

On the Agromyzidae (Diptera) in Norway, Part 1

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The present paper comments on thirty-three of the forty-seven species belonging to six Agromyzidae genera and presently known to occur in Norway. Thirteen species are reported new to the Norwegian fauna belonging to the family Agromyzidae. The species are: *Amauromyza* (*Cephalomyza*) *chenopodivora* Spencer, 1971, *Amauromyza* (*Cephalomyza*) *monfalconensis* (Strobl, 1909), *Cerodontha* (*Butomyza*) *rohdendorfi* Nowakowski, 1967, *Cerodontha* (*Butomyza*) *scutellaris* (Roser, 1840), *Cerodontha* (*Cerodontha*) *fulvipes* (Meigen, 1830), *Cerodontha* (*Cerodontha*) *stackelbergi* Nowakowski, 1972, *Cerodontha* (*Dizygomyza*) *caricicola* (Hering, 1926), *Cerodontha* (*Icteromyza*) *capitata* (Zetterstedt, 1848), *Cerodontha* (*Poemyza*) *pygmina* (Hendel, 1931), *Metopomyza* *flavonotata* (Haliday, 1833), *Metopomyza* *scutellata* (Fallén, 1823), *Metopomyza* *xanthaspioides* (Frey, 1946) and *Aulenagromyza* *buhri* (de Meijere, 1938). In addition new regional data is given for twenty species previously reported from Norway. The biology of the larva, when known, and the distribution in Norway and Europe are commented on for each of the species.

Key words: Diptera, Agromyzidae, *Amauromyza*, *Aulenagromyza*, *Calycomyza*, *Cerodontha*, *Metopomyza*, *Pseudonapomyza*, larval biology, distribution, Norway.

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Introduction

The larvae of Agromyzidae mine in leaves and stems of plants, thus infesting many plant species. Most species are oligophagous, but a few are polyphagous (Spencer 1990), and many species are important pests on various cultural plants. Kenneth A. Spencer laid the foundation of our knowledge of the Norwegian Agromyzid fauna with his monograph “The Agromyzidae (Diptera) of Fennoscandia and Denmark” (Spencer 1976). Yet, the Norwegian fauna of Agromyzidae is poorly known, although some recent data have been published (Andersen & Jonassen 1994, Andersen et al. 2004, Andersen 2011).

Agromyzidae is represented in Norway by fifteen genera belonging to two subfamilies, with a total of 185 species recorded so far. This paper is intended to be the first in a series which presents new data on the fauna of Agromyzidae in Norway.

Materials and methods

The present report deals with material collected during different projects and collecting trips in many parts of Norway, but mainly meadows with a rich flora in South-Eastern Norway have been investigated. If a species has been found more than once in the same district or EIS quadrat, only data on the first find is given. In such cases the total number of specimens investigated of the species is indicated. Most of the specimens were netted by the author, and the material has been stored in 70% ethanol in the author’s private collection. In a few cases flies were collected in a Malaise-trap. Localities are given using the revised Strand-system (Økland 1986) and the EIS system (Endrestøl 2005).

The species

Species not previously recorded from Norway are marked with an asterisk (*). If nothing else is noted, the material has been collected by the author and is deposited in the author's private collection.

GENUS *AMAUROMYZA* HENDEL, 1931

Subgenus *Cephalomyza* Hendel, 1931

* *Amauromyza (C.) chenopodivora* Spencer, 1971 (Figure 1)

Material. AK, Eidsberg: Slitu (EIS 29) 24 June 1999, 2♂♂1♀.

Distribution and host of larva. *A. (C.) chenopodivora* has been found only once in Norway. It is widespread in Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2012). The larva feeds on *Chenopodium* spp. and *Amaranthus* spp. (Spencer 1990).

* *Amauromyza (C.) monfalconensis* (Strobl, 1909) (Figure 2)

Material Ø, Eidsberg: Slitu (EIS 29) 24 June 1999, 1♂; Aremark: Bøen sætre (EIS 21) 12 June 2011, 2♂♂1♀; AK, Aurskog-Høland: Mikkelrud (EIS 29) 30 May 2011, 15♂♂22♀♀; 16 June 2011, 2♂♂; VE, Horten: Bastøy (EIS 19) 31 May 2009, 3♂♂; 4 June 2010, 5♂♂; 5 June 2011, 9♂♂1♀; TEI, Seljord: Blika (EIS 26) 1 June 2010, 1♂; 20 June 2010, 4♂♂1♀; 13 June 2011, 2♂♂2♀♀; 26 June 2011, 2♂♂; Hjartdal: Ambjørndalen (EIS 26) 20 June 2010, 1♂; 13 June 2011, 1♂; VAY, Flekkefjord: Veisdal, Hidra (EIS 4) 12 June 2004, 5♂♂.

Distribution and host of larva. *A. (C.) monfalconensis* is the most common Norwegian species in this genus, probably present in most parts of South-Eastern Norway. It is also widespread in Europe, including Denmark and Sweden (Spencer 1976, Martinez 2012). The larva feeds internally in the stem of *Rumex* spp. (Spencer 1990).

GENUS *CERODONTHA* RONDANI, 1861

Subgenus *Butomyza* Nowakowski, 1967

* *Cerodontha (B.) rohdendorfi* Nowakowski, 1967 (Figure 3)

Material. VAY, Flekkefjord: Veisdal, Hidra (EIS 4) 12 June 2004, 1♂.

Distribution and host of larva. *C. (B.) rohdendorfi* has been found only once in Norway. It is widespread, but not common in Europe, including Finland (Spencer 1976, Ellis 2012). The larva is oligophagous on Poaceae (Spencer 1976, Ellis 2012).

* *Cerodontha (B.) scutellaris* (Roser, 1840) (Figure 4)

Material. VE, Horten: Bastøy (EIS 19) 5 June 2011, 2♂♂; Horten: Borrehaugene (EIS 19) 20 June 2011, 1♂; AAY, Grimstad: Homborøy (EIS 6) 3 June 2011, 2♂♂1♀.

Distribution and host of larva. *C. (B.) scutellaris* has been found only once in South-Eastern Norway. It is widespread, but not common in Europe, including Denmark (Spencer 1976, Pitkin et al. 2012), and the larva is probably feeding on *Carex* spp. (Spencer 1976).

Subgenus *Cerodontha* s. str.

Cerodontha (C.) denticornis (Panzer, 1806) (Figure 5)

New material (4811 specimens investigated). Ø, Råde: Store Sletter (EIS 19) 28 August 1999, 6♂♂5♀♀; Sarpsborg: Greåker (EIS 20) 6 August 2002, 8♂♂13♀♀; Aremark: Bøen sætre (EIS 21) 12 June 2011, 2♂♂1♀; AK, Nannestad: Søndre Kringler (EIS 37) 16 June 2011, 1♂; HES, Løten: Løten kirke (EIS 46) 14 September 2003, 4♂♂5♀♀; HEN, Åmot: Rena (EIS 55) 17 September 2003, 10♂♂7♀♀; ON, Sel: Otta ungdomskole (EIS 62) 16 September 2003, 26♂♂9♀♀; Dovre: Dombåshaugen (EIS 71) 4 July 2011, 1♂2♀♀; BØ, Hole: Røyse (EIS 36) 19 June 1996, 1♀; Kongsberg: Ullebergåsen (EIS 27) 18 June 2010, 1♀; BV, Rollag: Gvammen gård (EIS 35) 23 May 2011, 7♂♂7♀♀; VE, Larvik: Tvetene (EIS 12) 9 July 2011, 4♂♂; TEY, Porsgrunn:

