

# OCCURRENCE OF NOCTUID SPECIES CAUSING SPRING DAMAGE IN VINEYARDS

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## INTRODUCTION

Noctuid moth caterpillars are capable to produce severe damage on grapevine buds in spring.

Bud loss caused by Lesser Yellow Underwing (*Noctua comes* Hübner) and Broad-bordered Yellow Underwing (*Noctua fimbriata* Schreber) was significant in south eastern Slovenia in period 2000 to 2005. Before that, migratory noctuids were not noticed as pests and they appeared only sporadically. In 2014 severe damages appeared again, reaching 75-80% of damaged buds in the most exposed areas. Besides previously recorded, Large Yellow Underwing (*Noctua pronuba* L.) is recognized as additional pest species. Participation of other Noctuidae and Geometridae species is marginal. Every noctuid has specific life cycle, feeding or other habits, slightly differing one from another. Caterpillars of identified species are found in the spring on various terrains, but their abundance is greater on southern slopes of hills and knolls where females in autumn lay eggs in habitats with favourable host plants. As noted also on previous occurrences, their effect appears to be greater on ridges. Damages on grapevine buds are more likely after mild winter conditions with low rate hibernation mortality. In such circumstances greater number of noctuid caterpillars survives and in the spring they struggle for food. When phenology of major herbaceous host plants progresses slowly, they prefer grapevine.

**Keywords:** vineyard, damaged buds, *Noctua fimbriata*, *Noctua comes*, *Noctua pronuba*

## MATERIALS AND METHODS

### Field survey and pest species identification

Samples (caterpillars feeding on grapevine buds) were collected at four locations in day and night time, while only 24 hour field inspections can give relevant insight. Caterpillars were reared in separated terrariums to adults and then identified.

### Host plants inventory

During field inspections for caterpillars, we also kept notice of vineyard vegetation.

### Damage evaluation

For damage evaluation we took notes of:

- Location: coordinates, acreages, elevation, position and vegetation.
- Host plants available on location and vegetation coverage.
- Portion and type of damaged grapevine buds: 10 blocks of 10 vines in line evenly distributed on the parcel.

## RESULTS

### Field survey and pest species identification

Like a decade ago, 24 hour field inspections confirmed most of the damage created by nocturnal pests. Caterpillars feeding on grapevine buds were collected at four locations. *Noctua comes*, *N. fimbriata* and *N. pronuba* represent 90-95% of the specimens. Other recorded species were *Amphipyra pyramidea* and *Peribatodes* sp. Even though *Noctua pronuba* is listed in literature as possible grapevine pest for some time, we acknowledged it for the first time. On inspected locations all recorded *Noctua* species were noted. Their appearance accumulated during four weeks, from middle of March – to second half of April.

All three Noctuid species indicate rivalry for food resources. During larvae rearing we noticed high aggression and even cannibalism tendency. When in stress, caterpillars eject repelling odour secretion from pronotum region gland. The reaction has double impact: it repels intruders and predators as well as makes epidermis hydrophobic.

### Host plants inventory

During field examination vineyards vegetation was recorded.

### Damage evaluation

Almost 50 locations were inspected. Damage was evaluated according to:

Location: Caterpillars are found on different terrains, but their abundance is greater on southern slopes of hills and knolls where females in autumn lay eggs in habitats with favourable host plants. As noted also on previous occurrences, their effect appears to be greater on ridges.

Vegetation coverage and host plants availability: Most parcels were covered with vegetation. As herbal variety increased, lower damage seemed to be recorded. For proper evaluation more locations should be inspected.

Portion and type of damaged grapevine buds: damaged buds scaled up to 85 %. Some *Vitis* cultivars have characteristics to develop grapes from secondary buds.



