



PRIME

PRE-SEMESTER BULLETIN

July 2018 to June 2019

REGION X – Northern Mindanao Region

AT A GLANCE

Table. Mean incidence of pest injuries, percentage of weed cover, and count of insect pests by month.

Region X

	2018						2019					
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
A. FOLIAR DISEASES												
Bacterial leaf blight	1.5	1.4	1.1	0.6	1.1	0.7	1.7	2.3	1.8	2.5	2.7	1.8
Bacterial leaf streak	1.6	2.1	1.6	1.5	1.0	1.3	2.3	1.4	2.5	0.9	0.3	0.0
Brown spot	5.9	5.8	3.7	4.8	10.7	6.2	4.3	4.7	4.8	2.9	4.5	7.2
Leaf blast	1.9	1.0	1.0	0.2	0.3	0.4	0.5	0.6	0.2	0.2	0.2	0.3
Red stripe	1.1	0.3	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0	0
B. DISEASE OR PEST INJURY ON TILLERS												
Deadheart	0.6	1.1	1.6	1.1	1.2	1.8	0.5	1.9	1.0	1.6	0.7	2.2
Sheath Blight	0.6	0.2	0.2	0.6	1.0	0	0.1	0.0	0.2	0.1	0	0
C. DISEASE OR PEST INJURY ON PANICLES												
Neck Blast	3.7	0.1	0.1	0.1	0	0	0.3	0.8	1.5	0	0	0
Whitehead	3.1	0.9	1.6	4.1	11.9	4.3	7.9	10.1	2.6	4.8	6.5	3.6
D. SYSTEMIC DISEASE OR PEST INJURY												
Bugburn	0.0	0	0	0	0	0	0.2	0	0	0.4	0	0
Hopperburn	0	0	0	0	0	0	0	0	0	0	0	0
Tungro	0.2	0	0	0	1.6	0.4	0	0	0	0	0	0
E. INSECT COUNT												
Brown Plant Hopper	0.0	0.0	0.0	0.0	0.0	0	0.0	0	0.0	0	0	0
Green Leaf Hopper	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Rice Black Bug	0.2	0.2	0.1	0.1	0.1	0.0	0.1	0.2	0.1	0.2	0.2	0.2
Rice Bug	0.7	0.2	0.2	0.4	1.0	0.3	0.3	0.2	0.3	0.4	0.3	0.2
Rice Grain Bug	0.0	0.0	0.0	0.0	0	0	0	0	0	0.0	0	0
F. RODENT INJURY												
	0.0	0	0	0	0	0.0	0.1	0	0	0	0	0
G. WEED COVER												
	0.7	1.3	1.4	3.1	5.2	3.0	2.4	1.8	1.7	4.2	6.4	3.8

LEGEND 1-5% 5%

Disclaimer: All the data presented in this report are based on the monthly monitoring of farmers' fields by regional data collectors of PRIME.

Monitored fields and data collectors

Municipalities surveyed:	Bukidnon: Malaybalay City, Maramag, and Valencia City
Monitoring date:	July 2018 - June 2019
Number of monitored fields:	105
Data collectors:	Christine Cayetano, Drexell June Taga, Henson Torres, Jaymar Libardos, May Cristine Arcojada, Rushcel Gamil

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Growth stages

In the second semester of 2018, transplanting in most of the monitored fields was in July to August and the peak of harvest was in October (Figure 1). Approximately 50% of the fields were fallow in November to December. In the first semester of 2019, transplanting of most fields occurred in January to February 2019 and peak of harvesting was in April. A large proportion of the fields were fallow in May to June 2019.

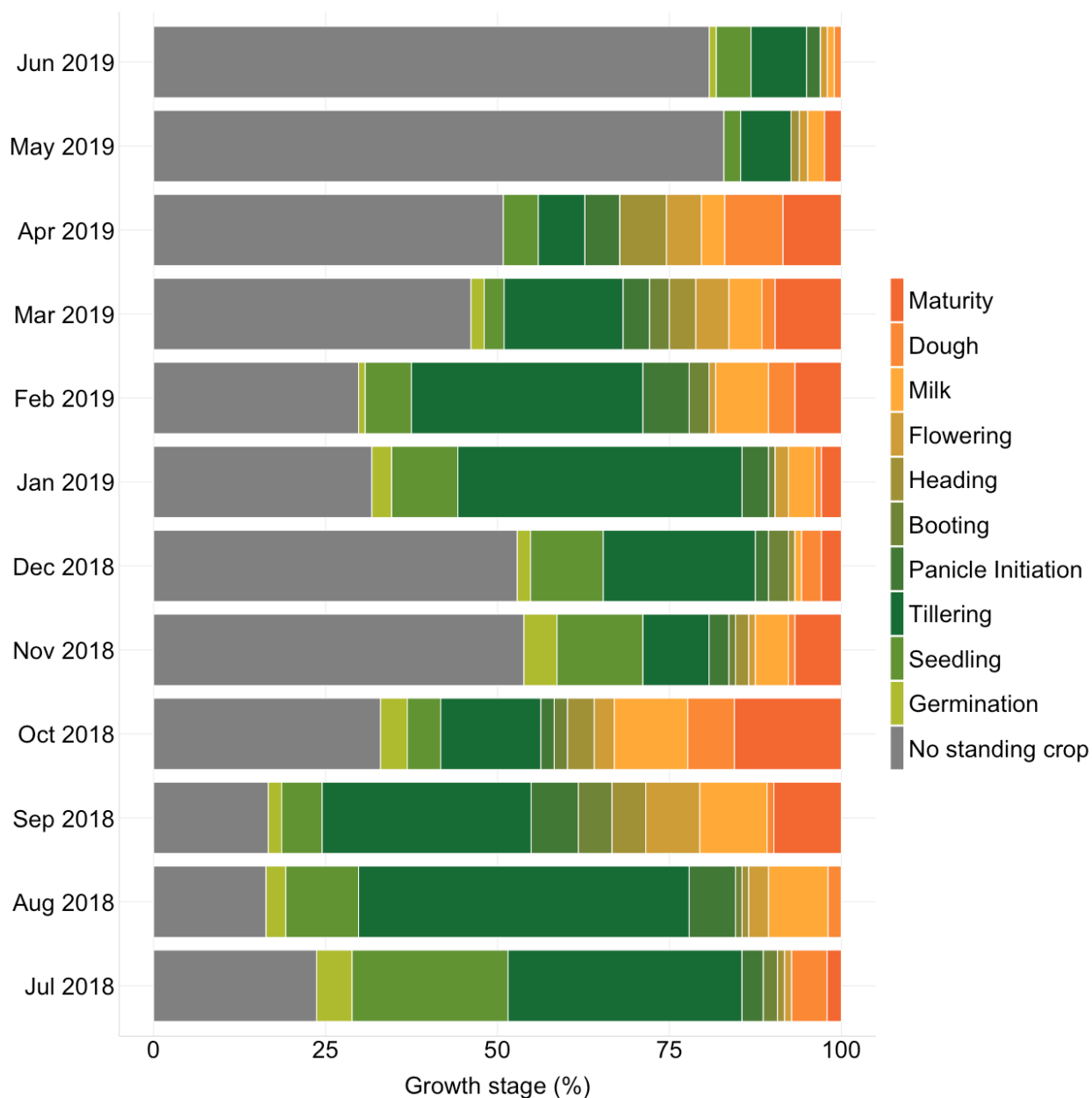


Figure 1. Proportion of crop growth stage of fields by month.

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Incidence of pest injuries, percentage of weed cover, and insect count

Box plots, also known box-and-whisker plots, are presented to facilitate the visualization of the distribution or range of collected data (Figures 2 to 8). The black closed circle in or near each bar represents the mean of each pest injury. The black vertical line in each bar represents the median which refers to the midpoint of the range of data. Since it is not affected by extreme values or outliers like the mean, the median represents the most common value of a variable.

A. Foliar diseases

Brown spot was the most important disease during the year. The mean incidence ranged from 5% to 11% and the median ranged from 3% to 7% in nine months. The highest mean incidence of bacterial blight and bacterial leaf streak was 3%, but the median was lower than 1% in majority of the fields. The incidence of leaf blast and red stripe was negligible.

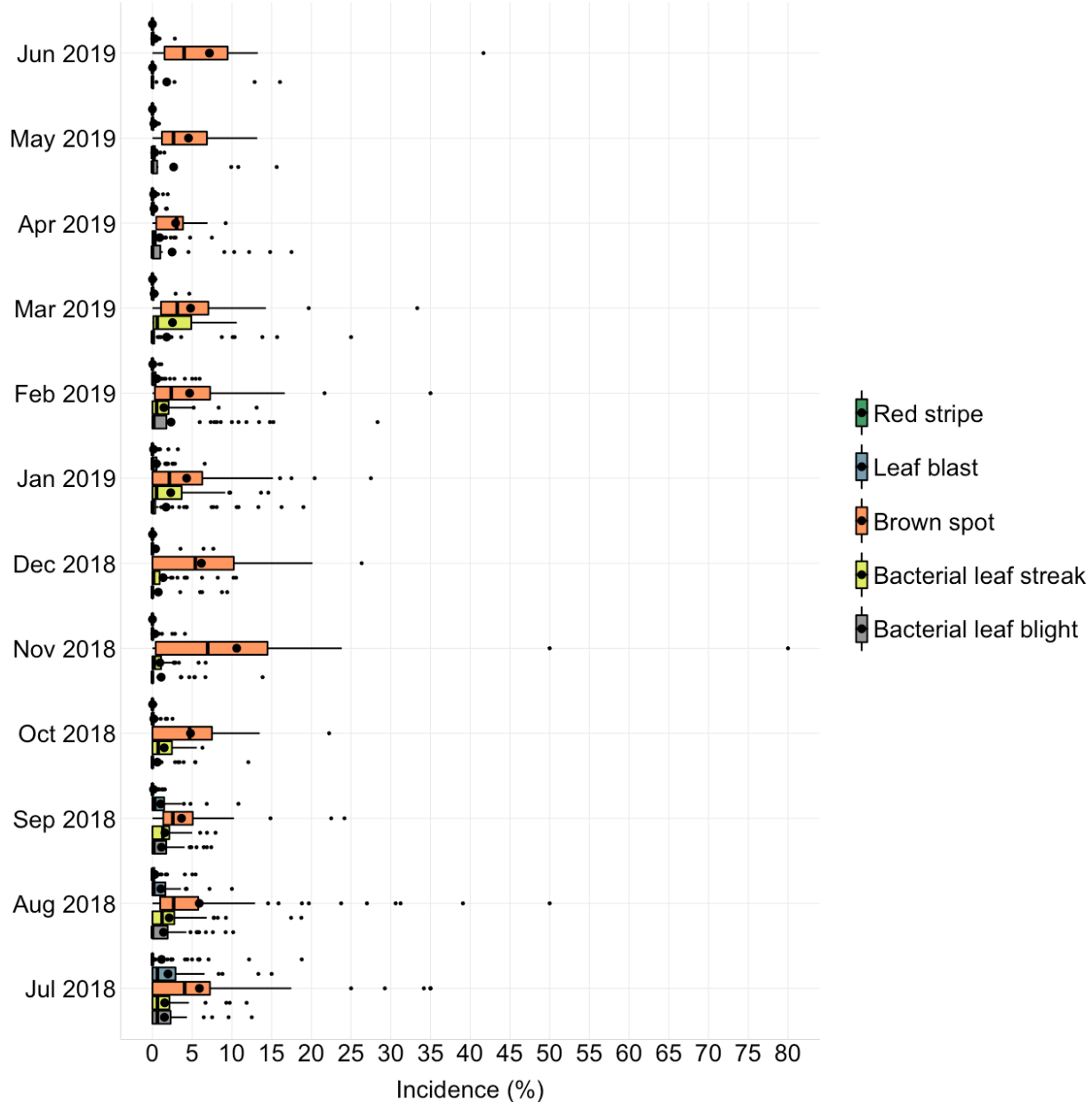


Figure 2. Incidence of foliar diseases Region X, July 2018 to June 2019.

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B. Insect pest injuries and diseases on tillers

The highest mean incidence of deadheart was 2% but it was not observed in most of the fields (Figure 3). The incidence of sheath blight was negligible during the year.