Berg (EIS 11) 21 August 2002, 14♂♂7♀♀; Skien: Vestre Marker (EIS 18) 13 June 2011, 5♂♂4♀♀; **TEI**, Hjørtedal: Ambjørndalen (EIS 26) 9 July 2010, 1♂1♀; **AAY**, Grimstad: Groos (EIS 6) 7 July 2003, 1♂1♀; **VAY**, Farsund: Lista fyr (EIS 1) 29 July 2003, 9♂♂6♀♀; Songdalen: Songdalen (EIS 2) 13 August 2007, 1♀; Flekkefjord: Hummerøy, Hidra (EIS 4) 3 August 2003, 2♂♂2♀♀; **VAI**, Sirdal: Tonstad (EIS 8) 13 June 2004, 4♂♂5♀♀; **RY**, Hå: Brusand (EIS 3) 24 June 1996, 1♂; **MRI**, Rauma: Venja (EIS 77) 6 July 2011, 2♂♂; Sunndal: Svøu (EIS 79) 5 July 2011, 1♂; **STI**, Trondheim: Byneset kirke (EIS 92) 16 July 2003, 4♂♂11♀♀; **NTI**, Frosta: Tautra (EIS 97) 15 July 2003, 2♂♂; **NSY**, Bodø: Ausvika (EIS 131) 14 June 2002, 1♂3♀♀; Brønnøy: Brønnøysund (EIS 114) 2 July 2006, 1♂1♀; **NSI**, Saltdal: Rognan (EIS 127) 15 June 2002 1♂1♀.

Distribution and host of larva. *C. (C.) denticornis* is very widespread in most of Norway, as in the rest of Europe (Martinez 2012). It has previously been reported from the counties Østfold, Akershus, Vestfold and Rogaland (Spencer 1976, Andersen & Jonassen 1994, Andersen et al. 2004). The larva is widely oligophagous on Poaceae (Spencer 1976, 1990, Ellis 2012).

* *Cerodontha (C.) fulvipes* (Meigen, 1830) (Figure 6)

Material (181 specimens investigated). **Ø**, Sarpsborg: Greåker (EIS 20) 6 August 2002, 8♂♂7♀♀; **AK**, Ås: Ås kirke (EIS 28) 16 June 2003, 1♂2♀♀; **BØ**, Lier: Espedal gartneri (EIS 28) 21 June 2003, 1♀; **VE**, Horten: Borrehaugene (EIS 19) 8 June 2002, 20♂♂17♀♀; Larvik: Hollefjell, Ula (EIS 12) 17 August 2011, 1♂; **TEY**, Porsgrunn: Berg (EIS 11) 21 August 2002, 1♂2♀♀; **AAY**, Grimstad: Landvik (EIS 6) 7 July 2003, 1♂; **VAY**, Flekkefjord: Hummerøy, Hidra (EIS 4) 3 August 2003, 6♂♂3♀♀; **VAI**, Sirdal: Tonstad (EIS 8) 13 June 2004, 2♂♂; **MRY**, Tingvoll: Tingvoll museum (EIS 85) 5 July 2011, 1♀.

Distribution and host of larva. *C. (C.) fulvipes* is found throughout coastal Southern Norway, but it is not common. It has been reported widespread in Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2012). The

larva has only been confirmed on *Poa trivialis* L., but it possibly infests also other grasses (Spencer 1976, 1990, Ellis 2012).

* *Cerodontha (C.) stackelbergi* Nowakowski, 1972 (Figure 7)

Material. **AAY**, Grimstad: Hesnesøy (EIS 6) 3 June 2011, 1♂1♀; 25 June 2011, 1♂.

Distribution and host of larva. *C. (C.) stackelbergi* has only been found on the small island Hesnesøy close to Grimstad in Norway. It is widespread, but not common, in Eastern Europe, and also reported from Finland (Spencer 1976, Martinez 2012). The host of the larva is unknown.

Subgenus *Dizygomyza* Hendel, 1920

Cerodontha (D.) bimaculata (Meigen, 1830) (Figure 8)

New material (322 specimens investigated). **Ø**, Aremark: Bøen sætre (EIS 21) 19 May 2011, 1♂1♀; **BØ**, Kongsberg: Ullebergåsen (EIS 27) 23 June 2009, 1♂; Nedre Eiker: Ryghsetra (EIS 28) 2 June 2011, 1♀; **VE**, Horten: Borrehaugene (EIS 19) 8 June 2002, 3♂♂; **TEY**, Bamble: Djupvik (EIS 11) 23 August 2002, 4♂♂3♀♀; **AAY**, Grimstad: Hesnesøy (EIS 6) 3 June 2011, 2♂♂2♀♀; **VAY**, Farsund: Lista fyr (EIS 1) 29 July 2003, 1♀; **MRI**, Rauma: Øvre Åsen gård (EIS 77) 6 July 2011, 1♀; **STI**, Røros: Sølendet (EIS 88) 27 July 2011, 2♂♂; **NSY**, Bodø: Bertnes (EIS 131) 13 June 2002, 1♂; **NSI**, Beiarn: Storjord (EIS 126) 16 June 2002, 1♀.

Distribution and host of larva. *C. (D.) bimaculata* is widespread in Norway. It has previously been reported from the counties Østfold, Akershus and Rogaland (Spencer 1976, Andersen & Jonassen 1994, Andersen et al. 2004). It appears widespread and common in most of Europe, including Fennoscandia and Denmark (Martinez 2012). The larva is feeding on *Luzula* spp. (Spencer 1990, Pitkin et al. 2012).

* *Cerodontha (D.) caricicola* (Hering, 1926) (Figure 9)

Material. **BØ**, Kongsberg: Ullebergåsen (EIS 27) 6 July 2010, 1♂.

Distribution and host of larva. *C. (D.)*

caricicola has only been found in Ullebergåsen nature reserve near Kongberg in Buskerud county in Norway. It is widespread in Europe, and is also reported from Denmark (Spencer 1976, Martinez 2012). The larva produces a mine in *Carex* spp. (Spencer 1990, Pitkin et al. 2012).

***Cerodontha (D.) fasciata* (Strobl, 1880)**

(Figure 10)

New material. AK, Bærum: Ostøya (EIS 28) 1–24 July 1984, 1♂ (caught in Malaise-trap by Fred Midtgaard); Ås: Ås kirke (EIS 28) 16 June 2003, 1♂; VE, Horten: Røre (EIS 19), 8 June 2003, 1♂; FN, Porsanger: Lakselv (EIS 174) 24 June 2004, 4♂♂ 1♀.

Distribution and host of larva. *C. (D.) fasciata* has previously been reported from the county Sogn og Fjordane in Norway (Spencer 1976). The larva produces mines in *Poa chaixii* L. It is widespread in Europe, including Fennoscandia and Denmark (Spencer 1976, 1990, Martinez 2012).

***Cerodontha (D.) iraeos* (Robineau-Desvoidy, 1851)** (Figure 11)

New material. FV, Alta: Tverrdalen (EIS 173) 25 June 2004, 1♂.

Distribution and host of larva. *C. (D.) iraeos* has previously been found in the counties Akershus and Nord-Trøndelag in Norway (Andersen & Jonassen 1994). It is reported widespread in most of Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2012). The larva forms a white mine in the leaves of *Iris pseudacorus* L. and *I. sibirica* L. (Spencer 1990, Ellis 2012).

***Cerodontha (D.) luctuosa* (Meigen, 1830)**

(Figure 12)

New material. BV, Sigdal: Prestfoss (EIS 27) 3 June 2002, 1♂; VE, Larvik: Stavern (EIS 12) 16 August 2011, 1♂; VAY, Kvinesdal: Kvinesdal (EIS 4) 10 June 2004, 1♂.

Distribution and host of larva. *C. (D.) luctuosa* has previously been reported from the counties Finnmark, Vestfold and Nord-Trøndelag in Norway (Spencer 1976, Andersen & Jonassen 1994). It is reported widespread and frequently common in Europe, including Fennoscandia and

Denmark (Spencer 1976, Martinez 2012). The larva mine in leaves of *Juncus* spp. (Spencer 1990, Pitkin et al. 2012).

