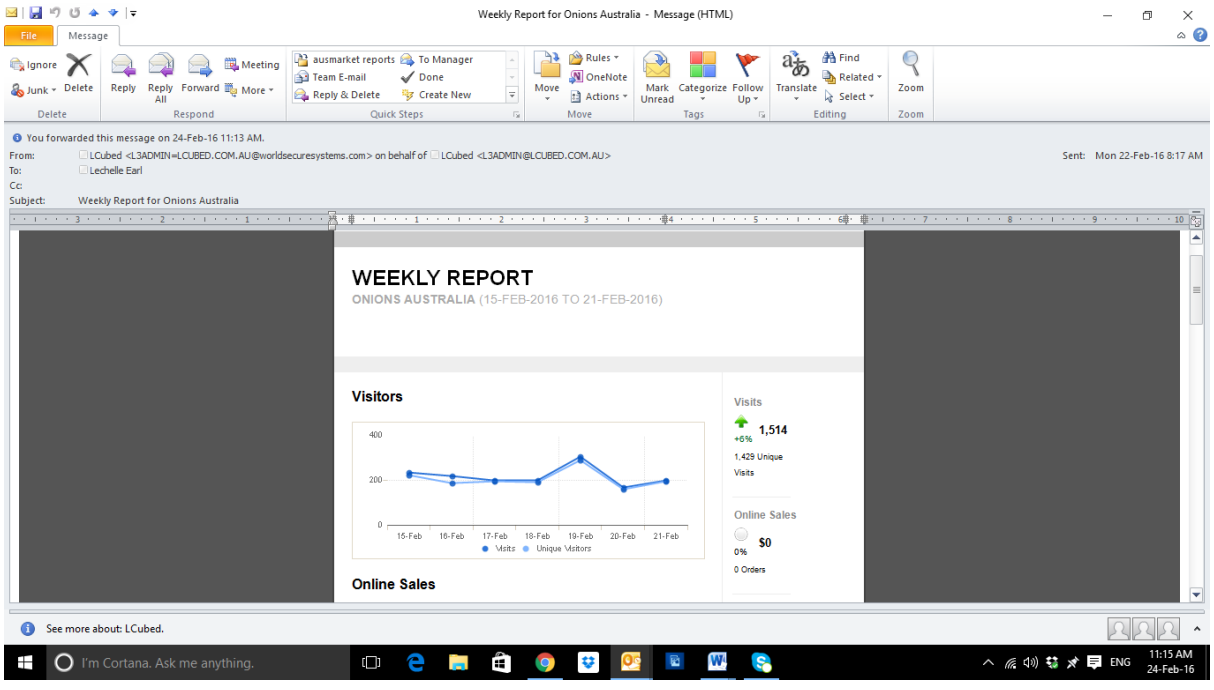
Levy payers also strongly supported the Grower Walks, which included a mix of produce market tours to meet those buying and selling their onions, on-farm harvesting and packhouse operations, seed company visits to see the latest development in seed varieties, as well as presentations from overseas growers informing of their growing methods, and scientists regarding soil sampling advances.

Onions Australia Annual Magazine

The Onions Australia Annual Magazine has been produced successfully, including the latest information in levy investment and R&D spending. In the 2015 edition of the magazine, 14 of the 44 pages comprised articles about the onion industry levy, while another 11 pages featured tailored onion industry articles. The magazine also included a comprehensive directory of industry contacts to enable ease of access for levy payers.

Onions Australia Website

The Onions Australia website has continued to grow to meet levy payers' needs as a 'one stop shop' for information about onions. Levy payers have recognised that the OA website is the 'only portal in Australia that contained onion related information'. The website received an average of 1294 visits per week. The website is in need of updating and an overhaul to bring it up to current technology standards.



"Layers" Newsletter

The "Layers" Newsletter was published three times per year (January, April and August) and was received well by levy payers. Feedback received was that the newsletter was a 'useful source of information'. The newsletter featured the latest on –farm news, as well as updates about Levy Payer Meetings as part of a regular stream of information.

OnionSTAT

Two reports were produced annually and sent to those growers who contributed information. The reports were labour intensive, given it took two Onions Australia staff quite some time to chase up the information from growers. OA did continue to pursue the information, however the opinion is that the format needs to be reworked.

Disease Poster

The disease poster – which evolved to become a series of fact sheets - was well received by growers. It is hoped that it will become an annual publication.