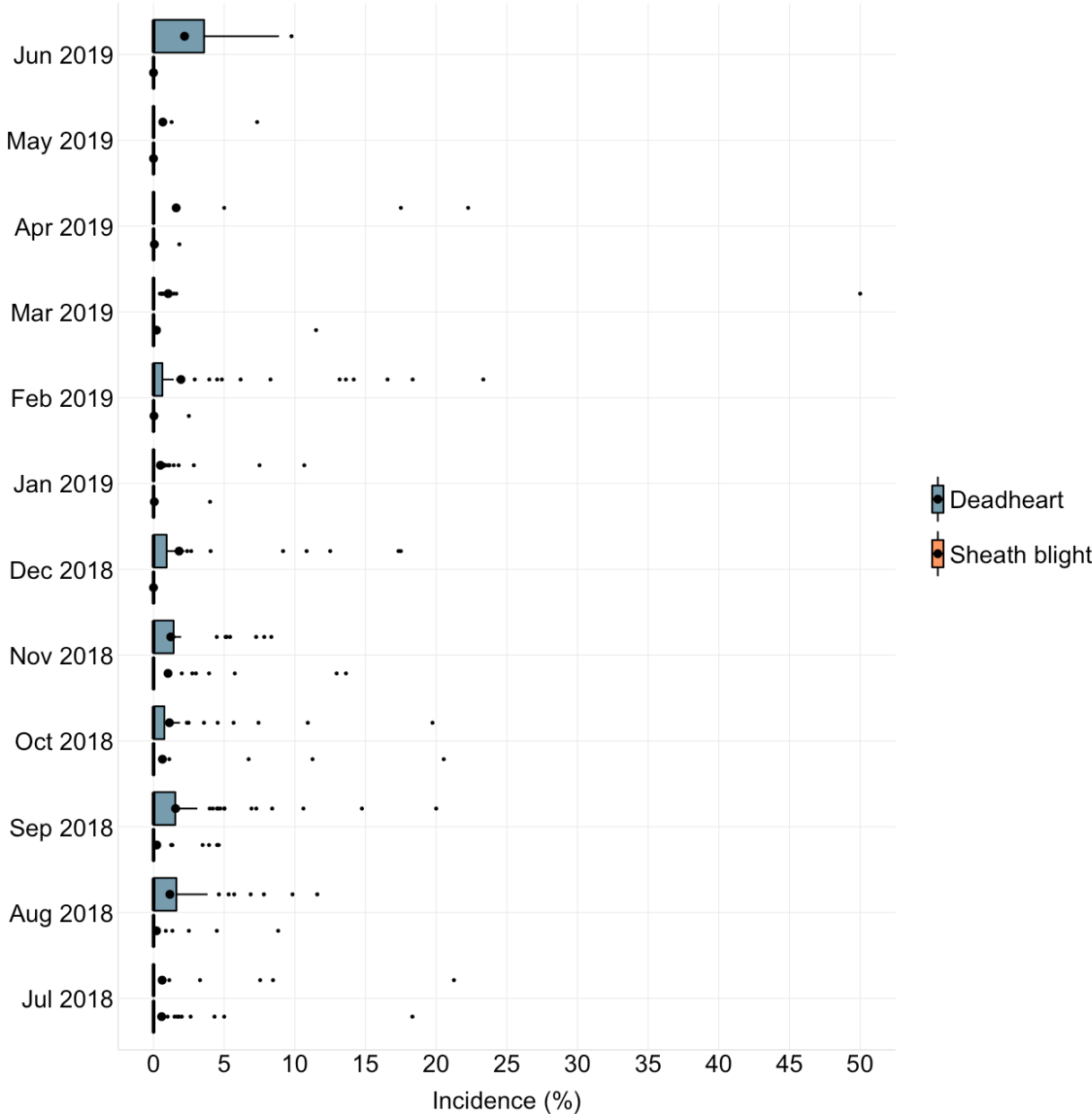


Figure 3. Incidence of deadheart and sheath blight in Region X, July 2018 to June 2019.

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C. Insect pest injuries and diseases on panicles

Whitehead was the most important insect pest injury during the year (Figure 4). The mean and median incidence of whitehead ranged from 5% to 12% in six months. The highest mean and median incidence of whitehead was observed in November 2018 at 12% and 11%, respectively. In November 2018, January 2019 and February 2019, whitehead incidence was high on mature standing crop of fields that were planted late. The incidence of neck blast was negligible.

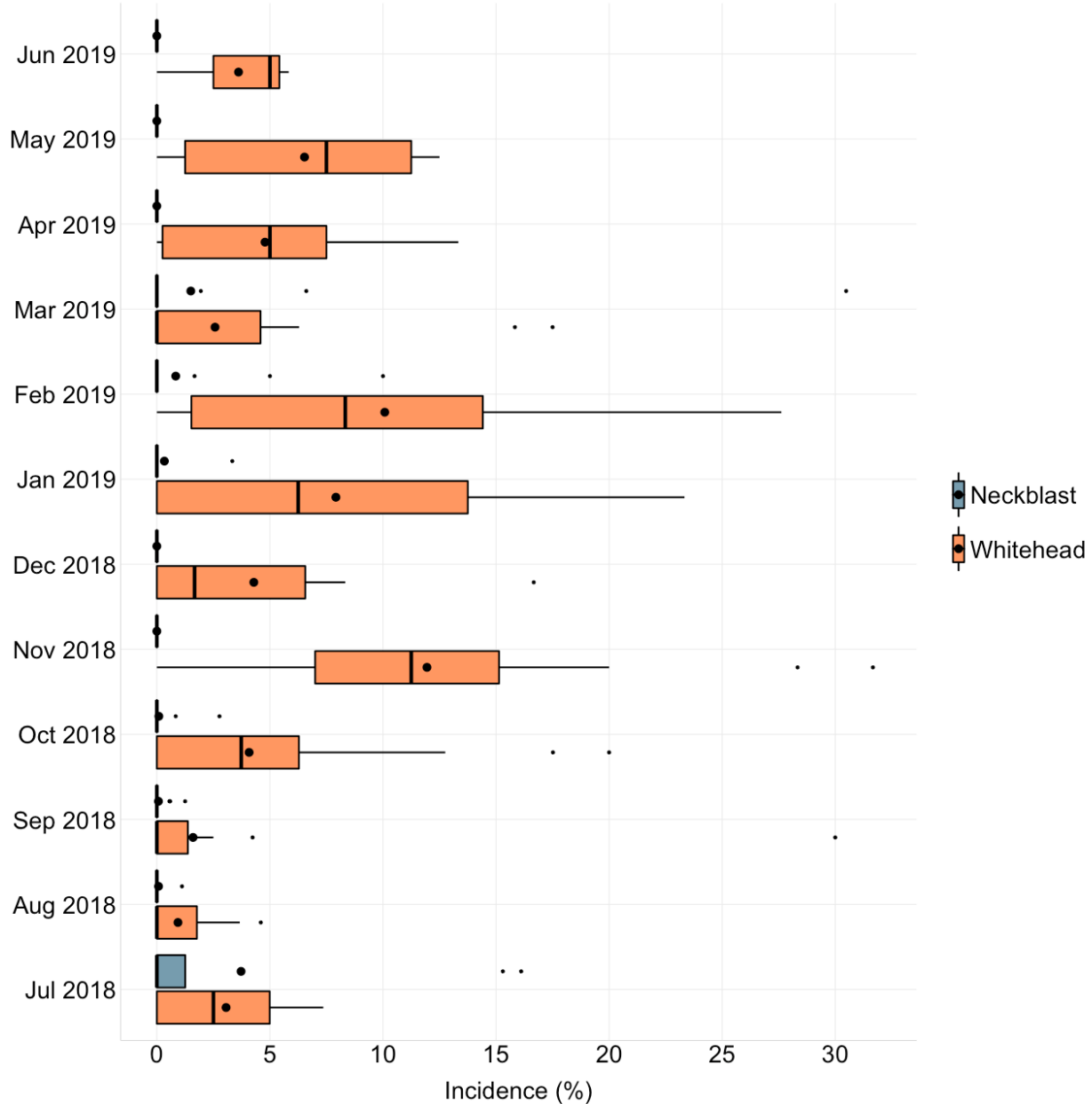


Figure 4. Incidence of neck blast and whitehead in Region X, July 2018 to June 2019.

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D. Systemic insect pest injuries and diseases

The incidence of bugburn, hopperburn and tungro was negligible during the year (Figure 5).

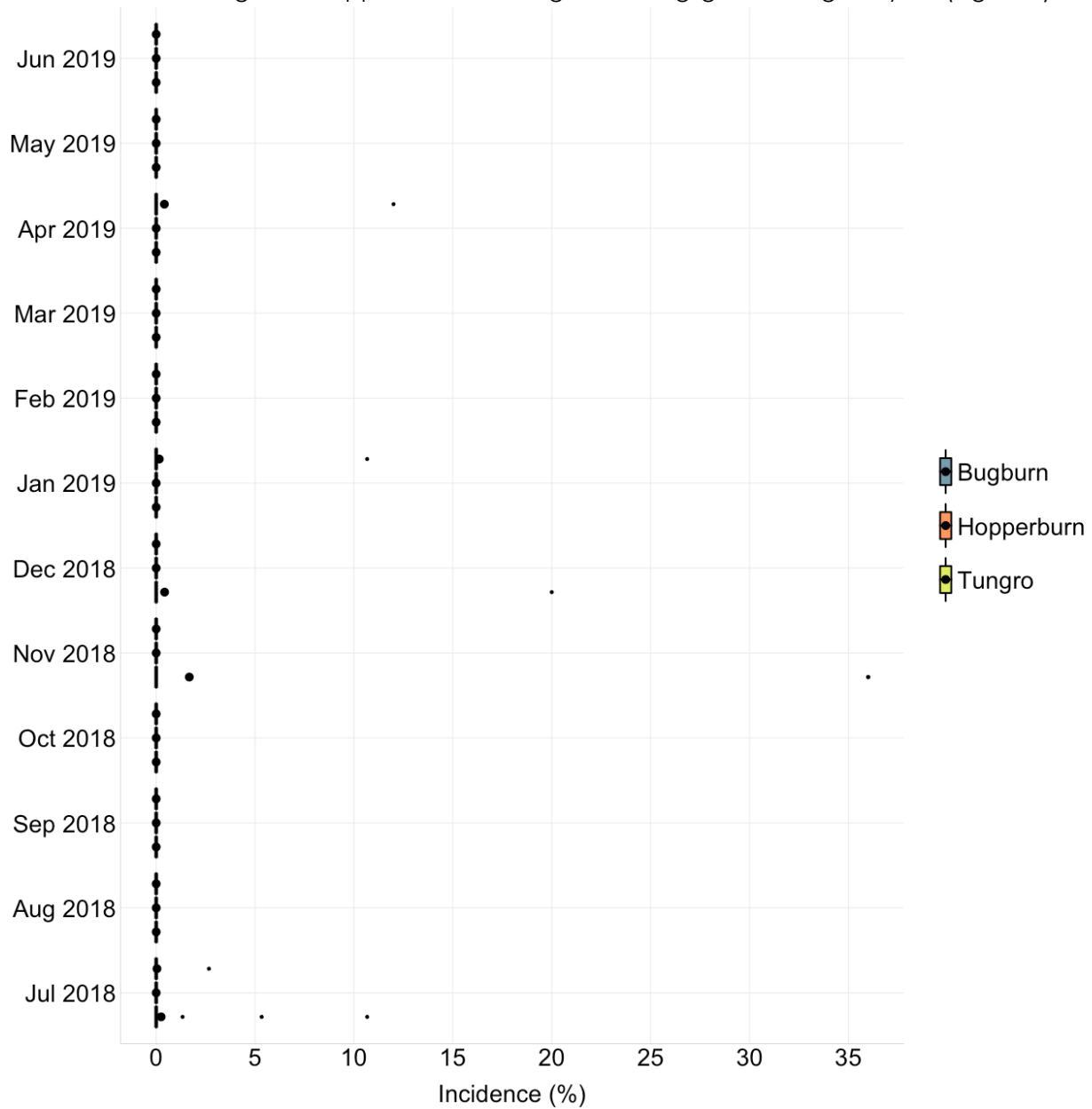


Figure 5. Incidence of bugburn, hopperburn and tungro in Region X, July 2018 to June 2019.

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E. Insect count

The observed number of insect pests during the year was generally negligible (Figure 6). The mean count of rice bug was 1 per square meter. The median count of all insect pests was 0 in all months.

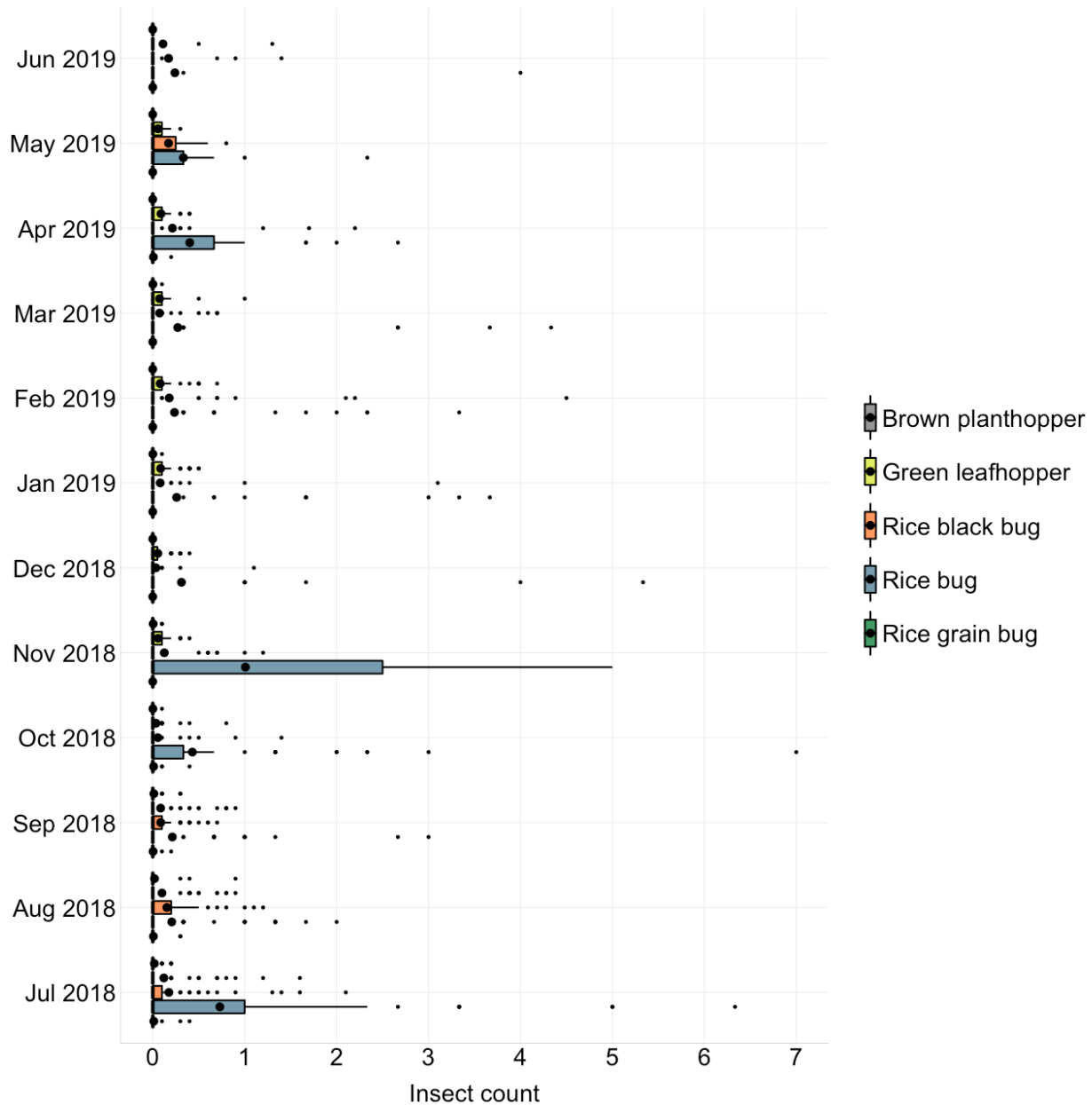


Figure 6. Count of insect pests in Region X, July 2018 to June 2019.