***Cerodontha (D.) morosa* (Meigen, 1830)**

(Figure 13)

New material (44 specimens investigated). HEN, Åmot: Rena (EIS 55) 17 September 2003, 1♂; BØ, Nedre Eiker: Ryghsetra (EIS 28) 2 June 2011, 2♂♂3♀♀; VE, Horten: Bastøy (EIS 19) 4 May 2007, 2♂♂; TEY, Kragerø: Kalstadkilen (EIS 11) 24 August 2002, 2♂♂2♀♀; TEI, Hjørtedal: Ambjørndalen (EIS 26) 1 June 2010, 1♂; AAY, Grimstad: Marivold (EIS 6) 7 July 2003, 1♂; NTI, Høylandet: Tverråa (EIS 107) 18 June 1987 (caught in Malaise-trap by Terje Jonassen), 1♂; NSY, Bodø: Straumøy (EIS 131) 16 June 2002, 6♂♂1♀.

Distribution and host of larva. *C. (D.) morosa* is probably common in most of Norway. It has previously been recorded in the county Troms in Norway (Spencer 1976). The species is also reported widespread and frequently common in Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2012). The larva mines in many *Carex* species (Spencer 1990).

Subgenus *Icteromyza* Hendel, 1931

*** *Cerodontha (I.) capitata* (Zetterstedt, 1848)**

(Figure 14)

Material. OS, Gausdal: Dokkvannet (EIS 53) 12 July 2003, 1♂.

Distribution and host of larva. *C. (I.) capitata* has been found only once in Norway; in a meadow close to the lake Dokkvannet in Oppland county. It appears widespread in Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2012). The larva mines in *Juncus* spp. (Spencer 1990).

Subgenus *Phytagromyza* Hendel, 1920

***Cerodontha (P.) flavocingulata* (Strobl, 1909)**

(Figure 15)

New material (162 specimens investigated). AK, Nannestad: Søndre Kringler (EIS 37) 1 June 2011, 7♂♂1♀; BV, Sigdal: Solumsmoen (EIS 27)

3 June 2002, 1♂; **BØ**, Hurum: Verket (EIS 28) 26 May 2002, 2♂♂; **VE**, Larvik: Tvetene (EIS 12) 25 June 2003, 1♂; **TEI**, Hjartdal: Ambjørndalen (EIS 26) 13 June 2011, 1♂; **AAV**, Risør: Sønedeled (EIS 11) 6 July 2003, 1♂; Grimstad: Indre Maløy (EIS 6) 3 June 2011, 1♂; **VAY**, Flekkefjord: Veisdal, Hidra (EIS 4) 12 June 2004, 3♂♂.

Distribution and host of larva. *C. (P.) flavocingulata* is a common species in most of South-Eastern Norway. It has previously been reported from several places in this part of the country (Andersen & Jonassen 1994, Andersen et al. 2004). It appears very widespread and common in Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2012). The larva is widely oligophagous on Poaceae (Spencer 1990, Ellis 2012).

Subgenus *Poemyza* Hendel, 1931

***Cerodontha (P.) atra* (Meigen, 1830)** (Figure 16)

New material (231 specimens investigated).

Ø, Aremark: Bøen sætre (EIS 21) 12 June 2011, 2♂♂; **AK**, Nannestad: Søndre Kringler (EIS 37) 1 June 2011, 1♂; **BØ**, Nedre Eiker: Ryghsetra (EIS 28) 2 June 2011, 2♂♂; **BV**, Rollag: Kvammen (EIS 35) 23 May 2011, 2♂♂2♀♀; **VE**, Horten: Bastøy (EIS 19) 17 May 2007, 1♂; **TEI**, Seljord: Blika (EIS 26) 20 June 2010, 5♂♂2♀♀; **TEY**, Skien: Vestre Marker (EIS 18) 13 June 2011, 3♂♂2♀♀; **AAV**, Grimstad: Groos (EIS 6) 7 July 2003, 2♂♂1♀; Risør: Sønedeled (EIS 11) 6 July 2003, 14♂♂17♀♀; **VAY**, Farsund: Lista fyr (EIS 1) 29 July 2003, 2♂♂1♀; Flekkefjord: Hummerøy, Hidra (EIS 4) 3 August 2003, 2♂♂1♀; **VAI**, Sirdal: Haugom (EIS 4) 13 June 2004, 1♂; **RI**, Forsand: Oanes (EIS 7) 4 August 2003, 1♂; **MRI**, Rauma: Staurset (EIS 77) 6 July 2011, 1♂1♀; **NSY**, Bodø: Bliksvær (EIS 131) 14 June 2002, 3♂♂3♀♀.

Distribution and host of larva. *C. (P.) atra* is the most common *Poemyza*-species in Norway, probably present and common in most of the country. It has previously been reported from the counties Østfold and Akershus (Andersen & Jonassen 1994, Andersen et al. 2004). It is widespread in Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2012). The

larva is oligophagous on Poaceae (Spencer 1990, Ellis 2012).

***Cerodontha (P.) calamagrostidis* Nowakowski, 1967** (Figure 17)

New material. **Ø**, Eidsberg: Slitu (EIS 29) 27 May 1999, 1♂; **BV**, Sigdal: Nermoen (EIS 35) 3 June 2002, 1♂; **VE**, Horten: Borrehaugene (EIS 19) 10 May 2011, 1♂; **TEI**, Seljord: Nord-Blika (EIS 26) 13 June 2011, 1♂; **MRI**, Sunndal: Svøu (EIS 79) 5 July 2011, 1♂.

Distribution and host of larva. *C. (P.) calamagrostidis* has been found spread but rare in Southern Norway. It has previously been reported from Østfold county (Andersen et al. 2004). The species appear widespread in Europe, including Sweden and Finland (Spencer 1976, Martinez 2012). The larva is narrowly oligophagous on Poaceae (Spencer 1990, Ellis 2012).

***Cerodontha (P.) incisa* (Meigen, 1830)**

(Figure 18)

New material (35 specimens investigated).

Ø, Eidsberg: Slitu (EIS 29) 27 May–3 August 1999, 1♂4♀♀; Aremark: Bøen sætre (EIS 21) 12 June 2011, 1♂; **AK**, Enebakk: Flateby (EIS 29) 12 June–24 August 1998, 1♂3♀♀; **BV**, Sigdal: Solumsmoen (EIS 27) 3 June 2002, 2♂♂; **VE**, Sande: Sande (EIS 28) 16 June–9 August 2000, 2♂♂2♀♀; Horten: Bastøy (EIS 19) 4 August 2007, 1♂1♀.

Distribution and host of larva. *C. (P.) incisa* is probably present in most of Southern and Middle Norway. It has previously been reported from the counties Nord-Trøndelag and Oppland (Spencer 1976, Andersen & Jonassen 1994). It appears widespread in Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2012). The larva is oligophagous on Poaceae (Spencer 1990, Ellis 2012).

***Cerodontha (P.) lapplandica* (Rydén, 1956)**

(Figure 19)

New material (24 specimens investigated).

NTI, Høylandet: Tverråa (EIS 107) 18 June 1987, 1♂ (caught in Malaise-trap by Terje Jonassen); **NSY**, Bodø: Hunstad (EIS 131) 13 June 2002, 1♂; **NSI**, Beiarn: Arstad (EIS 126) 16 June 2002,

1♂; **TRY**, Tromsø: Holt (EIS 162) 21 June 2004, 1♂1♀; **FV**, Alta: Elvestrand (EIS 173) 22 June 2004, 2♂♂4♀♀.

Distribution and host of larva. *C. (P.) lapplandica* has previously been reported from the counties Nordland and Troms in Norway (Spencer 1976). So far it has been reported only from Northern Norway, the record furthest south is in Nord-Trøndelag. It has been reported from some other North European countries including Sweden, mainly in mountainous areas (Spencer 1976, Martinez 2012). The larva is oligophagous on Poaceae (Spencer 1990, Ellis 2012).