Outputs

Regional Levy Payers Meetings – 2 per year

Grower Walks - 4 per year (held in conjunction with RLPM)

Onions Australia Annual Magazine – 1 edition per year

Onions Australia Website – updated and maintained weekly

“Layers” Newsletter – editions per year

Disease Poster - published once

Outcomes

Magazine

The OA Magazine has continued to be the centrepiece of all communications between Onions Australia and levy payers. The willingness of the researchers to provide comprehensive information and photographs/diagrams to update levy payers as to the progress of their levy funded research was well received growers.

Three editions of the magazine were produced during the life of the communications project, encompassing not only latest research, but industry advancements, HAL/HIA updates, news about industry figures and other onion specific information. Feedback received during the midterm review of VN12003 showed that growers viewed the annual magazine as "a valuable source of information that provided updates on the industry and R&D projects". The review found "some growers have kept every copy for the last 20 years and refer to them whenever they're seeking information. Others have copies of articles available in their workplace and if other growers have not seen those articles, do not orcannot find their copy of the magazine, then they will provide details of Onions Australia, so that this information will be available for fellow growers/stakeholders."

Onions Australia believes the magazine has been exceptionally effective as a communication tool within the industry.

Newsletter

The "Layers" Newsletter proved popular as a more conversational publication for levy payers, published nine times during the life of the VN12003 project. The size of the newsletter enabled it to be emailed to Onions Australia's database of levy payers and other industry representatives, as well as for a hard copy to be posted.

The newsletter was the ideal vehicle to provide international statistics on a more regular basis, as well as to inform levy payers of the latest happenings within the Australian onion industry.

Given its frequency, Onions Australia was able to convey more up to date information as well as updates on any pressing issues within the industry.

The midterm review into VN12003 found that "most growers stated that their focus is on-farm so receiving information about what is occurring in other regions of Australia, or even overseas, was quite desirable. This, combined with the monthly enewsletter, provided a regular stream of information for them to consider."

Website

The OA website has provided a one stop shop form of information for levy payers. The news section is updated at a minimum of twice a week, while information about upcoming events is also updated regularly.

According to the midterm review, "the website was seen as having an important role in communication, as it was seen as the only portal in Australia that contained onion related information."

Growers Walks

The grower walks were held in conjunction with Regional Levy Payer Meetings, and were well supported by levypayers.

In 2013 levy payers visited the Melbourne Market Authority and met with onion wholesalers, as well as venturing out on-farm to inspect a crop trial on the outskirts of Melbourne (Vic) and attending a new seed breeding information day, while later in the year they inspected on farm activities at Delta Produce near Mannum in SA, before heading to the Rivapak packing facilities. In 2014 the trips included Field Fresh in Tasmania, and the Simplot frozen processing plant also in Tasmania, as well as visiting Qualipac Produce in Queensland's Lockyer Valley, a HIA research project trial site near Gatton, the University of Queensland's Gatton agricultural campus, and a hand harvesting onion crop. In 2015 field trips were undertaken to Rowett's Onions in Bordertown (SA), and a SARDI soil sampling workshop was held, while later in the year levy payers visited the new Epping Market in Melbourne before attending a trade show which showcased the latest innovations in the onion industry.

Each of the grower days also featured a networking session designed to allow delegates to meet with other industry representatives and swap information.

The midterm review found that the grower walks were seen as being "a valuable part of the communication program". Those interviewed for the review agreed that the combining of the walks with the Regional Levy Payer Meetings was successful, enabling those attending "to inspect and discuss R&D projects and for networking opportunities with other growers."

The review found that the meetings and the walks combined "provided the opportunity to hear what was happening in other onion production regions. These meetings are seen as being well conducted and the close-knit onion grower community will see growers attend them more often."

OnionSTAT

Two OnionSTAT reports were collected and collated during each of the three years of the project.

While the reports were collated as required under the project, growers were extremely reluctant to contribute, and there was a general feeling that even when they did supply numbers, they were not entirely reliable.

Again, the midterm review found that "OnionSTAT is not fulfilling the purpose it was designed to". "Most of those interviewed stated that, while they understood the importance of this type of information, they did not trust the reports due to the limited number of growers providing data and the accuracy of this data".

OA staff spent much time calling, emailing and talking face to face with growers in a bid to attract more growers to participate. OnionSTAT was also discussed at Regional Levy Payer Meetings, and OnionSTAT forms were handed out to attendees. However, despite written guarantees that all information would remain strictly confidential there was limited take-up.