F. Rat injury

The incidence of rat injury was negligible during the year (Figure 7).

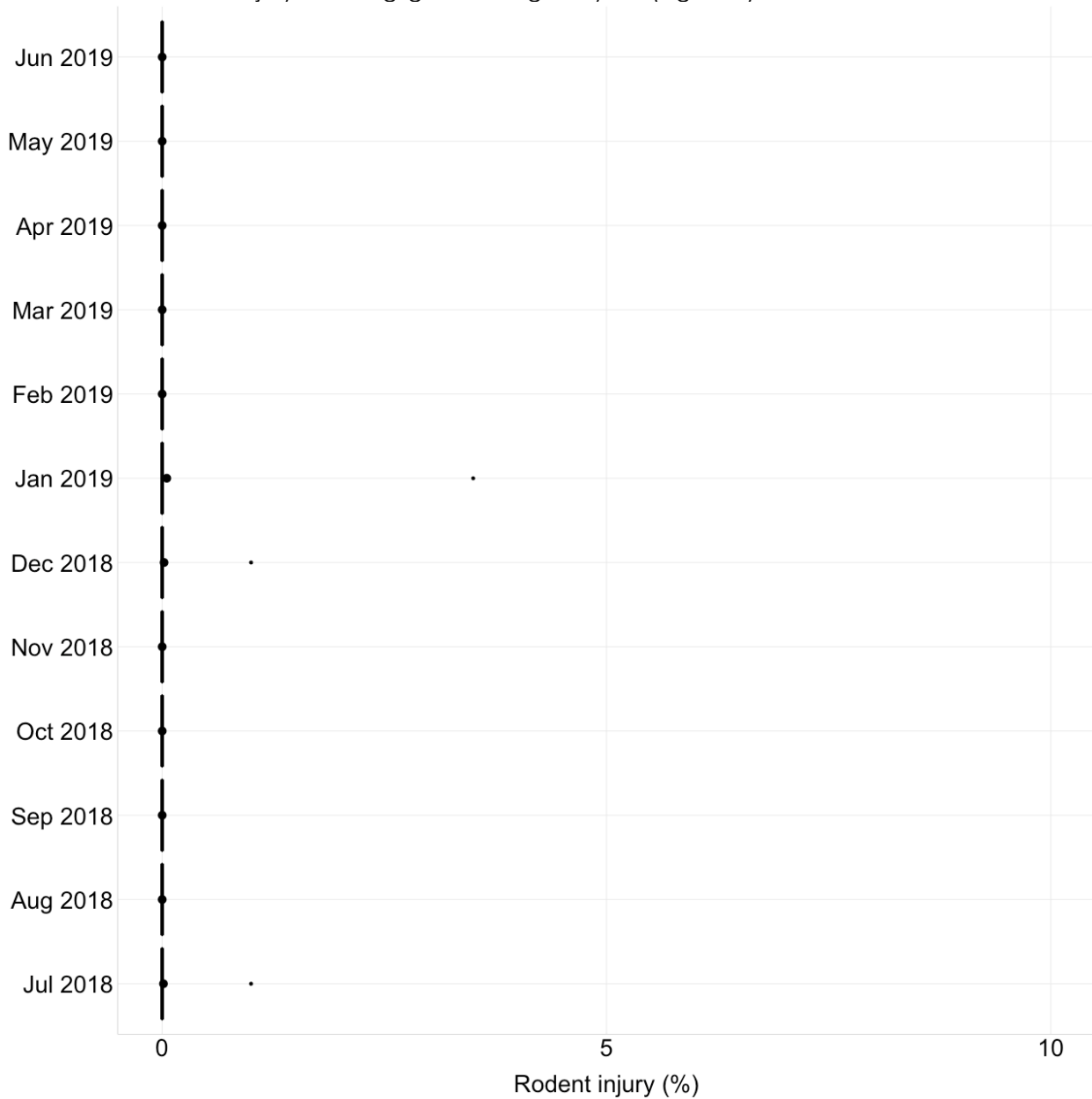


Figure 7. Boxplot of percent (%) rat injury incidence in Region I, July 2018 to June 2019

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G. Weed cover

The mean percentage of weed cover was 5% in November 2018 and 6% in May 2019. Although weed infestation in some fields was higher than 10%, the median was 0 which indicates that weeds were not observed in most of the monitored fields.

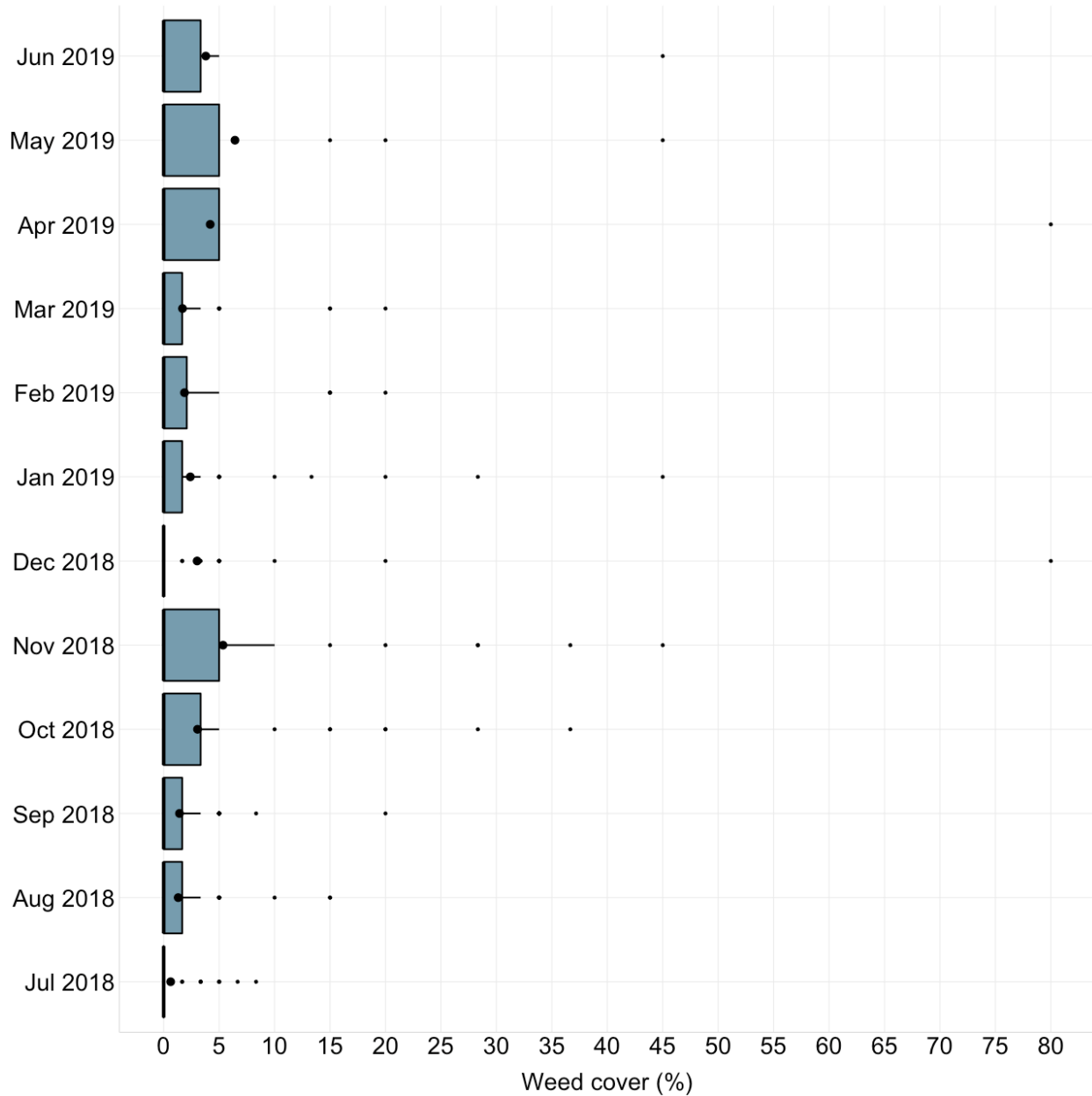


Figure 8. Percentage of weed cover in Region X, July 2018 to June 2019.

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Management of major pests

This section describes the management of the most important pests during the reporting period. A pest is operationally considered important if the mean incidence of injury (for insect pests and diseases) or percentage of cover (for weeds) in at least one month was at least 5%, or in the case of insect pests, the count was at least 5 per square meter.

Brown spot

1. The most practical and economical approach to manage brown spot is to grow a resistant variety.
2. When feasible, improve soil fertility by regularly monitoring nutrients in the soil, and the application of required fertilizers.
3. If possible, determine the occurrence of Akiochi, a nutritional disorder, in the field. Brown spot develops on plants affected by Akiochi and has, in fact, been used as its indicator. It is caused by excessive concentration of hydrogen sulfide in the soil and results in reduced nutrient uptake. Akiochi occurs in irrigated fields that are poorly drained and have excessive organic matter. Low decomposition of stubbles, which usually occurs in areas with short fallow period, results in high organic matter.
4. Use certified seeds or clean seeds. Brown spot is a seedborne disease which means that growing an infected seed will result in diseased plants during the cropping season. Seeds can be cleaned manually using flotation method which consists of the following steps:
 - a. Dissolve 1.5 kg salt in 40 liters of water.
 - b. Soak seeds in the salt solution.
 - c. Stir to float diseased, unfilled and broken seeds.
 - d. Remove floating seeds by hand or with a sieve.
 - e. Wash seeds 3 to 4 times with clean water.
 - f. Dry in the shade thoroughly before sowing.
5. The pathogen in the seeds can be eliminated by hot water seed treatment. This treatment is not recommended if seeds had been chemically treated or primed (pre-soaked to promote germination). It consists of the following steps:
 - a. Soak seeds for 1 to 3 hours in tap water.
 - b. Preheat water bath. To ensure uniform temperature in the container, the amount of water should allow seeds to move freely and constantly stir the mixture. Maintain temperature by adding room temperature water.
 - c. Prepare packets made of cheese cloth or nets and fill half of each packet with seeds.
 - d. Transfer and soak seeds in hot water bath (52 to 57°C) for 15 mins. Put weights to keep the seeds submerged. Constantly check the temperature.
 - e. Immediately remove and cool the seeds by washing with room temperature water.
 - f. Spread and dry the seeds in the shade completely before sowing.

A disadvantage of the hot water seed treatment is that it requires careful handling. However, it is more effective than fungicide treatment because fungicides may not penetrate the seed coat.

6. Use optimum seeding rate (e.g., 80 kg per hectare) for direct-seeded rice and optimum plant spacing (e.g., 20 cm x 20 cm) for transplanted rice. A dense plant canopy reduces sunlight penetration, increases leaf wetness duration and lowers temperature in the plant canopy, creating a favorable microclimate for disease development.

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7. Apply potassium and other required nutrients in addition to nitrogen. Potassium reduces the amount of most rice diseases.
8. Apply calcium silicate fertilizer or silicon fertilizer before crop establishment if the soil is deficient in silicon.
9. Apply fungicides, such as azoxystrobin, ready mixture of azoxystrobin and difenoconazole, and propiconazole, as foliar spray. Seeds may also be treated with fungicides, such as carbendazin and benomyl. Use fungicides as a last resort in controlling the disease. Pathogens become resistant to chemical pesticides if these are not used properly. Avoid repetitive use of a single active ingredient and mix or alternate an active ingredient with an appropriate partner. Integrate the use of chemical pesticides with cultural practices or non-chemical methods. Wherever feasible, several strategies should be used together.
10. If possible, irrigate the field continuously until one week before harvest. Do not drain the field for long periods because drought stress favors brown spot.
11. Remove alternate hosts in the field, such as *Echinochloa* spp. and weedy rice.
12. If harvested plants had severe disease, immediately plow or rotavate the field after harvest to incorporate infected stubbles and crop residues in the soil.
13. Dry grains immediately after harvest to moisture content of at least 14% .
14. Store grains in sealed containers with moisture content of at least 14%.