Cerodontha (P.) lateralis (Macquart, 1835)

(Figure 20)

New material (48 specimens investigated). **Ø**, Moss: Reierbukta (EIS 19) 3 September 1998, 1♂3♀♀; Eidsberg: Slitu (EIS 29) 3 August 1999, 1♂5♀♀; **VE**, Horten: Bastøy (EIS 19) 4 May–21 August 2007, 4♂♂5♀♀; **TEY**, Porsgrunn: Berg (EIS 11) 21 August 2002, 3♀♀; **AAV**, Grimstad: Landvik (EIS 6) 7 July 2003, 2♂♂1♀; **VAY**, Farsund: Kviljo (EIS 1) 29 July 2003, 1♂.

Distribution and host of larva. *C. (P.) lateralis* is common in most of South-Eastern Norway. It has previously been reported from the counties Østfold and Vestfold (Andersen et al. 2004). It is widespread through Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2012). The larva is narrowly oligophagous on Triticeae (Spencer 1990, Ellis 2012).

Cerodontha (P.) muscina (Meigen, 1830)

(Figure 21)

New material (98 specimens investigated). **Ø**, Eidsberg: Slitu (EIS 29) 19 July 1999, 1♂; Sarpsborg: Greåker (EIS 20) 6 August 2002, 1♂; **HEN**, Stor-Elvdal: Koppang (EIS 64) 17 July 2003, 1♂; **BØ**, Lier: Kjellstadveien 42 (EIS 28) 21 June 2003, 1♂; **TEI**, Seljord: Nord-Blika (EIS 26) 1 June 2010, 1♂; **FV**, Alta: Flaten (EIS 173) 22 June 2004, 4♂♂2♀♀.

Distribution and host of larva. *C. (P.) muscina* has been found relatively common in most parts of Norway. Previously it has been reported from several parts of Southern Norway

(Spencer 1976, Andersen & Jonassen 1994, Andersen et al. 2004). It has been reported from most of Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2012). The larva is widely oligophagous on Poaceae (Spencer 1990, Ellis 2012).

* *Cerodontha (P.) pygmina* (Hendel, 1931)

(Figure 22)

Material. **AK**, Ås: Ås kirke (EIS 28) 20 May 1994, 1♂; **VE**, Sande: Galleberg (EIS 28) 25 May 2000, 1♂ (identified by Michael von Tschirnhaus).

Distribution and host of larva. *C. (P.) pygmina* has been found only in the counties Akershus and Vestfold in South-Eastern Norway. It is reported from several European countries, but is not a common species (Martinez 2012). The host of the larva is unknown.

Subgenus *Xenophytomyza* Frey, 1946

Cerodontha (X.) atronitens (Hendel, 1920)

(Figure 23)

New material (27 specimens investigated). **Ø**, Askim: Askim sentrum (EIS 29) 18 June 2001, 5♂♂1♀; Aremark: Bøen sætre (EIS 21) 12 June 2011, 1♂; **AK**, Nannestad: Søndre Kringler (EIS 37) 16 June 2011, 1♂; **VE**, Horten: Borrehaugene (EIS 19) 8 June 2002, 2♂♂; **TEY**, Skien: Vestre Marker (EIS 18) 13 June 2011, 1♂; **TEI**, Hjartdal: Ambjørndalen (EIS 26) 26 June 2011, 1♀; **AAV**, Grimstad: Homborøy (EIS 6) 3 June 2011, 1♂1♀; **VAY**, Flekkefjord: Veisdal, Hydra (EIS 4) 12 June 2004, 2♂♂1♀.

Distribution and host of larva. *C. (X.) atronitens* has been found to be relatively common in parts of South-Eastern Norway. It has previously been reported from Akershus county (Andersen & Jonassen 1994). It occurs widespread in Europe, and has also been found in Fennoscandia and Denmark (Spencer 1976, Martinez 2012). The larva has been reared from the leaf sheath of *Poa nemoralis* L. (Scheirs et al. 1995).

Cerodontha (X.) biseta (Hendel, 1920)

(Figure 24)

New material (30 specimens investigated). **Ø**, Moss: Alby (EIS 19) 12 June 2001, 2♂♂3♀♀;

VE, Horten: Borrehaugene (EIS 19) 8 June 2002, 2♂♂; Larvik: Gutterød gartneri (EIS 12), 25 June 2003, 1♂; **TEI**, Bø: Bø sentrum (EIS 18) 13 June 2004, 1♂; **AAy**, Grimstad: Indre Maløy (EIS 6) 25 June 2011, 1♂4♀♀.

Distribution and host of larva. *C. (X.) biseta* has been found scattered in South-Eastern Norway. It has previously been reported from Akershus county (Andersen & Jonassen 1994). It is reported widespread but local in most of Europe, including Fennoscandia and Finland (Spencer 1976, Martinez 2012). The host of the larva is unknown.

***Cerodontha (X.) venturii* Nowakowski, 1967**
(Figure 25)

New material (32 specimens investigated). **AK**, Nannestad: Søndre Kringler (EIS 37) 1 June 2011, 1♂; **BV**, Sigdal: Prestfoss (EIS 27) 3 June 2002, 1♂1♀; **VE**, Horten: Borrehaugene (EIS 19) 27 May 2010, 1♂; **TEI**, Hjartdal: Ambjørndalen (EIS 26) 20 June 2010, 7♂; **AAy**, Grimstad: Homborøy (EIS 6) 3 June 2011, 2♂♂.

Distribution and host of larva. *C. (X.) venturii* has been found scattered in South-Eastern Norway. It was reported for the first time from Akershus county in Norway by Andersen & Jonassen (1994). It has been reported from many European countries, including Denmark and Finland (Spencer 1976, Martinez 2012). The larva mine in *Dactylis glomerata* L. (Dempewolf 2001).

GENUS *METOPOMYZA* ENDERLEIN, 1936

* ***Metopomyza flavonotata* (Haliday, 1833)**
(Figure 26)

Material. **Ø**, Rygge: Store Sletter (EIS 19) 13 June 2003, 1♀; **AK**, Nannestad: Søndre Kringler (EIS 37) 1 June 2011, 1♀; **BØ**, Kongsberg: Ullebergåsen (EIS 27) 21 June 2008, 2♂♂; **VE**, Horten: Borrehaugene (EIS 19) 27 May 2010, 1♂; 10 May 2011, 1♂; Horten: Bastøy (EIS 19) 4 June 2010, 1♂; **TEI**, Hjartdal: Ambjørndalen (EIS 26) 1 June 2010, 1♂; **TEY**, Skien: Vestre Marker (EIS 18) 13 June 2011, 1♂; **AAy**, Grimstad: Hesnesøy (EIS 6) 3 June 2011, 1♀; **NSI**, Beiarn: Storjord (EIS 126) 16 June 2002, 1♂.

Distribution and host of larva. *M. flavonotata* is the most common species in this genus in Norway and probably present throughout the country. It occurs widespread in Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2012). The larva is oligophagous on Poaceae, forming a mine in the leaf sheath (Spencer 1990, Ellis 2012, Pitkin et al. 2012).

* ***Metopomyza scutellata* (Fallén, 1823)** (Figure 27)

Material. **BØ**, Kongsberg: Ullebergåsen (EIS 27) 21 June 2008, 5♂♂6♀♀; 4 July 2008, 2♀♀; 6 June 2009, 1♂.

Distribution and host of larva. *M. scutellata* has been found only in Ullebergåsen nature reserve near Kongsberg in Norway. It occurs widespread in Europe, including Fennoscandia and Denmark, but rarely common (Spencer 1976, Martinez 2012). The larva feeds on *Carex* spp. (Spencer 1990, Ellis 2012).