Disease Poster

The disease poster evolved into a series of fact sheets, due to the volume of information available and the issues facing different growing regions.

The fact sheets were designed and published in the final half of the project, and were welcomed by growers.

The sheets focused on bacterial diseases, foliar fungal diseases, bulb growth stages of onions, soil-borne diseases, storage fungal diseases, storm damaged onions, virus diseases and onion insect pests.

Evaluation and Discussion

All components of the project – apart from OnionSTAT – were delivered with exceptional effectiveness, and to the satisfaction of levy payers, as evidenced in the midterm review paper.

Feedback forms were issued to those attending OA's annual conference and or Regional Levy Payer Meetings, asking attendees to evaluate the communication project.

On average OA received a 70pc return rate from those attending, with OA staff personally handing out the forms.

The forms ask attendees how they heard about the events, if it met their requirements for attending, the most beneficial aspects of the event, whether they would recommend it to other growers, suggestions regarding the content of the event, and what areas could be improved.

An overview of responses is:

- 65pc heard about events via email/e-newsletter, remainder were evenly split by being either referred to or reading about it in newsletter or website;
- 90pc attended the networking opportunities;
- 90pc said the conference met their expectations;
- The most beneficial reason (80pc) for attending was meeting fellow growers/networking;
- All would recommend the meetings;
- 98pc were either very or somewhat satisfied and the only neutral response was regarding the venue;
- Most would attend another conference;

Other topics they would like covered at events or in the publications:

- Learn more about trade/export (OA in response to this organized an Austrade representative to attend a meeting to talk about trade and export opportunities);
- Learn more about marketing (OA also organized a HIA representative to attend a meeting to discuss outcomes of the new marketing levy).

OA believes that the needs of levypayers were met as required under the project, and was pleased to receive such positive feedback from levypayers.

The only component which was disappointing was the takeup of OnionSTAT, which only improved marginally during the life of the project, despite the best efforts and time investment by OA staff.

The potential of OnionSTAT was recognized both by OA and levypayers, with those interviewed in the midterm review stating that "OnionSTAT was designed to help growers make better decisions about planting and, hence, marketing, but this is not happening, as the industry is not providing the data that is needed for this to be accomplished".

Recommendations

Maintain and further develop social media communications abilities;

Investigate podcasts as a method of disseminating information;

Explore alternative ways of gathering information for OnionSTAT;

Upgrade the OA website to meet new technology requirements and make it easier for inhouse management.

Scientific Refereed Publications

nil

Intellectual Property/Commercialisation

No commercial IP generated

Appendices

Onions Australia fact sheet

Onion Disease Fact Sheet

Bacterial Diseases

Bacterial Diseases

Xanthomonas Leaf Blight (*Xanthomonas axonopodis pv. allii*), Slippery Skin (*Burkholderia gladioli pv. alliicola*), Sour Skin (*B. cepacia*), Center Rot (*Pantoea ananatis*), Enterobacter Bulb Decay (*Enterobacter cloacae*), Soft Rots (*Dickeya chrysanthemi, Pectobacterium carotovorum subsp. carotovorum*)

COMMON HOSTS

Onion, Garlic

SYMPTOMS (ON ONION LEAVES AND BULBS)

Figure 1:
Xanthomonas leaf blight lesions appear as irregularly shaped, white flecks, pale spots, or lenticular lesions with water-soaked margins. Lesions enlarge, become tan to brown, cause extensive water-soaking, dieback and blighting of foliage, but not bulb infection.

Figure 2:
In the field, early stages of bacterial leaf infection will appear as watersoaking along the entire length of the leaf;

Figure 3:
Later stages appear bleached (white to tan) and desiccated. No fungal structures will be present.

Figure 4:
Soft rot may appear in the field or in storage as water-soaked tissue of leaves, neck and/or bulb; usually progressing from leaves to the neck to the bulb. The interior of the bulb may break down and a watery, foul-smelling liquid may ooze from the neck if the affected bulb is squeezed.

Figure 5:
Bacterial bulb infection can be observed while plants are in the field or in storage. Softening of the neck may be observed and bulb tissue may appear translucent or water-soaked.

Figure 6:
Enterobacter bulb decay appears firm and healthy until cut to expose interior scales which are brown, soft and rotten; progressing downward from the neck.