Whitehead caused by stemborer

1. Monitor the peak of yellow stem borer population in the area. This can be done using light traps. Do not transplant or sow seeds when insect population is high.
2. Consider the use of pheromones to control stemborers.
3. The most practical and economical approach to manage whitehead is to grow a resistant variety. Rotate varieties with different levels of resistance because a resistant variety may later become susceptible if grown continuously across several cropping seasons.
4. Practice planting synchrony with defined fallow period in your area. Asynchronous planting results in overlapping generations of stemborer throughout the year. If this is not possible, a farmer who intends to grow a susceptible variety should not establish his crop later than most farmers' fields.
5. Raise level of irrigation water periodically to submerge the eggs on the lower parts of the plant.
6. Remove egg masses manually in the nursery and field.
7. Manage the application of nutrient fertilizers. Apply the required amount of nitrogen in splits instead of applying all the required amount at the start of the cropping season. Nitrogen makes the plant tissues softer and facilitates penetration of stemborer larvae.
8. Remove alternate hosts during the cropping season and fallow period.
9. If high infestation occurred, cut stubbles close to the ground and dry or remove stubbles from the field. A less laborious option is to plow the field during fallow to bury stubbles.
10. Do not apply insecticides during the early vegetative stage. Systemic insecticides may be applied after the vegetative stage. Systemic insecticides were found to be more effective than contact insecticides because the larvae and pupae stay inside the stem. Insecticides should be used with extreme caution. Monitor the population of stemborers and intensity of deadheart or whitehead prior to the application of insecticides because its efficacy is low when generations of stemborer overlap and when damage is already severe. Apply the insecticide according to the instructions in the product label including the pre-harvest interval (wait time between a pesticide application and when a crop can be harvested).

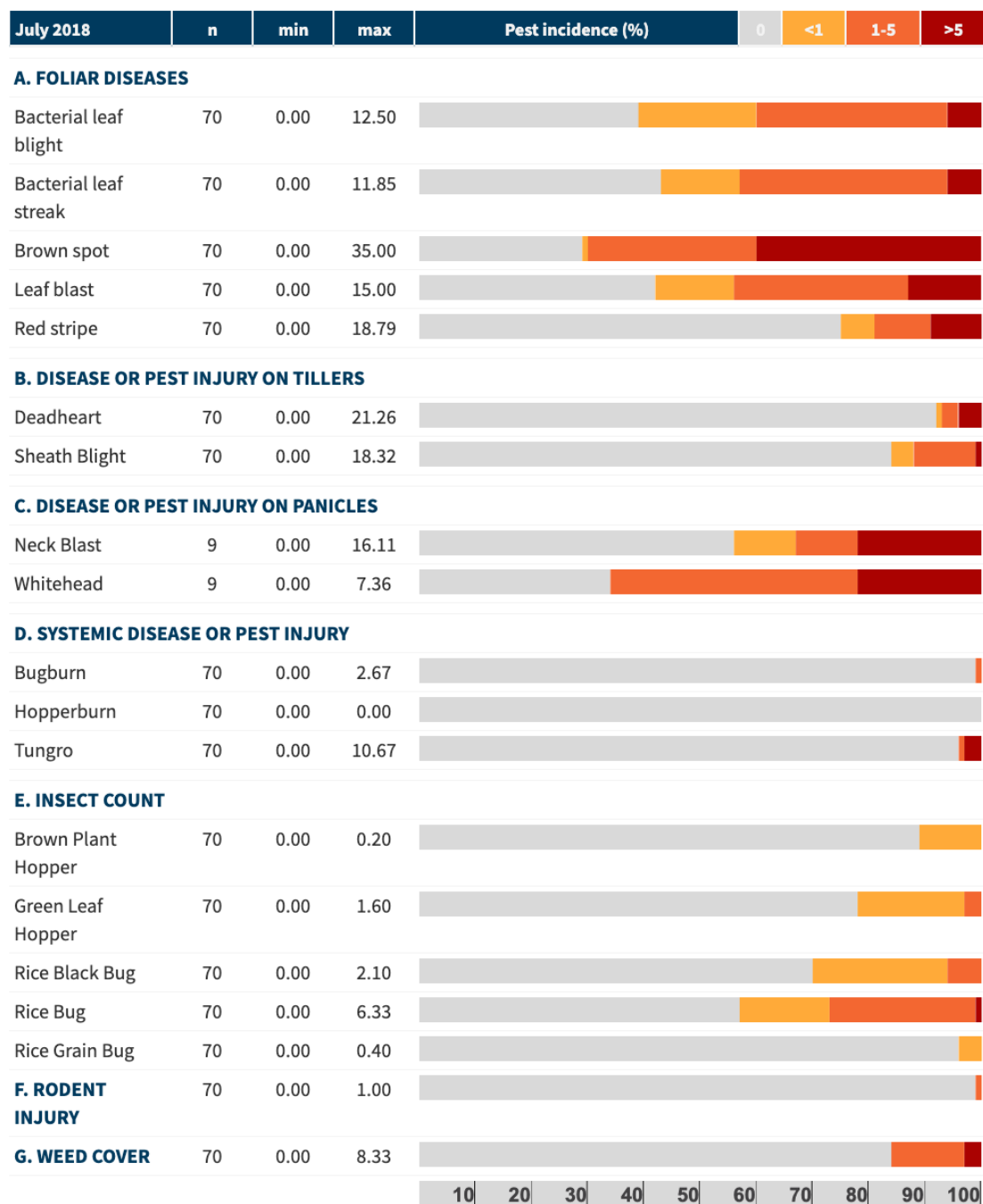
Disclaimer: All the data presented in this report are based on the monthly monitoring of farmers' fields by regional data collectors of PRIME.

Insecticides should be used as the last resort and should be integrated with other methods to conserve natural enemies.

Weeds

1. Plow and harrow the field several times before crop establishment. If feasible, start land preparation 3–4 weeks before planting.
2. If weedy rice is a problem, apply glyphosate before land preparation or seeding. The application of pretilachlor with fenclorim during final land preparation or levelling has also been reported to reduce weedy rice.
3. Practice stale seedbed technique. According to the IRRI Knowledge Bank (<http://www.knowledgebank.irri.org/step-by-step-production/growth/weed-management/stale-seedbed-technique>), this technique is done as follows:
 - a. Perform tillage operations. Plow, harrow, and level the field.
 - b. Stimulate weed emergence by light irrigation.
 - c. Irrigate the field at least two weeks before sowing.
 - d. Maintain enough soil moisture to allow weeds to germinate.
 - e. Kill the emerged seedlings using non-selective herbicides (e.g., glyphosate) or light cultivation.
 - f. If the soil condition is suitable for sowing, broadcast seeds without further tillage operations. Tillage could bring more weed seeds near the soil surface, thus promoting weed germination.
4. Level the field to ensure a constant water level that controls weeds. Avoid high spots where weeds can grow.
5. Apply pre-emergence herbicide (e.g., pretilachlor + fenclorim 2–3 days after sowing). Follow recommended amount and timing of product and water condition in the field as indicated in the label. Do not use the same herbicide over long periods to prevent herbicide resistance.
6. If grass weeds are the main weed problem, apply early post-emergence herbicide.
7. Maintain a 2-5 cm water level in the field to minimize weed emergence. If water is sufficient, flood the fields until closure of the plant canopy.
8. Apply nitrogen fertilizer just after weeding to minimize rice-weed competition for nitrogen.
9. If feasible, consider the use of biological control agents to suppress growth or reduce population of weeds.
10. If feasible, plow the field during fallow to kill weeds and prevent the build-up of weed seeds in the soil.

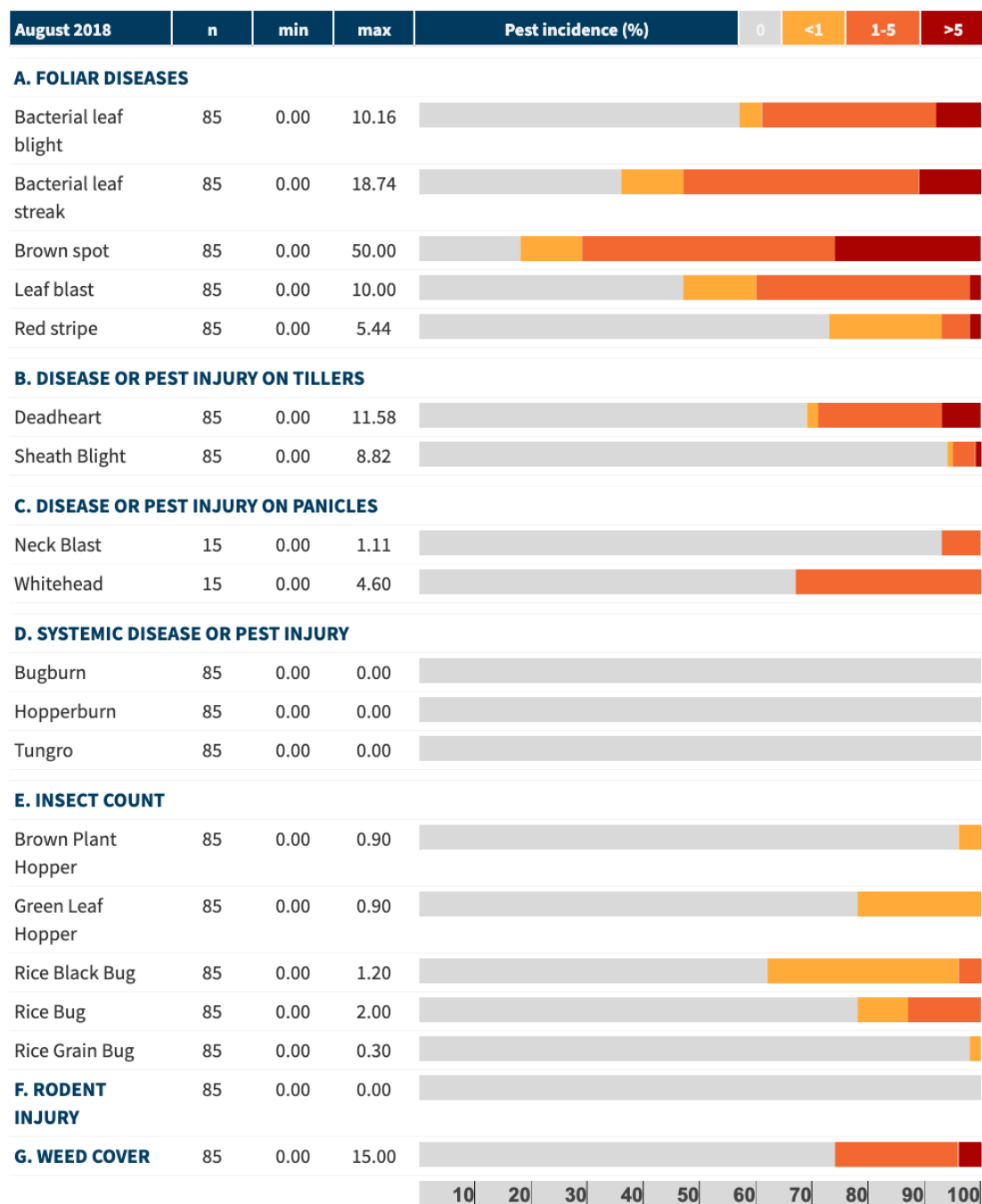
Region X



Annex Figure 1. Incidence of pest injuries, count of insect pests, and weed cover in July 2018. Horizontal bar shows the proportion of fields in each range of pest injury incidence, insect count, or weed cover.

Disclaimer: All information provided in this monitoring report are generated from the PRIME monthly pest survey results submitted by the regional data collectors.

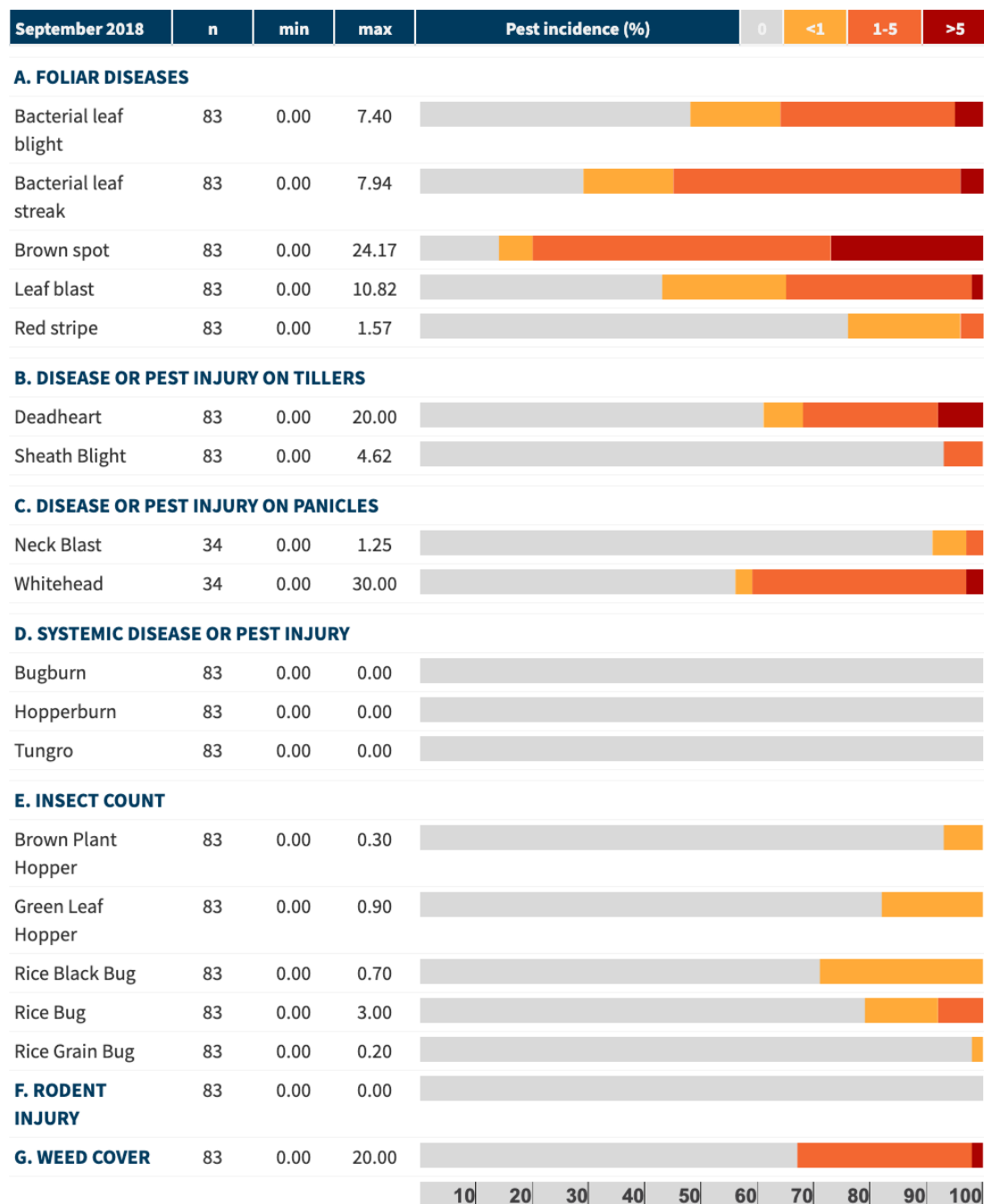
Region X



Annex Figure 2. Incidence of pest injuries, count of insect pests, and weed cover in August 2018. Horizontal bar shows the proportion of fields in each range of pest injury incidence, insect count, or weed cover.