* ***Metopomyza xanthaspioides* (Frey, 1946)**
(Figure 28)

Material. **Ø**, Sarpsborg: Greåker (EIS 20) 2 June 2003, 1♂; Aremark: Bøen sætre (EIS 21) 12 June 2011, 1♂3♀♀; **AK**, Oslo: Hovedøya (EIS 28) 11 May 2011, 1♂; **VE**, Sande: Galleberg (EIS 28) 25 May 2000, 1♀; **AAy**, Grimstad: Indre Maløy (EIS 6) 2 June 2011, 1♂3♀♀.

Distribution and host of larva. *M. xanthaspioides* is relatively common in South-Eastern Norway. It is a widespread, but relatively uncommon species in the rest of Europe, including Sweden and Finland (Martinez 2012). The host plant of the larva is unknown.

GENUS *CALYCOMYZA* HENDEL, 1931

***Calycomyza artemisiae* (Kaltenbach, 1856)**
(Figure 29)

New material. **VE**, Tjøme: Verdens Ende (EIS 19) 18 August 2002, 1♂; Larvik: Tvetene (EIS 12) 25 June 2003, 1♂.

Distribution and host of larva. *C. artemisiae* is a rare species in Norway. It has previously been reported from the counties Akershus and north

Oppland (Spencer 1976). It is the only species from this small genus found in Norway. It appears widespread in Europe, including Fennoscandia and Denmark (Martinez 2012). The larva mine in *Achillea* spp., *Artemisia* spp. and *Eupatorium* spp. (Spencer 1990, Ellis 2012, Pitkin et al. 2012).

GENUS *AULAGRYMYZA* ENDERLEIN, 1936

* *Aulagromyza buhri* (de Meijere, 1938)

(Figure 30)

Material. AAY, Grimstad: Hesnesøy (EIS 6) 25 June 2011, 5♂♂1♀.

Distribution and host of larva. *A. buhri* has been found only on the island Hesnesøy close to Grimstad on the South-Eastern coast of Norway. It is widespread in Europe except in the southern parts, and has not been reported from Sweden or Denmark (Martinez 2012). The larva is a stem-miner in *Galium album* Miller and *Asperula* spp. (Spencer 1976, 1990).

Aulagromyza trivittata (Loew, 1873) (Figure 31)

New material (151 specimens investigated). Ø, Moss: Alby (EIS 19) 12 June 2001, 5♀♀; Askim: Askim sentrum (EIS 29) 18 June 2001, 1♀; BØ, Hole: Røyse (EIS 36) 19 June 1996, 6♀♀; Hurum: Tofte (EIS 28) 18 May 2002, 1♂2♀♀; Hurum: Verket (EIS 28) 26 May 2002, 1♂2♀♀; VE, Horten: Borrevann (EIS 19) 7 June 1997, 1♀; Horten: Borrehaugene (EIS 19) 27 May 2010, 26♂♂12♀♀; AAY, Grimstad: Hesnesøy (EIS 6) 3 June 2011, 1♂5♀♀.

Distribution and host of larva. *A. trivittata* is the most common Norwegian species in this genus and is found to be relatively common in South-Eastern Norway. It has previously been reported from the county Akershus (as *Paraphytomyza trivittata*, Andersen & Jonassen 1994, Andersen et al. 2004). It occurs widespread in Europe, including Denmark and Sweden (Spencer 1976, Martinez 2012). The larva is a stem-miner in *Galium album* Miller (Spencer 1990).

GENUS *PSEUDONAPOMYZA* HENDEL, 1920

Pseudonapomyza atra (Meigen, 1830)

(Figure 32)

New material (37 specimens investigated). AK, Nannestad: Søndre Kringler (EIS 37) 16 June 2011, 1♂; Oslo: Hovedøya (EIS 28) 11 May 2011, 1♂; VE, Horten: Bastøy (EIS 19) 4 May–6 July 2007, 5♂♂8♀♀, 31 May 2009, 1♂; TEY, Kragerø: Jomfruland (EIS 11) 16 July 2011, 1♂3♀♀; AAY, Grimstad: Indre Maløy (EIS 6) 25 June 2011, 1♂.

Distribution and host of larva. *P. atra* is relatively common in coastal areas of South-Eastern Norway. It has previously been reported from Akershus county (Andersen & Jonassen 1994, Andersen et al. 2004). It is reported widespread in Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2012). The larva feeds in a leaf-mine in Gramineae (Spencer 1990).

Pseudonapomyza europaea Spencer, 1973

(Figure 33)

New material. Ø, Rygge: Store Sletter (EIS 19) 13 June 2003, 5♂♂1♀.

Distribution and host of larva. *P. europaea* has been found only on two small islands in the Oslofjord-area: Bastøy in Vestfold county (Andersen & Jonassen 1994) and Store Sletter in Østfold county. It occurs widespread in Europe, but has not been reported from the other Nordic countries (Martinez 2012, Pitkin et al. 2012). The host plant of the larva is unknown.

Conclusions

The Norwegian fauna of Agromyzidae has increased to 198 species when the species reported in this article are included. Already Spencer in 1976 reported 385 Agromyzidae species present in Denmark and Fennoscandia. Consequently it is reasonable to believe that today only about half of the Norwegian fauna of Agromyzidae has been discovered. The best investigated areas lies in South-Eastern Norway, while Western, Middle and Northern Norway are much less investigated.

Also coastal areas are generally better investigated than inland and mountainous areas.

Acknowledgement. As part of various research projects, Øystein Kjos has been most helpful in collecting flies. One male *Cerodontha (Poemyza) lapplandica* (Rydén, 1956) and one male *Cerodontha (Dizygomyza) morosa* (Meigen, 1830) included here was caught by Terje Jonassen, and one male *Cerodontha (Dizygomyza) fasciata* (Strobl, 1880) was caught by Fred Midtgaard, and handed over to me, of which I am grateful. I am also grateful to Michael von Tschirnhaus for identifying one male *Cerodontha (Poemyza) pygmina* (Hendel, 1931) in my material. Part of the field work was supported by grants from the The Research Council of Norway. I am also indebted to Trond Hofsvang for reviewing a previous version of the manuscript.

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Appendix. Distribution maps of 33 species of Agromyzidae in the genera *Amauromyza*, *Aulagromyza*, *Calcomyza*, *Cerodontha*, *Metopomyza* and *Pseudonapomyza* recorded from Norway. The distribution is given as EIS-grid maps (European Invertebrate Survey).

FIGURE 1. Distribution of *Amauromyza* (*Cephalomyza*) *chenopodivora* Spencer, 1971 in Norway.

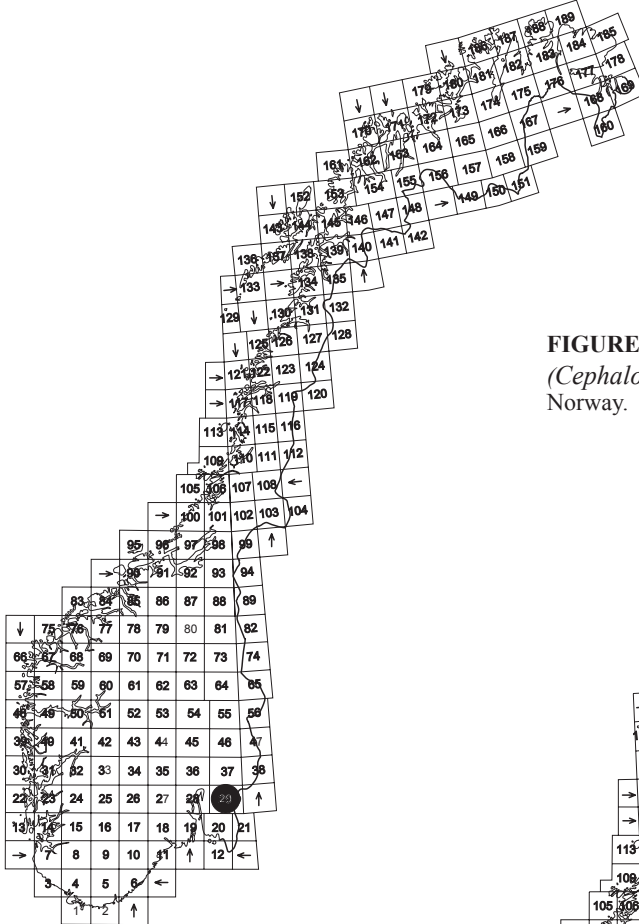


FIGURE 2. Distribution of *Amauromyza* (*Cephalomyza*) *monfalconensis* (Strobl, 1909) in Norway.