Figure 9: Habitat with most favourite host plants: dandelion (*Taraxacum officinale*), grape vine (*Vitis vinifera*), strawberries (*Fragaria vesca*), hawthorn (*Leontodon hispidus*),... And other weeds: narrowleaf plantain (*Plantago lanceolata*), broadleaf plantain (*Plantago major*), daisy (*Bellis perennis*), deadnettle (*Lamium maculatum*), primrose (*Primula vulgaris*), grass (Poaceae). Photo: D. Bajec



Figures 1, 2 and 3: Broad-bordered Yellow Underwing (*Noctua fimbriata* Schreber) caterpillar and moths. Photo: D. Bajec

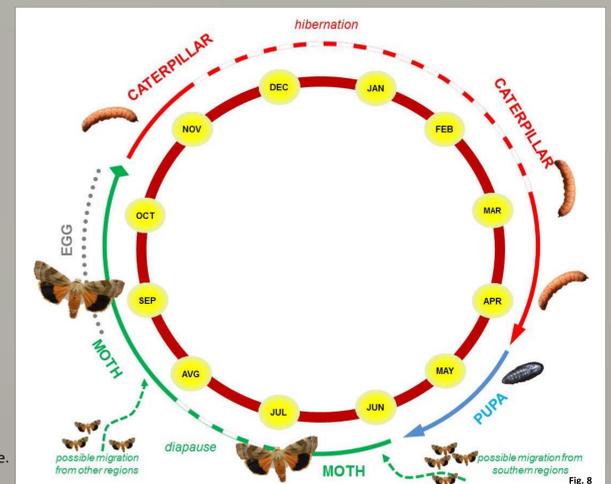


Figures 4, 5 and 6: Large Yellow Underwing (*Noctua pronuba* L.) caterpillar and moths. Photo: D. Bajec



Figure 7: Lesser Yellow Underwing (*Noctua comes* Hübner) caterpillar. Photo: D. Bajec

Figure 8: *Noctua fimbriata* and *N. comes* life cycle. Scheme: D. Bajec



Figures 10 and 11: Pictures show two neighbouring vineyards with different type of vegetation and damage degree. Section with abundant host plants showed 35 % damage, while area with no or only grass coverage suffered 85 % eaten buds. Photo: D. Bajec

## DISCUSSION AND CONCLUSIONS

After damage on grapevine buds in the period from 2000 – 2005, we expected the phenomenon to occur again. In the late summer of that period we used pheromone and automated light traps to detect moths. Later in autumn we also monitored for hatched caterpillars. The prediction and forecasting of spring occurrence was unproductive, since the abundancy of noctuids we assessed, had almost none correlation with the spring damage.

Observations show, that damages on grapevine buds are more likely after mild winter conditions with low rate hibernation mortality. In such circumstances greater number of noctuid caterpillars survives and in the spring they struggle for food.

Caterpillars of *Noctua comes*, *N. fimbriata* and *N. pronuba* are polyphages in the heterogeneous vineyard environment. They can feed on weeds but also grapevine and many nearby apple, birch or willow trees. When phenological development of major herbaceous host plants progresses slowly, they prefer grapevine.

While *Noctua fimbriata*, *N. comes* and *N. pronuba*, though 'close related', have their own biological timetable and feeding habits, they leave vineyards in devastation when participating each in high density. The longevity of spring feeding time determines damage degree.

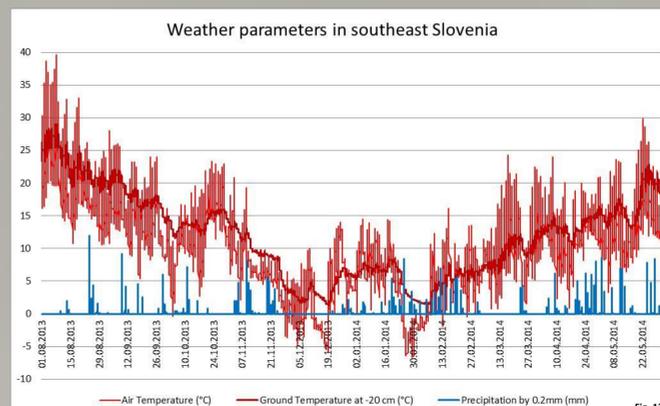


Figure 12: Weather parameters in south eastern Slovenia in period from August 2013 to July 2014, when Noctuid larvae hatched from eggs, developed and pupated. Overwintering time shows mild temperature conditions with sporadic below zero air temperatures and lowest ground temperatures reaching only 2,5 °C twice in December 2013 and first decade of January 2014. Otherwise average winter ground temperatures settled around 5–7.5 °C. Data was collected by Adcon Telemetry weather stations and processed on hourly bases.