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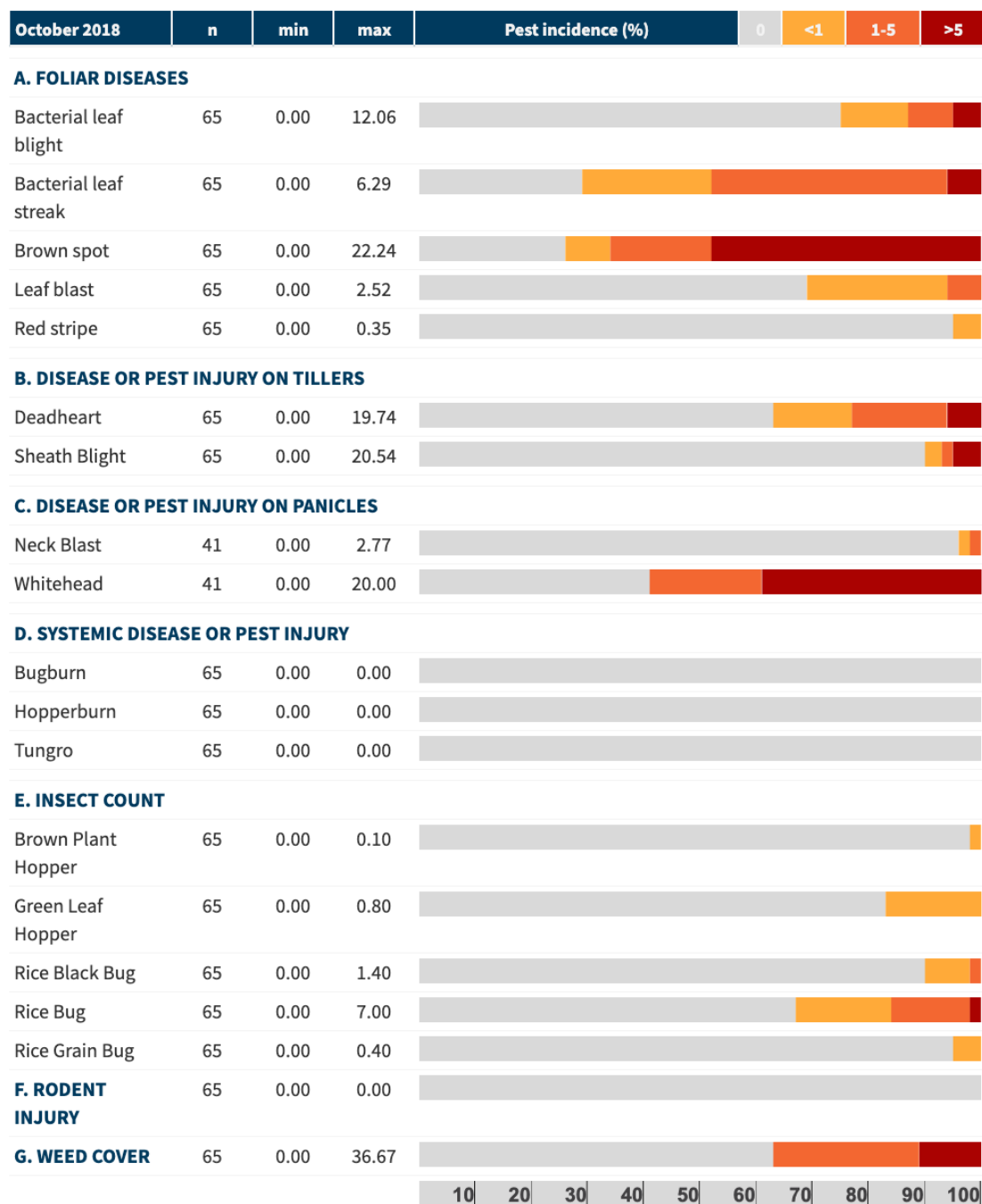
Region X



Annex Figure 3. Incidence of pest injuries, count of insect pests, and weed cover in September 2018. Horizontal bar shows the proportion of fields in each range of pest injury incidence, insect count, or weed cover.

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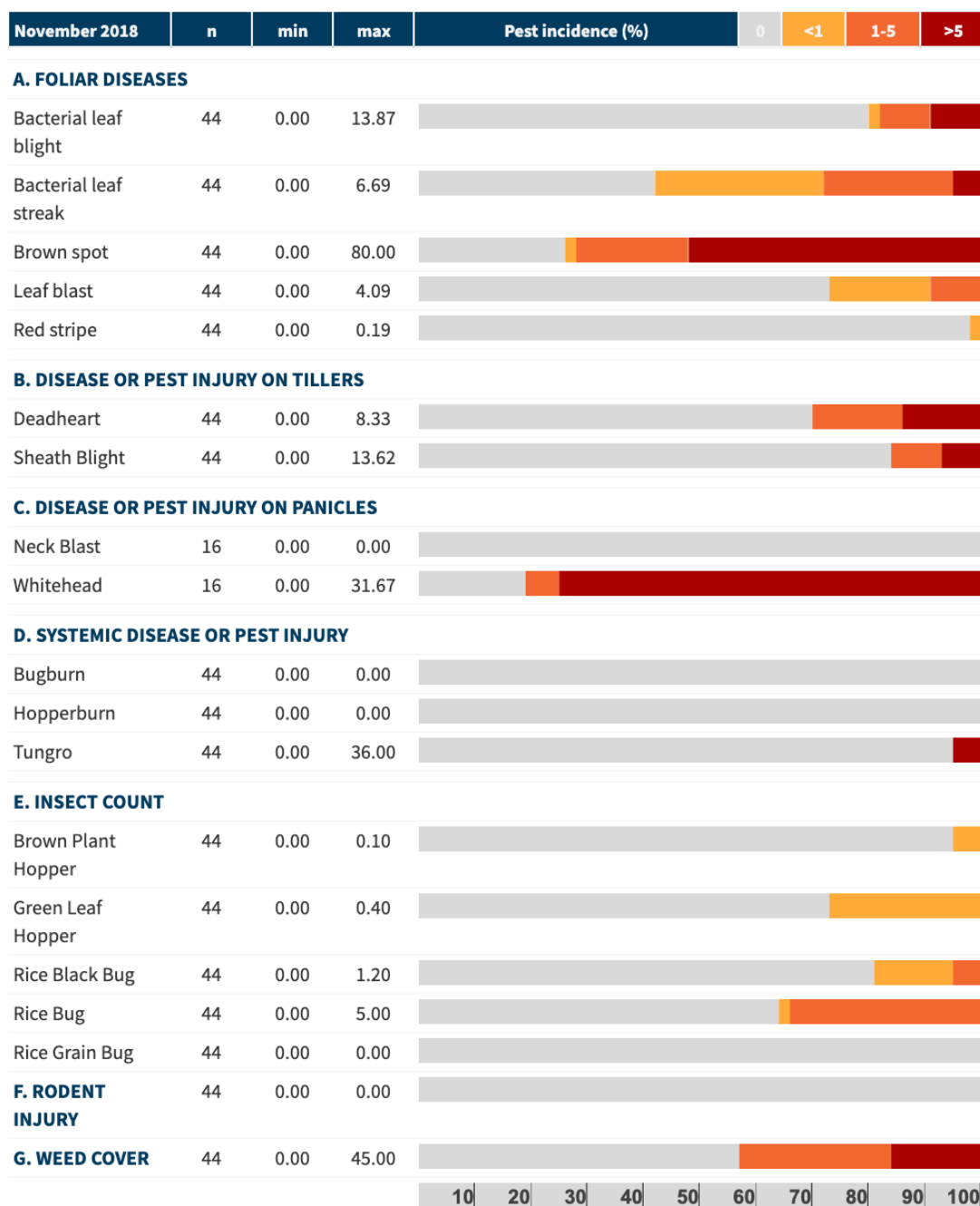
Region X



Annex Figure 4. Incidence of pest injuries, count of insect pests, and weed cover in October 2018. Horizontal bar shows the proportion of fields in each range of pest injury incidence, insect count or weed cover.

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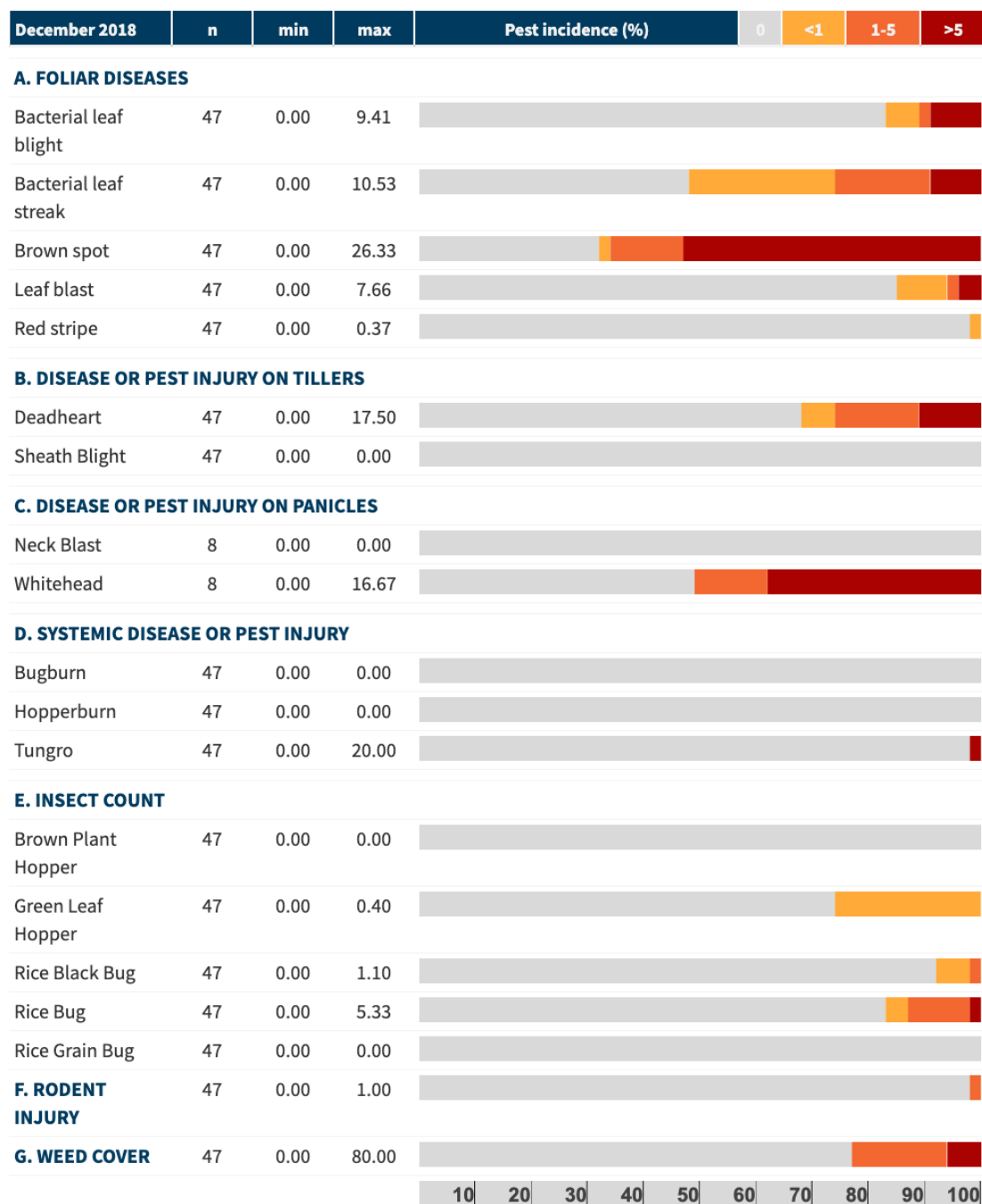
Region X



Annex Figure 5. Incidence of pest injuries, count of insect pests, and weed cover in November 2018. Horizontal bar shows the proportion of fields in each range of pest injury incidence, insect count or weed cover.