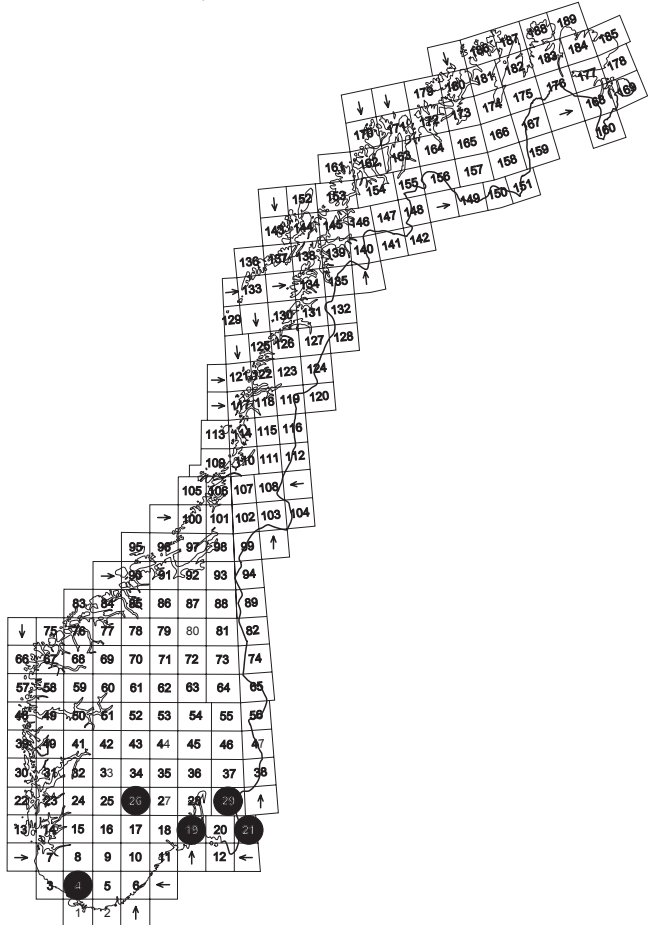


FIGURE 3. Distribution of *Cerodontha* (*Butomomyza*) *rohdendorfi* Nowakowski, 1967 in Norway.

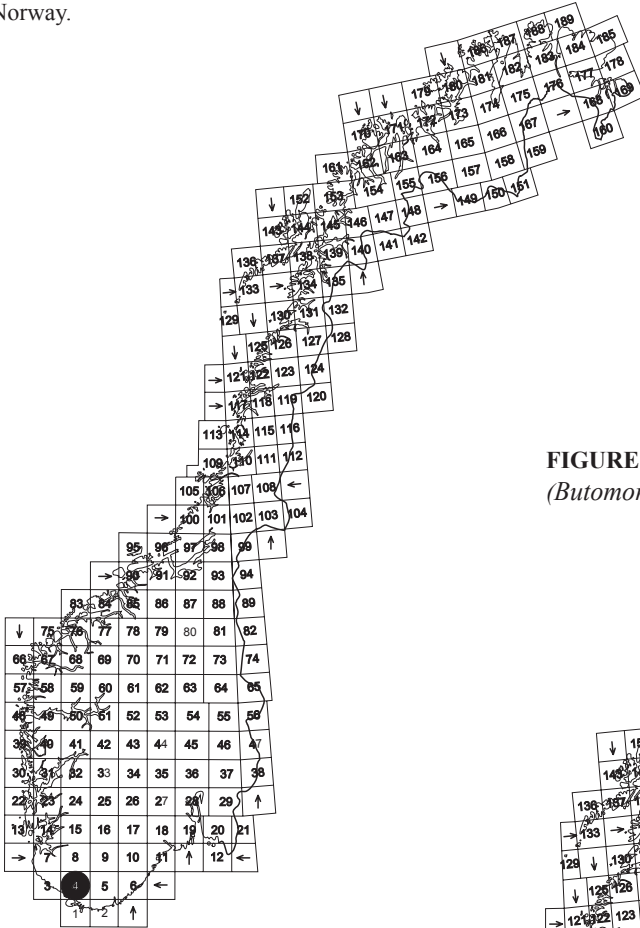


FIGURE 4. Distribution of *Cerodontha* (*Butomomyza*) *scutellaris* (Roser, 1840) in Norway.

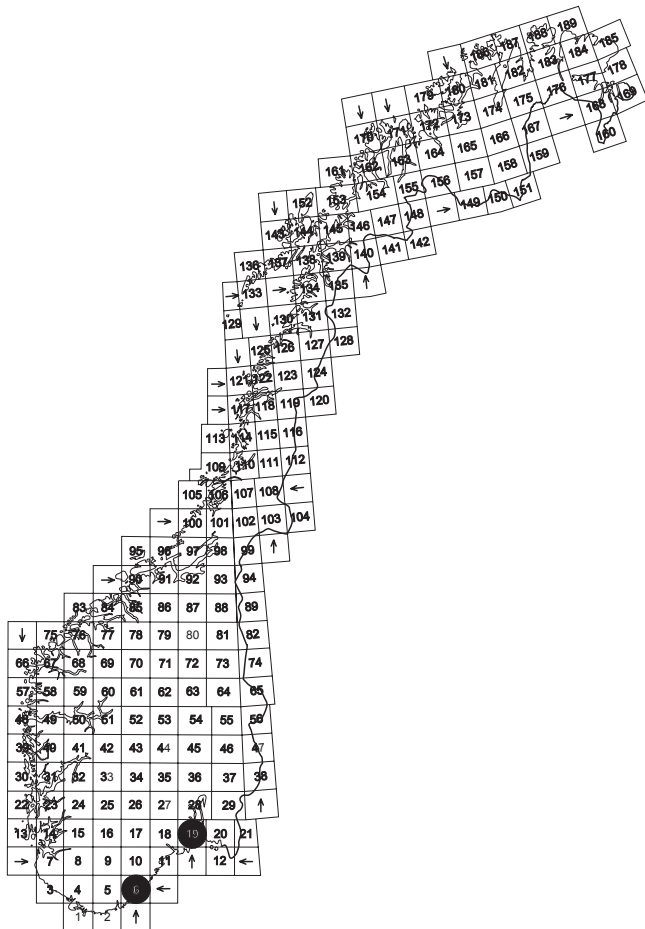


FIGURE 5. Distribution of *Cerodontha* (*Cerodontha*) *denticornis* (Panzer, 1806) in Norway.