FACTORS FAVOURING

Most bacteria are favoured by:

- Harvest and storage temperatures above 30°C (86°F); some are favored by lower temperatures.
- Free moisture and high humidity (greater than 75%) during production and harvest.
- Planting of contaminated seed, transplants, sets
- Irrigation water; storm damage; excess nitrogen after bulb initiation; insects like thrips and maggots; and bruising during harvest.

Fig 1

Fig 2

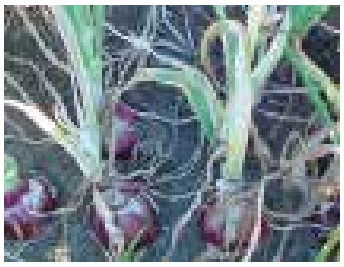


Fig 3

Fig 4

Fig 5

Fig 6

Onion Disease Fact Sheet

Foliar Fungal Diseases

Foliar Fungal Diseases

Purple Blotch (*Alternaria porri*)
Powdery Mildew (*Leveillula taurica*)
Downy Mildew (*Peronospora destructor*)
Botrytis Diseases (*Botrytis* species)

COMMON HOSTS

Onion, Garlic

SYMPTOMS (ON ONION)

Figure 1:
Purple blotch may appear on leaves or seed stalks as small, water-soaked lesions that develop white centers. The lesion margin is a shade of red or purple, surrounded by a yellow zone that may extend 1 inch [2.5 cm] or larger. Lesion centers may contain brown to dark gray spores of the fungus.

Figure 2:
Powdery mildew includes circular to oblong, white to grayish white patches of fungal growth with irregular margins; often after initiation of bulbing.

Figure 3 & 4:
Downy mildew commonly starts in spots in a field and spreads to surrounding areas. Initial symptoms appear as pale, elongate patches that turn light tan to brown on the foliage, affected leaf or seed stem tissues during moist periods.

Figure 5 & 6:
Botrytis (blast, leaf blight) may appear as a small white, sunken, elliptical lesion (less than 1/8 inch or 2 mm) with necrotic center. Multiple lesions may develop on the leaf, and cause a tip die-back and blighting of the leaf.

FACTORS FAVOURING

Most bacteria are favoured by:

- Harvest and storage temperatures above 30°C (86°F); some are favored by lower temperatures.
- Free moisture and high humidity (greater than 75%) during production and harvest.
- Planting of contaminated seed, transplants, sets
- Irrigation water; storm damage; excess nitrogen after bulb initiation; insects like thrips and maggots; and bruising during harvest.

Fig 1

Fig 2

Fig 3

Fig 4

Fig 5

Fig 6

Onion Disease Fact Sheet

Bulb Growth Stages of Onion

Bulb Growth Stages of Onion

Allium cepa L.

ALLIUM TYPE

Fresh Market and Storage Onion

Both pre- and post-bulb production are technically vegetative growth phases that occur during the first cycle of growth after planting (seeds, transplants, sets).

PRE-BULB GROWTH STAGES

1 Radical and flag leaf emergence (10–30 days post seeding) *Fig. 1*

2 One to two true leaves (30–50 days p.s.)

3 Three to four leaves (50–70 days p.s.) *Fig. 2*

4 Five to seven leaves (70–90 days p.s.) *Fig. 3*

5 Eight to 12 leaves, bulb initiation (90–110 days)

POST-BULB GROWTH STAGES

6 Bulb diameter of 2.5 to 4.0 cm (110–130 days p.s.)

7 Bulb diameter of 4.0 to 7.5 cm (130–150 days p.s.) *Fig. 5*

8 Bulb diameter greater than 7.5 cm (150–170 days p.s.)

9 Bulb enlargement complete, greater than 50% cropped to dry down (more than 170 days p.s.) *Fig. 6*

Reproductive Stages do not technically begin until the second cycle of growth after vernalization of the mature bulb; the bulb will then produce a scape or seed stalk (*Fig. 7*) and umbel (*Fig. 8*) which produces true seed after fertilization.