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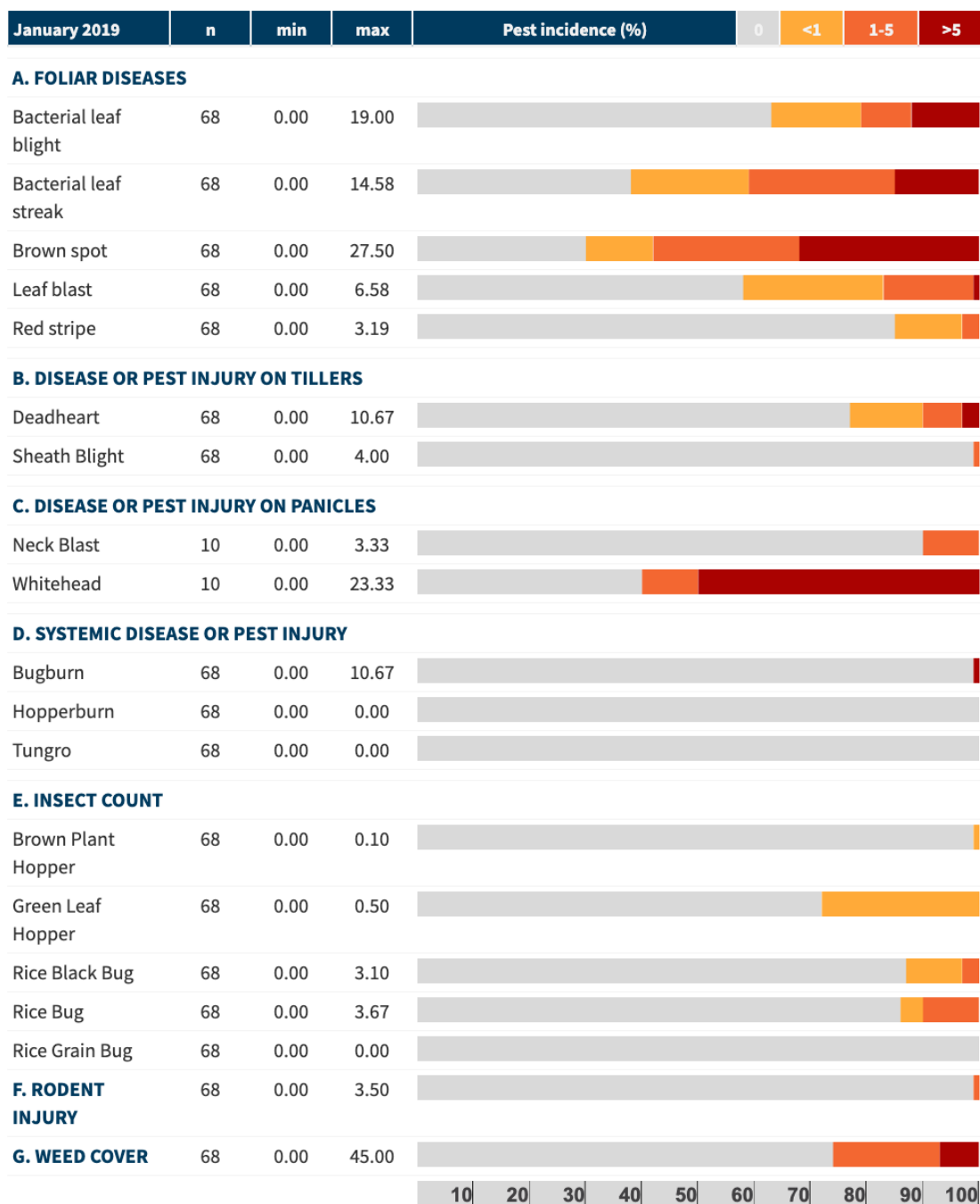
Region X



Annex Figure 6. Incidence of pest injuries, count of insect pests, and weed cover in December 2018. Horizontal bar shows the proportion of fields in each range of pest injury incidence, insect count or weed cover.

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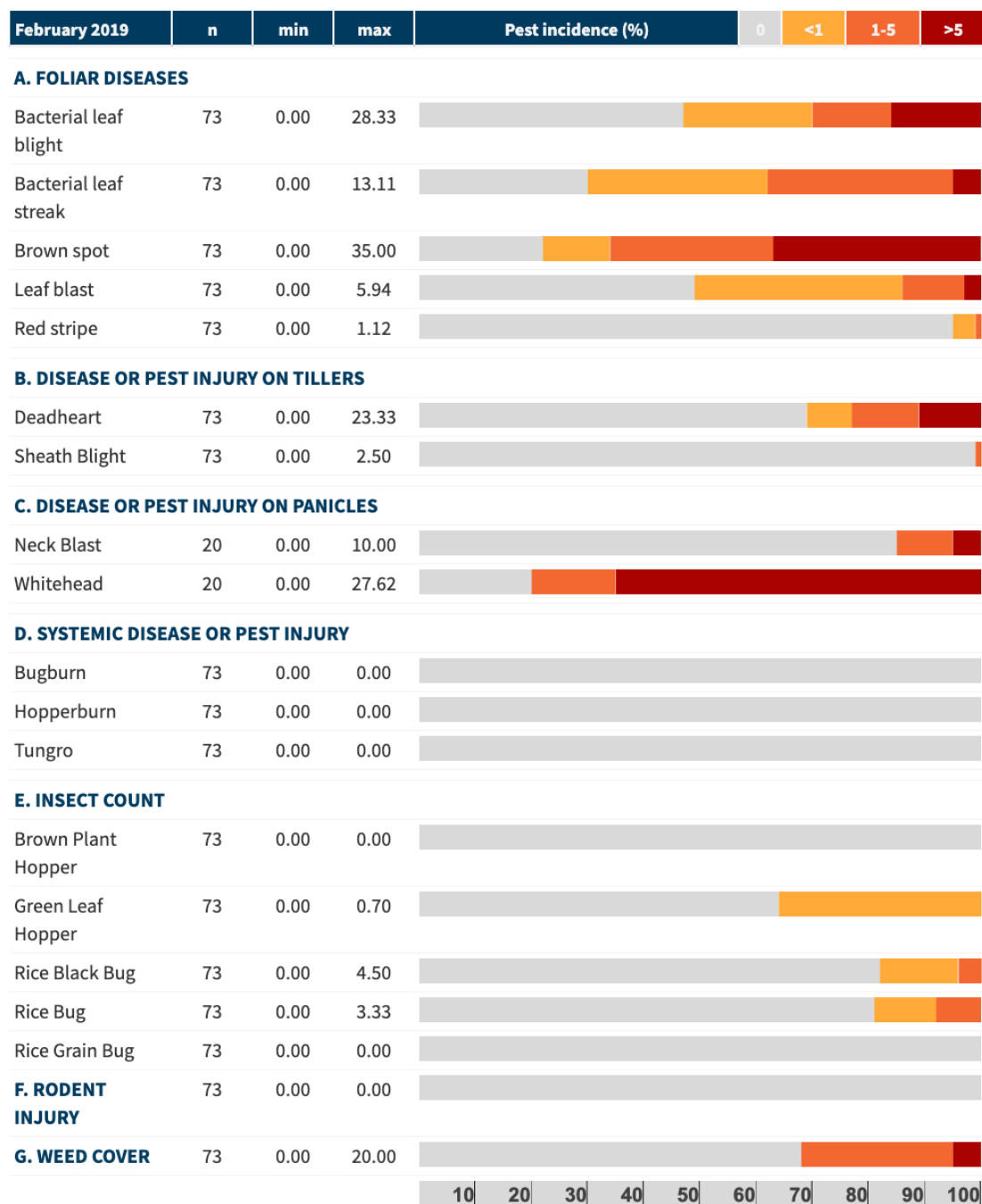
Region X



Annex Figure 7. Incidence of pest injuries, count of insect pests, and weed cover in January 2019. Horizontal bar shows the proportion of fields in each range of pest injury incidence, insect count or weed cover.

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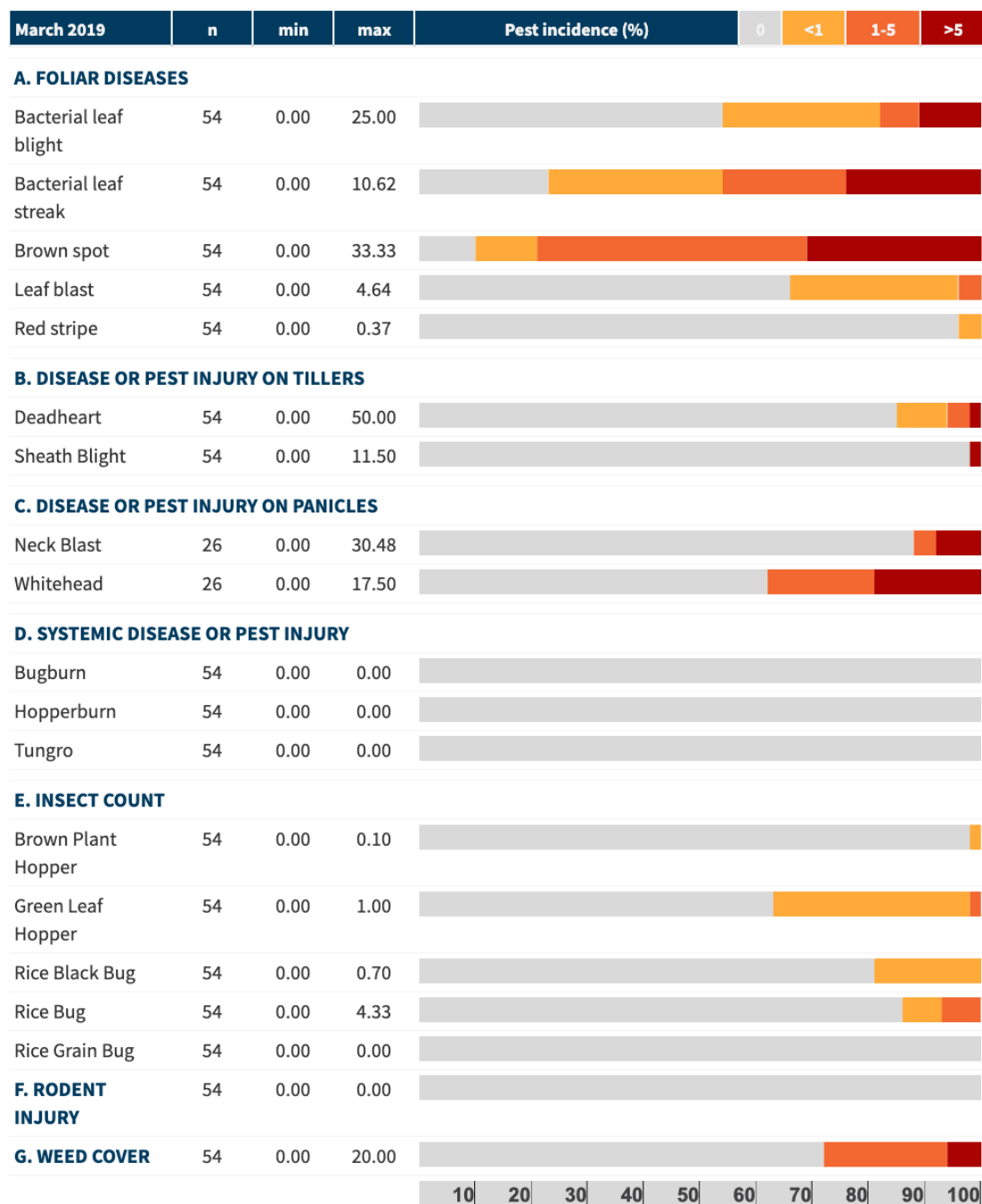
Region X



Annex Figure 8. Incidence of pest injuries, count of insect pests, and weed cover in February 2019. Horizontal bar shows the proportion of fields in each range of pest injury incidence, insect count or weed cover.

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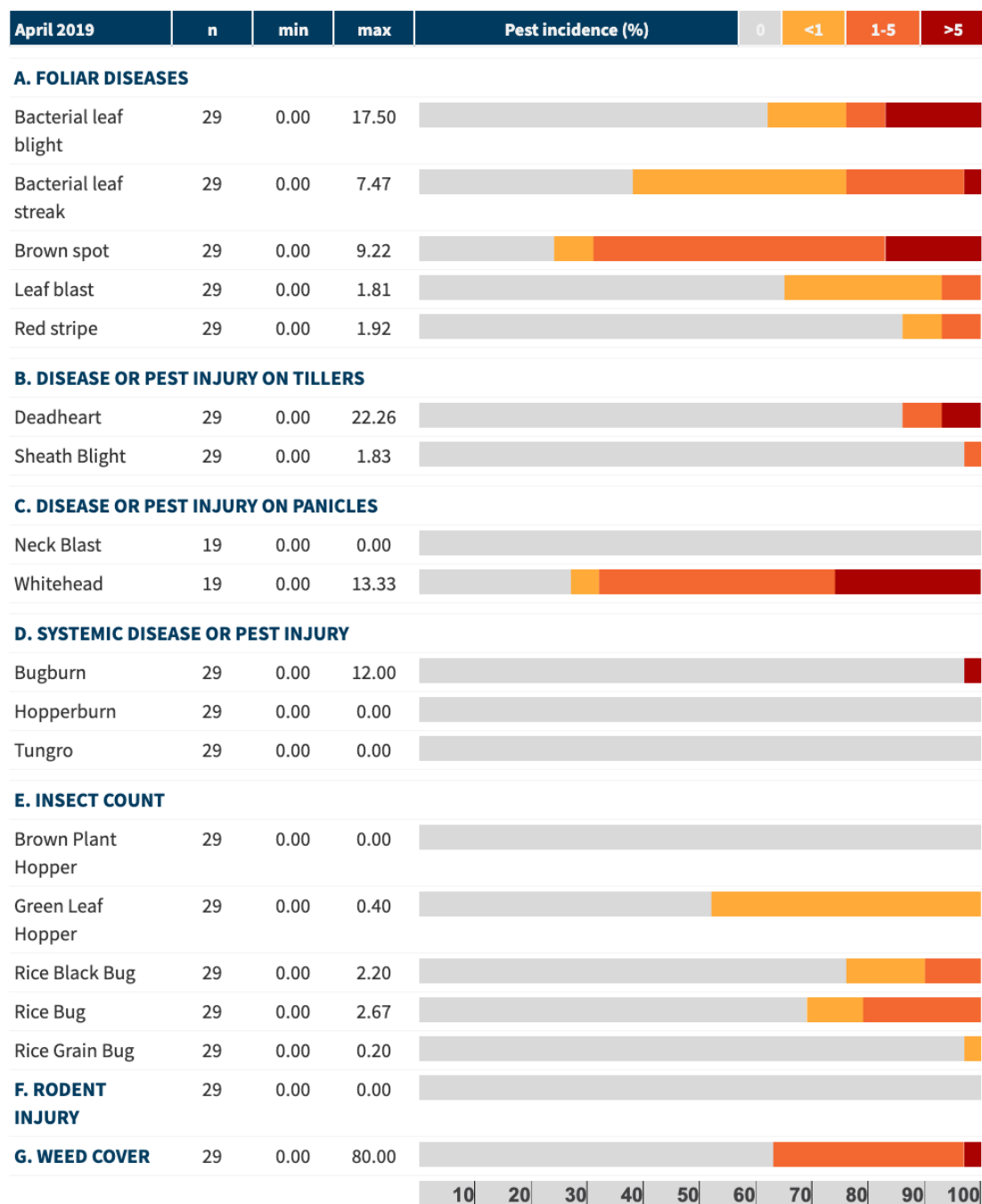
Region X



Annex Figure 9. Incidence of pest injuries, count of insect pests, and weed cover in March 2019. Horizontal bar shows the proportion of fields in each range of pest injury incidence, insect count or weed cover.