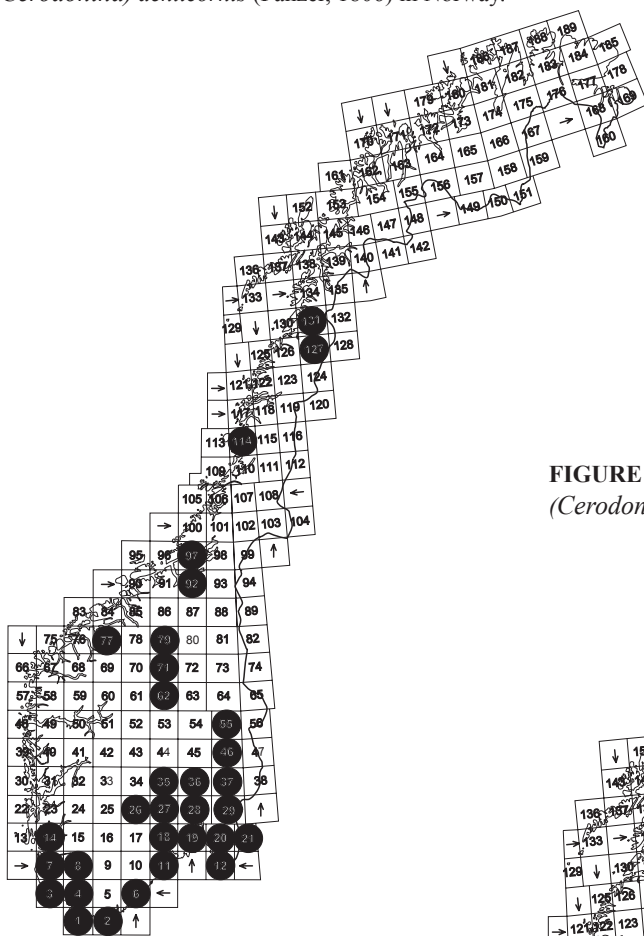


FIGURE 6. Distribution of *Cerodontha* (*Cerodontha*) *fulvipes* (Meigen, 1830) in Norway.

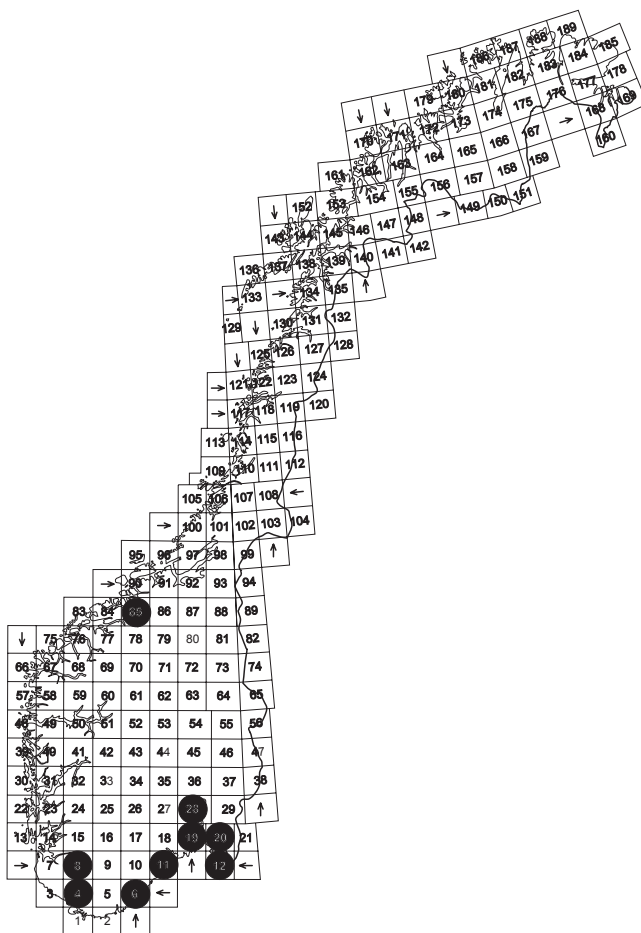


FIGURE 7. Distribution of *Cerodontha* (*Cerodontha*) *stackelbergi* Nowakowski, 1972 in Norway.

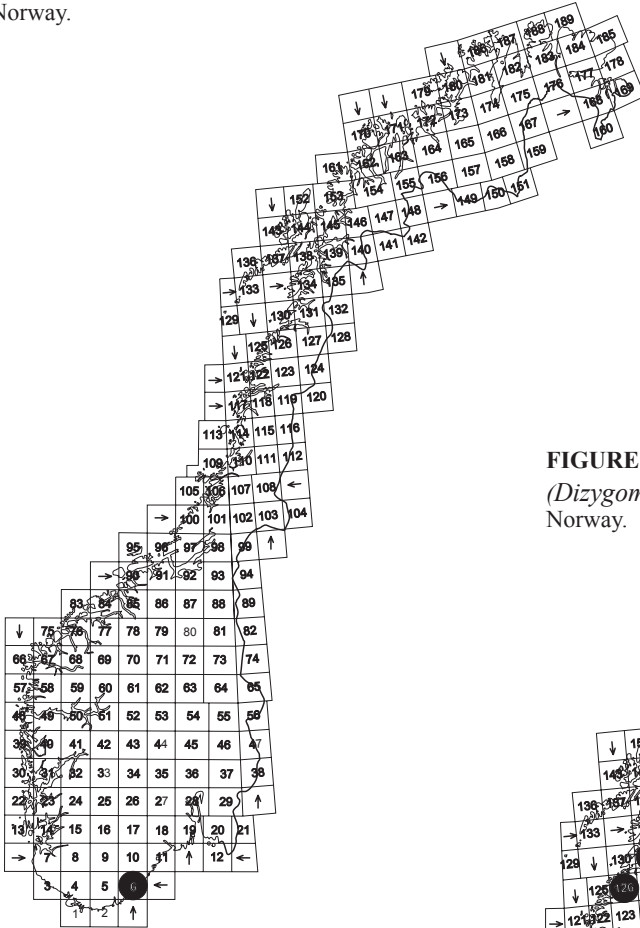


FIGURE 8. Distribution of *Cerodontha* (*Dizygomyza*) *bimaculata* (Meigen, 1830) in Norway.

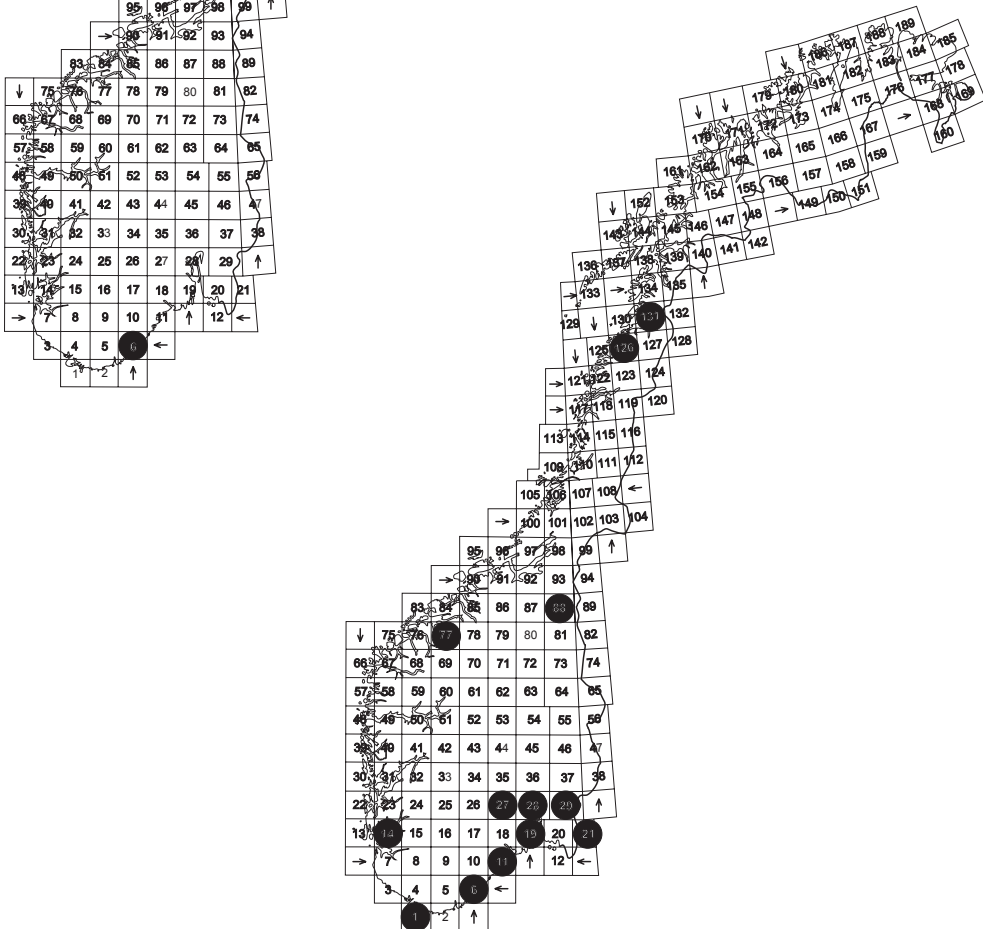


FIGURE 9. Distribution of *Cerodontha (Dizygomyza) caricicola* (Hering, 1926) in Norway.

