Among the notable events of the 2016–17 season were incidents of cotton mealybug (Phenacoccus solenopsis; CMB) infestations. Reports, many for the first time, stretched from central to southern Queensland and the Border Rivers area (see photos of CMB adults and juveniles).

CMB is labelled a highly invasive species for good reason. It first appeared in damaging numbers in the Emerald irrigation area and the Burdekin in 2009–10. Biosecurity Queensland now consider CMB widespread within the state.

CMB has also been confirmed in WA, NT and Victoria. In February 2017, a report from Gunnedah of mealybugs on okra (Abelmoschus esculentus, ladyfinger), a member of the cotton plant family (Malvaceae), was later identified by NSW DPI as being solenopsis. This establishes the presence of CMB in and among the cotton growing areas of NSW.

CMB must now be considered a feature of the natural cropping landscape across the Australian cotton industry. It should be treated in a way so as to minimise its potential for damage and destruction (see photos of damage/infestation).

Why now?

The increased incidence and rising pest status of CMB can be attributed to a number of factors:

- 2016–17 has definitely been a good season for insects. The mild, wet winter and wet spring allowed higher than usual numbers of wild host plants for various insects, including CMB, to flourish, thereby supporting overwintering populations. Heavy and relentless mirid pressure, masses of Rutherglen bugs (normally at low or very low numbers in cotton) and reports of mealybug infestations in numerous crops clearly demonstrate the link between overwintering refuges and the green bridge they provide for insect pests from one crop/season to the next.

- The warm to hot and largely dry conditions for most of the season provided the ideal conditions for enhanced CMB population growth and dispersal. Adult female CMB lay on average 350 eggs which hatch in less than two hours and the life cycle from crawler (1st instar) to adult is only around 14 days under warm-hot summer conditions. Glasshouse experiments conducted by DAF researchers in Toowoomba show that a gentle breeze at 2.8 km is sufficient to blow crawlers and even some older instars off the plant they are on. Wind, water and crawling from one plant to the next are the main dispersal mechanisms for this pest. How far CMB can be dispersed on wind currents is anyone’s guess but the distances are likely to be considerable. For this reason, a squeaky clean (weed free) paddock is no guarantee of immunity from CMB infestation – they could come in from next door on wind currents.

- Inadequate farm hygiene, particularly in areas where CMB is considered endemic, is a major factor in determining the probability of CMB infestation. Surveys have clearly shown a link between mealybug incidence and the presence of alternate hosts including ratoons, volunteer cotton and a number of weed species. Over 150 plant species serve as hosts for CMB, including cucurbits, ornamentals, malvaceous plants such as okra and hibiscus, tomato, eggplant, potato, pigweeds and various brassica weeds. Common weeds harbouring CMB in and around cotton crops include fleabane, amaranths, wild turnip, marshmallow, pigweeds, nightshades, ratoon and volunteer cotton. DAF researchers in Toowoomba have found that overwintering populations move into the root zone of these hosts.

- Insecticide applications targeting other insects (eg. mirids) that impact on beneficial insect communities within crops can significantly influence the dynamics of other, often non-target, pests such as CMB. Research from different parts of the world where CMB is a problem shows that beneficial insects are so highly effective in controlling this pest that chemical insecticides or other forms of intervention are rarely, if ever, necessary. Nevertheless, there are instances where intervention is sometimes necessary, as in the case where the need to control other pests (eg. mirids) within a crop impacts on beneficial insect communities which in turn removes the natural constraints on mealybug populations within that crop. This was certainly the case for some cotton crops in Queensland during 2016–17.
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Management options – what you can do

CMB is best managed within an IPM framework, the key elements of which are:
1. Farm hygiene and decontamination of farm machinery;
2. Conservation and use of naturally occurring beneficial insects; and,
3. Regular sampling for and early detection of CMB.

For the remainder of the 2016–17 season

- Pre- and post-harvest best practice. While the risk of a CMB infestation can never be completely eliminated, the experience from central Queensland shows that in paddocks infested with CMB, pre and post-harvest best practice will help to minimise the risk of re-infestation the following season. Root cut, mulch and incorporate crop residue where appropriate (if disease implications are not significant) after harvesting infested areas/paddocks.
- Minimise the risk of carry-over. CMB populations on crops that have been defoliated or are close to it will generally be cleaned up by beneficial insects; in some instances, where crop maturity coincides with declining temperatures and shortening day length, surviving mealybugs will often go to ground (moving to the root zone) from where they can emerge the following season in response to the presence of weeds and/or suitable crop hosts.
- Follow end-of-season crop management practice guidelines for infested crops. Put into practice the industry Come-Clean-Go-Clean protocols. Make sure machinery used in CMB infested field is thoroughly cleaned and de-contaminated before being used elsewhere. For further information and checklists, visit the CottonInfo website: www.cottoninfo.com.au

For the autumn/winter and upcoming season (2017–18)

- Practice good farm hygiene in the off-season and prior to the start of the next one; minimise on-farm sources of mealybug survival and carryover, eg. weeds, ratoon and seed cotton.
- Try to preserve your beneficials from the start of the season, through the use of pest thresholds, avoiding prophylactic sprays (eg. use of an insecticide with all glyphosate sprays), and selection of the softest option when spraying is required, taking particular note of impact on CMB beneficials.
- Upon first detection, mark infested plants/spots and thereafter monitor regularly for CMB and key beneficial insects (lacewings, Cryptolaemus, three-banded ladybird, Aenasius parasitoid) (see photos of beneficials) as they are highly effective at keeping CMB populations in check.
- Early detection will aid in more effective management. After initial detection, determine the type and extent of infestation. Remove plants if the infestation is limited to a small number of plants.
- Crop oils can be useful in managing low-moderate densities of some insect pests, including mealybugs, through repeated applications – check product label for target pests and rates.
- Chemical insecticides do not provide 100 per cent control so beneficials are still critical for season-long CMB management. As such, insecticides should be used for CMB control only in very specific circumstances, when:
  • Beneficials are absent, disrupted or at very low densities; and,
  • CMB infestation/damage is increasing.
- Industry research to identify and support new chemical
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registrations has recently been completed. Details about intervention with insecticides and other options for CMB management in-crop will be made available to the cotton industry once regulatory approval is secured.

Follow end-of-season crop management practice guidelines for infested crops. Put into practice the industry Come-Clean-Go-Clean protocols.

While the risk of a CMB infestation can never be completely eliminated, the experience from central Queensland shows that in paddocks infested with CMB, harvest and post-harvest best practice will help to minimise the risk of re-infestation the following season. Refer to the CottonInfo website for more information on end-of-season best practice with regard to CMB management.

CMB research update

A CRDC and DAF funded research project aimed at developing management options for CMB will end in June. The project outputs to date include chemical control options that are compatible with conservation and use of naturally occurring beneficial insects. Trials to date have shown very effective CMB control when soft options chemistry is used in conjunction with the actions of natural enemies in specific situations/scenarios. The project team is also working with chemical companies to ensure that the recommended chemical intervention guidelines and options will have regulatory approval prior to dissemination to industry.

Principals Research Scientist, Crop and Food Science, Queensland Department of Agriculture and Fisheries

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