Disclaimer: All the data presented in this report are based on the monthly monitoring of farmers' fields by regional data collectors of PRIME.

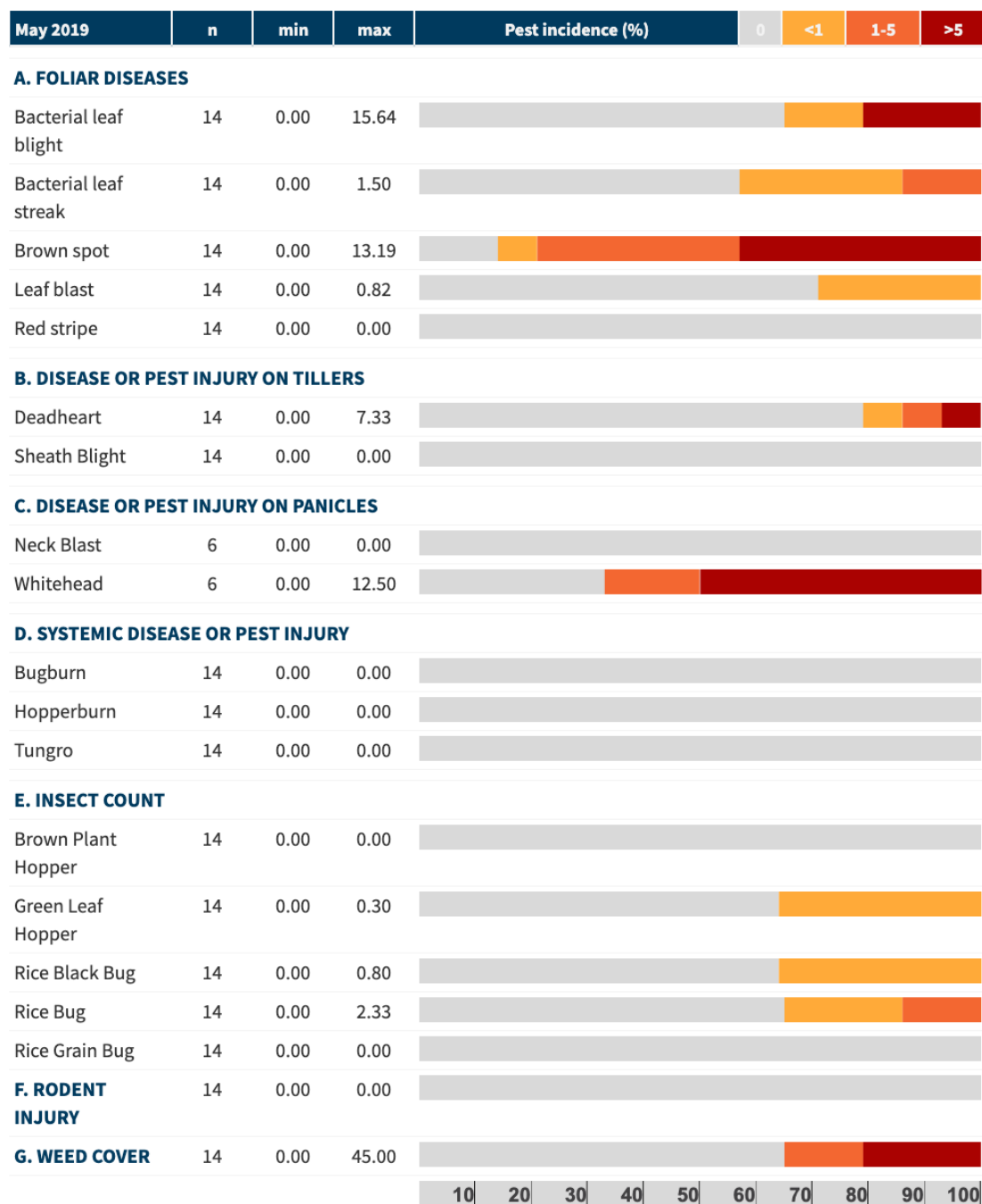
Region X



Annex Figure 10. Incidence of pest injuries, count of insect pests, and weed cover in April 2019. Horizontal bar shows the proportion of fields in each range of pest injury incidence, insect count or weed cover.

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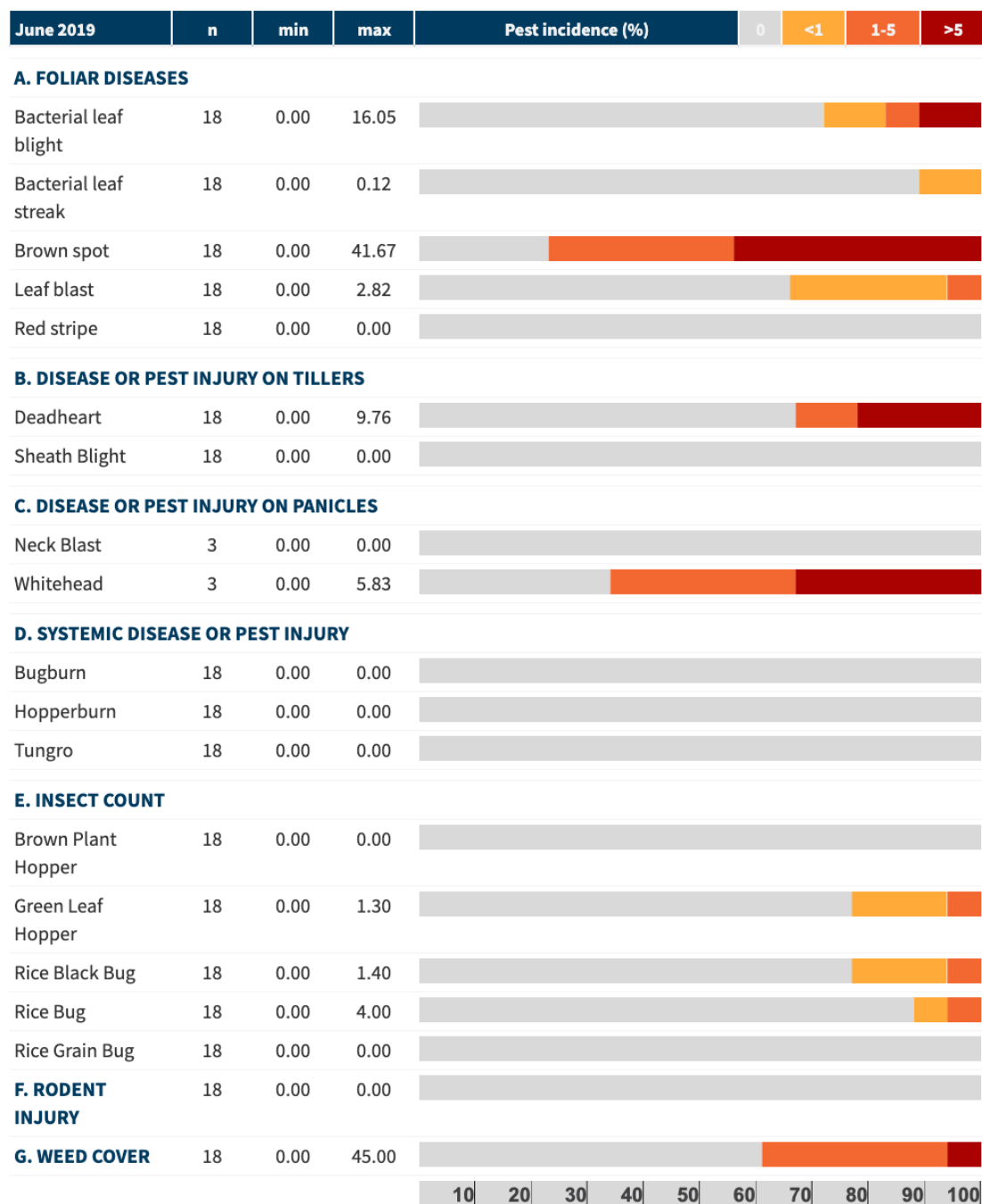
Region X



Annex Figure 11. Incidence of pest injuries, count of insect pests, and weed cover in May 2019. Horizontal bar shows the proportion of fields in each range of pest injury incidence, insect count or weed cover.

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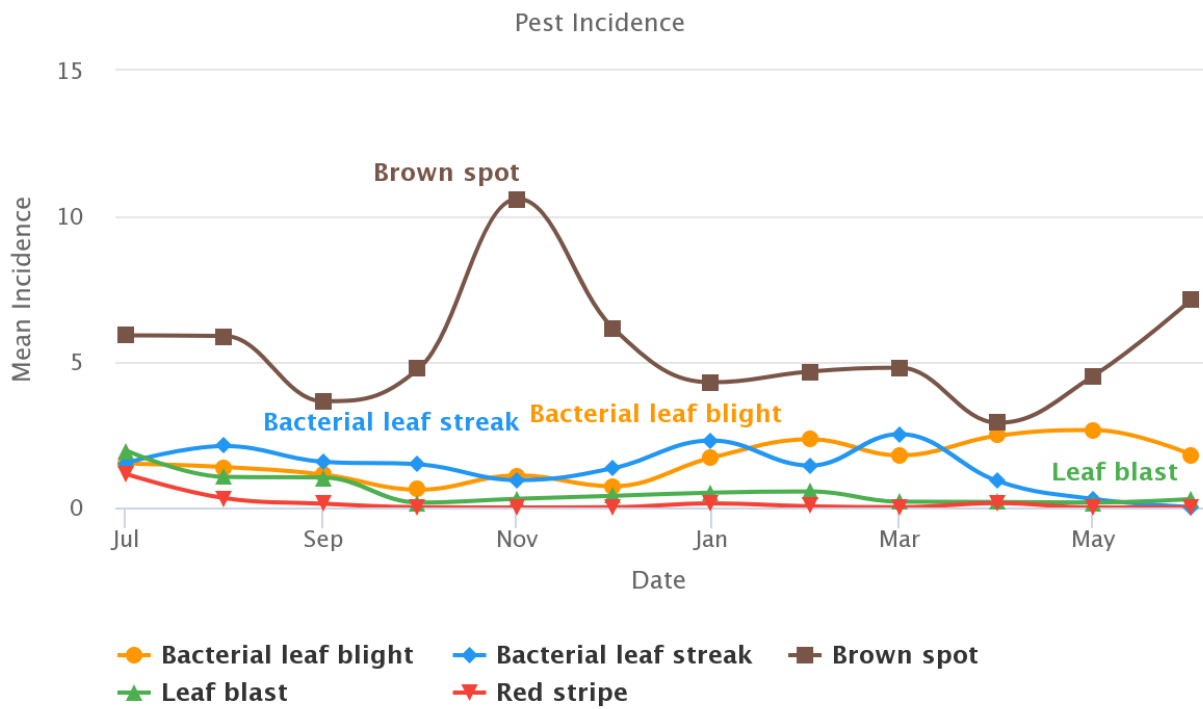
Region X



Annex Figure 12. Incidence of pest injuries, count of insect pests, and weed cover in June 2019. Horizontal bar shows the proportion of fields in each range of pest injury incidence, insect count or weed cover.