Fig 1

Fig 2

Fig 3

Fig 4

Fig 5

Fig 6

Fig 7

Fig 8

Onion Disease Fact Sheet

Soil-Borne Diseases

Soil-Borne Diseases

Fusarium Basal Rot (*Fusarium oxysporum f. sp. cepae*)
Pink Root (*Phoma terrestris*)
White Rot (*Sclerotium cepivorum*)

COMMON HOSTS

Onion, Garlic

SYMPTOMS (ON ONION)

Figure 1 & 2:
Fusarium basal rot appears as yellow and tan to brown leaves, usually beginning at the leaf tips and developing downward. Plants may wilt and then die; infected bulbs appear discolored (tan to brown) and roots and basal plates are rotted.

Figure 3 & 4:
Pink root appears as discolored roots (yellow to brown to red to purple); infected roots may disintegrate. Leaf number and bulb size may be reduced by severe infection.

Figure 5:
Blue mold first appears as pale yellow blemishes, watery soft spots, and occasionally purple-red stain on scales. A green to blue mold may develop on the surface of lesions, there may be a light tan or gray color on the fleshy scales, and bulbs may become tough (punky) with a musty odour.

Figure 6:
Fusarium basal rot starts in the field and can progress in storage from a dry basal plate rot to a dry rot of the fleshy scales.

FACTORS FAVOURING

Most bacteria are favoured by:

- Temperatures greater than 28°C (82°F) during late vegetative to mid bulbing stages favor infection by Fusarium basal rot and pink root; while white rot is favored by lower temperatures.
- Moisture stress (deficiency or excess) may predispose the crop to infection by Fusarium and pink root.
- These soil-borne diseases are favored by frequent cropping to Alliums (every 3–4 years), planting of contaminated transplants and sets of susceptible varieties, and injury to roots by cultivation and insect feeding.

Fig 1

Fig 2

Fig 3

Fig 4

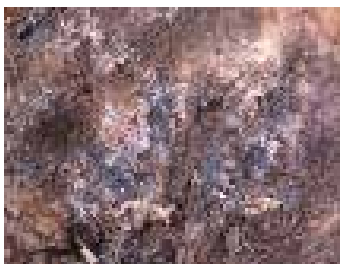


Fig 5

Fig 6

Onion Disease Fact Sheet

Storage Fungal Diseases

Storage Fungal Diseases

Black mold (*Aspergillus niger*)
Blue mold (*Penicillium species*)
Gray mold or neck rot (*Botrytis* species)
Fusarium rot (*Fusarium oxysporum* f. sp. *cepae*)

COMMON HOSTS

Onion, Garlic

SYMPTOMS (ON ONION)

Figure 1 & 2:
Black mold develops as black discoloration (usually at the neck), shallow lesions on outer scales, streaks of black mycelium and conidia beneath the outer dry scales, and black discoloration in bruised areas. Bulbs usually do not rot, unless secondary bacterial infection occurs.

Figure 3 & 4:
Gray mold (neck rot) develops as a semi-watery decay, usually in the neck, that progresses down through the bulb. Fleshy scales soften and become water-soaked and translucent, with white to gray mycelium between scales. Gray to black sclerotia and gray mold may form on outer and inner scales.

Figure 5 & 6:
White rot appears as yellowing and dying of older leaves, stunting of plants, and death of foliage. Infected roots will exhibit white, fluffly mycelium on the basal plate with presence of small, poppy-sized brown to black sclerotia in and on tissues.

FACTORS FAVOURING

Most bacteria are favoured by:

- Temperatures greater than 28°C (82°F) during late vegetative to mid bulbing stages favor infection by Fusarium basal rot and pink root; while white rot is favored by lower temperatures.
- Moisture stress (deficiency or excess) may predispose the crop to infection by Fusarium and pink root.
- These soil-borne diseases are favored by frequent cropping to Alliums (every 3–4 years), planting of contaminated transplants and sets of susceptible varieties, and injury to roots by cultivation and insect feeding.

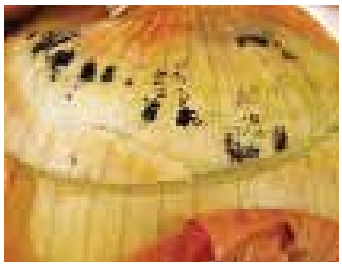


Fig 1

Fig 2

Fig 3

Fig 4

Fig 5

Fig 6

Storm Damaged Onions

Allium cepa L.

Fig 1

Fig 2

Fig 3

Fig 4

ALLIUM TYPE

Fresh Market and Storage Onion; protocols based on National Crop Insurance Standards; compare damaged and non-damaged portions of field or fields of the same variety, plant age.