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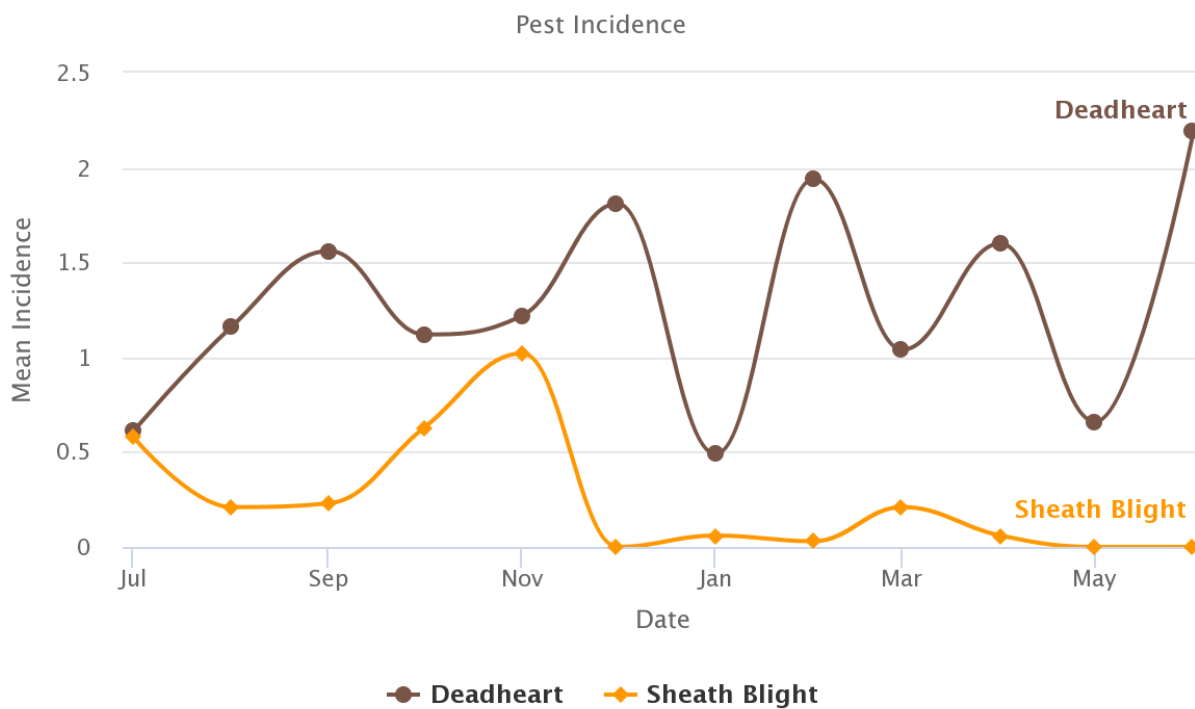
FOLIAR DISEASES



Annex Figure 13. Mean incidence of foliar diseases in Region X, July 2018 to June 2019.

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DISEASE OR PEST INJURY ON TILLERS

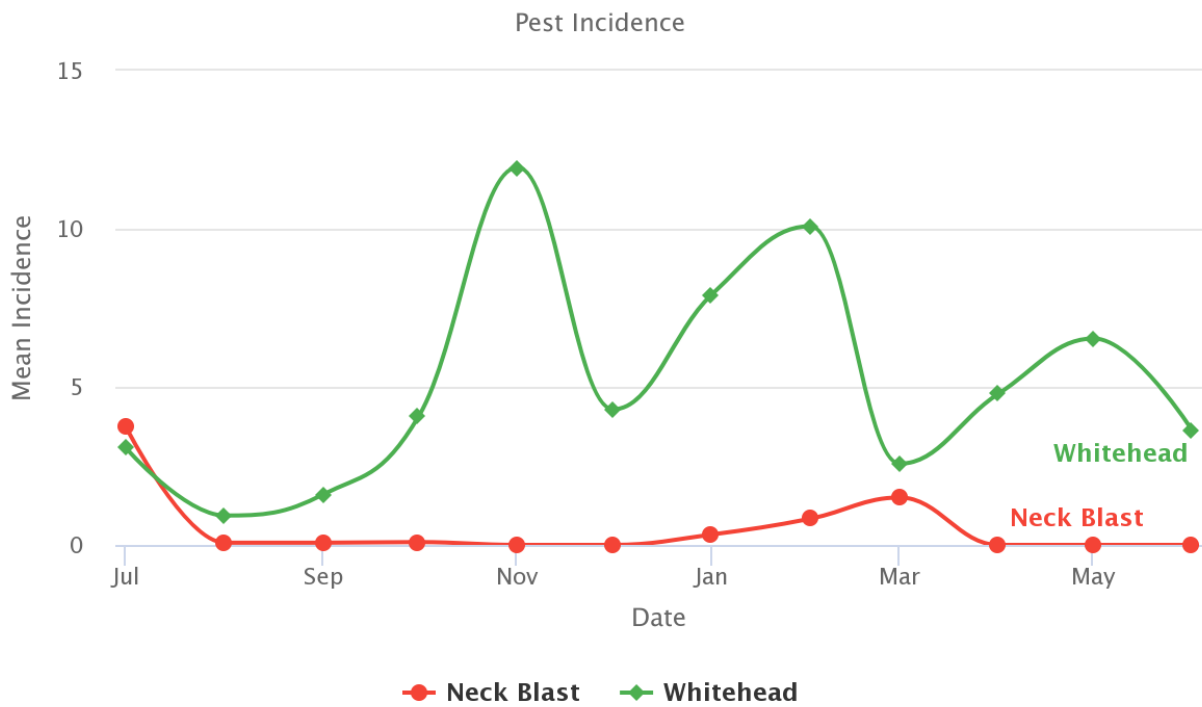


Highcharts.com

Annex Figure 14. Mean Incidence of deadheart and sheath blight in Region X, July 2018 to June 2019.

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DISEASE OR PEST INJURY ON PANICLES

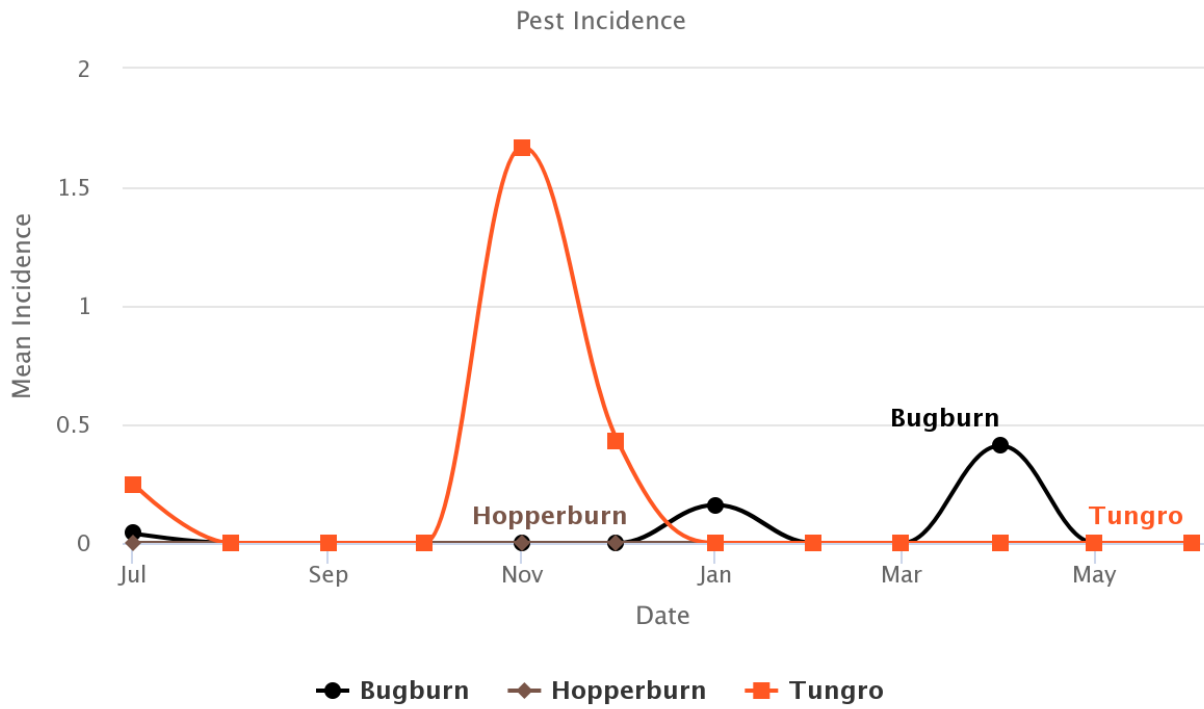


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Annex Figure 15. Mean incidence of neck blast and whitehead in Region X, July 2018 to June 2019.

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SYSTEMIC DISEASE OR PEST INJURY

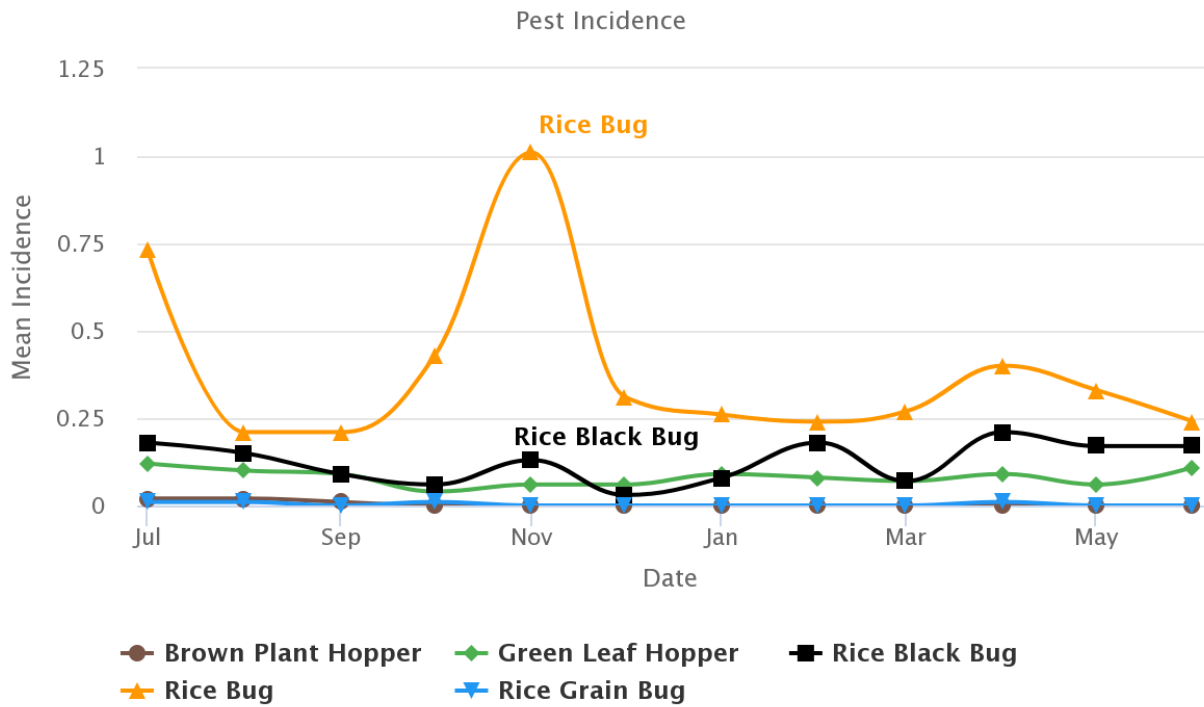


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Annex Figure 16. Mean incidence of bugburn, hopperburn and tungro in Region X, July 2018 to June 2019.

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INSECT COUNT



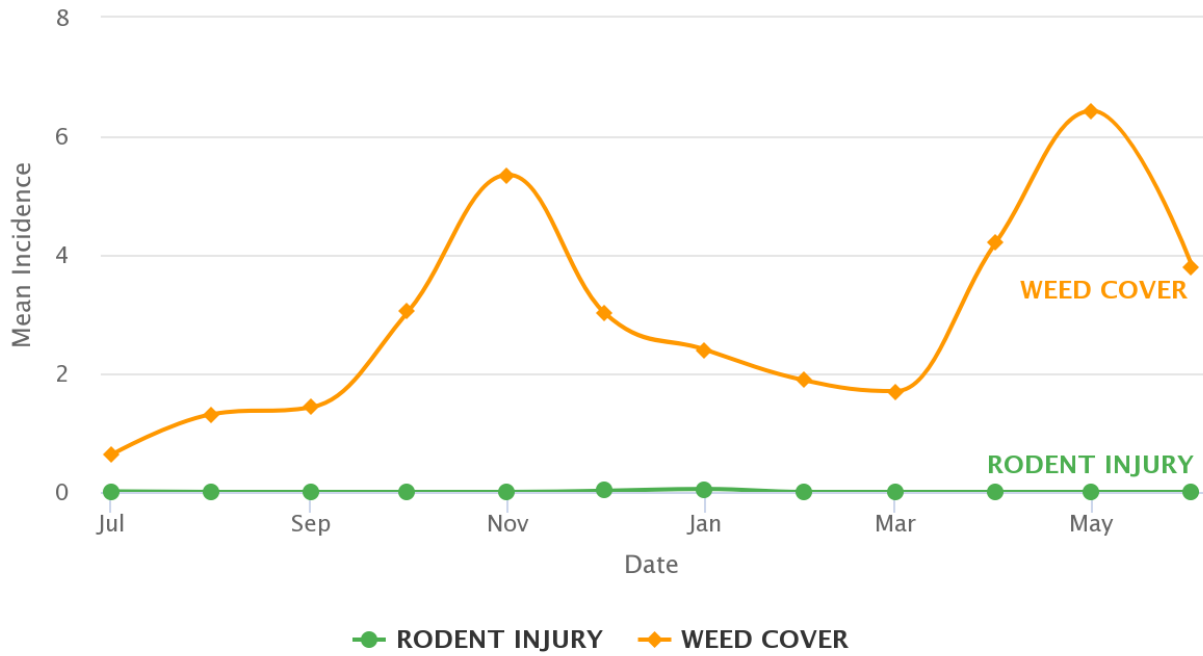
Highcharts.com

Annex Figure 17. Mean count of insect pests in Region X, July 2018 to June 2019.

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Other INJURY

Pest Incidence



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Annex Figure 18. Mean incidence of rat injury in Region X, July 2018 to June 2019.

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