_____ Record stage of plant growth (V1 to R9)

_____ Record dates of planting, storm event(s), evaluation

_____ ESTIMATE PLANT STAND LOSS (NUMBER/ACRE)

Figure 1:
Measure number of plants between furrows (bed width) by 10–20 ft [3–6 m] = 1/1000 Acre [Hectare] at 5 to 6 representative sites in the affected area or field.

_____ ESTIMATE DEFOLIATION (PERCENT LOSS)

Figure 2 & 3:
Estimate percent of foliage damaged (bruised) or removed by the storm activity (10–20 ft [3–6 m] x 1 bed wide at 5 to 6 sites).

_____ ESTIMATE BULB DAMAGE (PERCENT AFFECTED)

Figure 4:
Evaluate percent of 50–100 bulbs at 5 to 6 sites for evidence of storm damage (as cuts, nicks, dents, bruises) on exposed outer 2–3 fleshy scales.

Virus Diseases

IYSV (*Iris yellow spot virus*),
OYDV (*Onion yellow dwarf virus*),
Garlic Mosaic (OYDV, *Leek yellow stripe virus*)

COMMON HOSTS

Onion, Garlic

SYMPTOMS (ON ONION)

Figure 1 & 2:
IYSV symptoms include dry, straw-colored, diamond-shaped lesions on leaves and scapes. Lesions often develop on the margins of the youngest, fully developed leaves or the swollen part of the scape. Lesion centers may have a green or concentric rings of green and white tissue. Lesions may coalesce, cause tip blight and extensive death of foliage and lodging of scapes.

Figure 3:
OYDV appears as yellow streaks at the bases of leaves which may appear crinkled, flattened, and fall over. Scapes may show extensive yellowing, twisting and curling with small flower heads and poor quality seed.

Figure 4:
Garlic Mosaic appears as a mild to strong mosaic, chlorotic mottling, striping and streaking of leaves. Infected plants are stunted.

FACTORS FAVOURING

- High temperatures greater than 30°C (86°F) may stress plants and favor pests and IYSV vectors like thrips.
- Moisture stress (drought) also favors thrips which in turn may aggravate IYSV if present in the region.
- Viral diseases are affected by planting of contaminated transplants and sets; insect vectors like onion and tobacco thrips (IYSV) and aphids (OYDV, Garlic Mosaic); variable plant stands; and plant stress (fertility, moisture, temperature).

Fig 1

Fig 2

Fig 3

Fig 4

Onion Insect Pests

Thrips (*Thrips tabaci, Frankliniella* species)
Maggots (*Delia antiqua, D. platura*)
Leafminers (*Liriomyza* species)

COMMON HOSTS

Onion, Garlic

SYMPTOMS (ON ONION)

Figure 1 & 2:
Thrips (onion, western flower) feed primarily on leaves reducing bulb growth. Larvae are 0.5–1 mm (0.02–0.04 inch) long, yellow and elongate (cigar-shaped). Adults (2 mm or 0.8 inch) are winged and darker (gray to brown) in color. Onion thrips transmit Iris yellow spot virus (IYSV).

Figure 3 & 4:
Maggot larvae tunnel in roots, seedlings and young bulbs causing reduced stands and stunted plants. Larvae are cream colored and legless (8 mm or 0.3 in long). Adults are brownish gray flies (10 mm or 0.4 in) similar in appearance to a housefly.

Figure 5 & 6:
Leafminers are the larvae of small flies that make meandering tunnels under the surface of onion (and other crop) leaves. Flies are small (1.5–2 mm or less than 0.08 inch), and yellow and black. Larvae are pale-colored maggots found only within the leaf mines, and may have pale green or yellow coloration as they become full grown.

FACTORS FAVOURING

- High temperatures greater than 30°C (86°F) favor thrips, while lower temperatures favor maggots.
- Moisture stress (drought) also favors thrips; while excess moisture favors maggots.
- These insect pests are favored by frequent cropping to Alliums (every 3–4 years), early-season planting; and variable plant density (thrips).


Fig 1


Fig 2


Fig 3

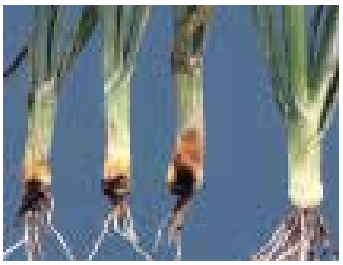


Fig 4


Fig 5


Fig 6