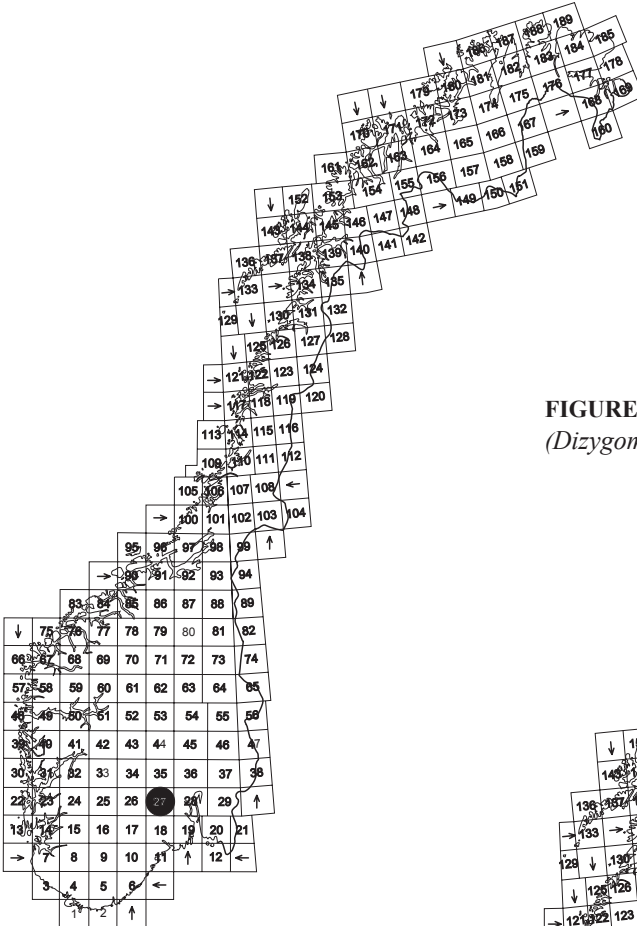


FIGURE 10. Distribution of *Cerodontha (Dizygomyza) fasciata* (Strobl, 1880) in Norway.

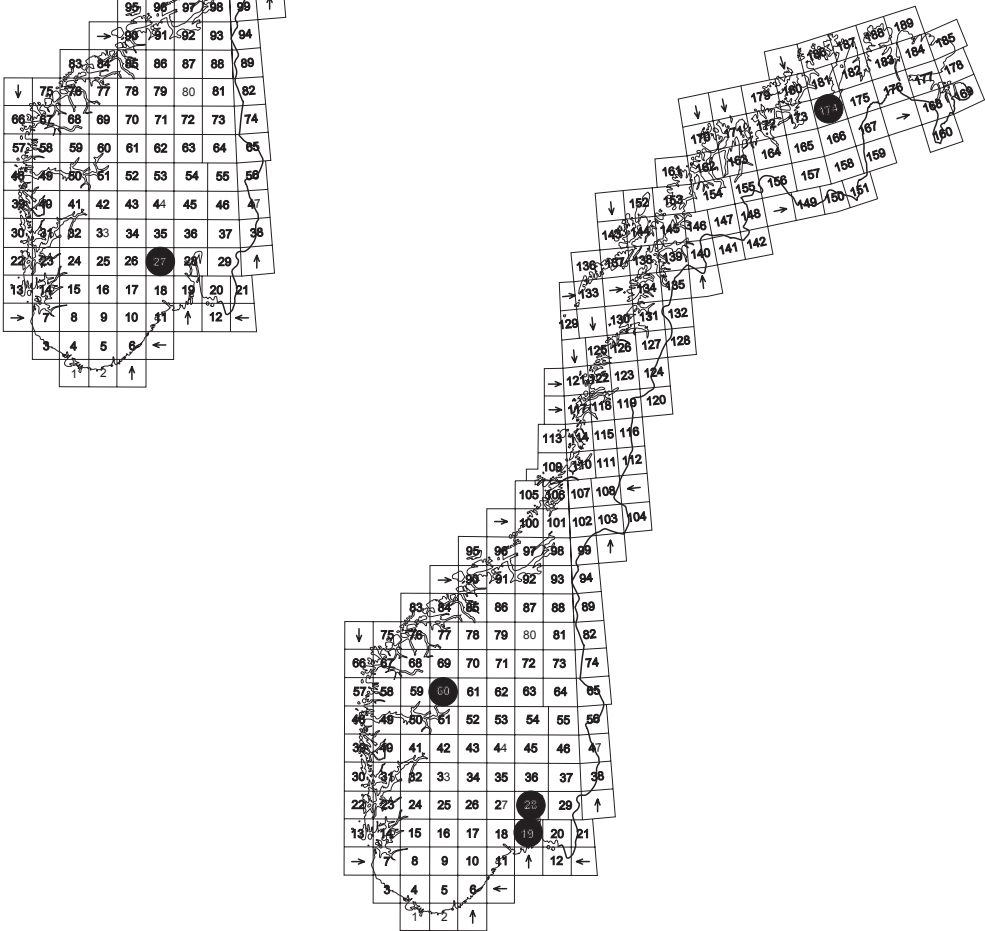


FIGURE 11. Distribution of *Cerodontha (Dizygomyza) iraeos* (Robineau-Desvoidy, 1851) in Norway.

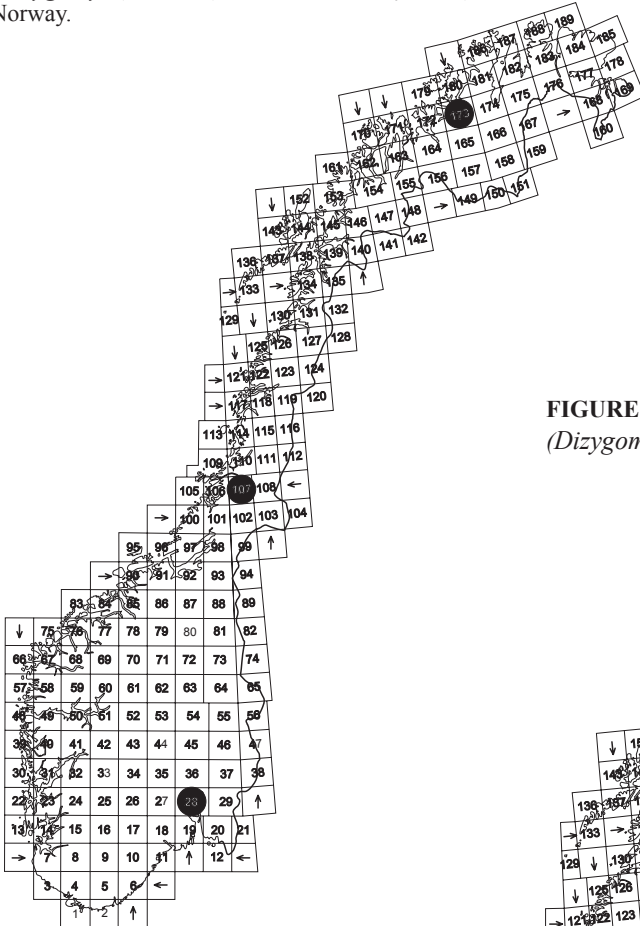


FIGURE 12. Distribution of *Cerodontha (Dizygomyza) luctuosa* (Meigen, 1830) in Norway.

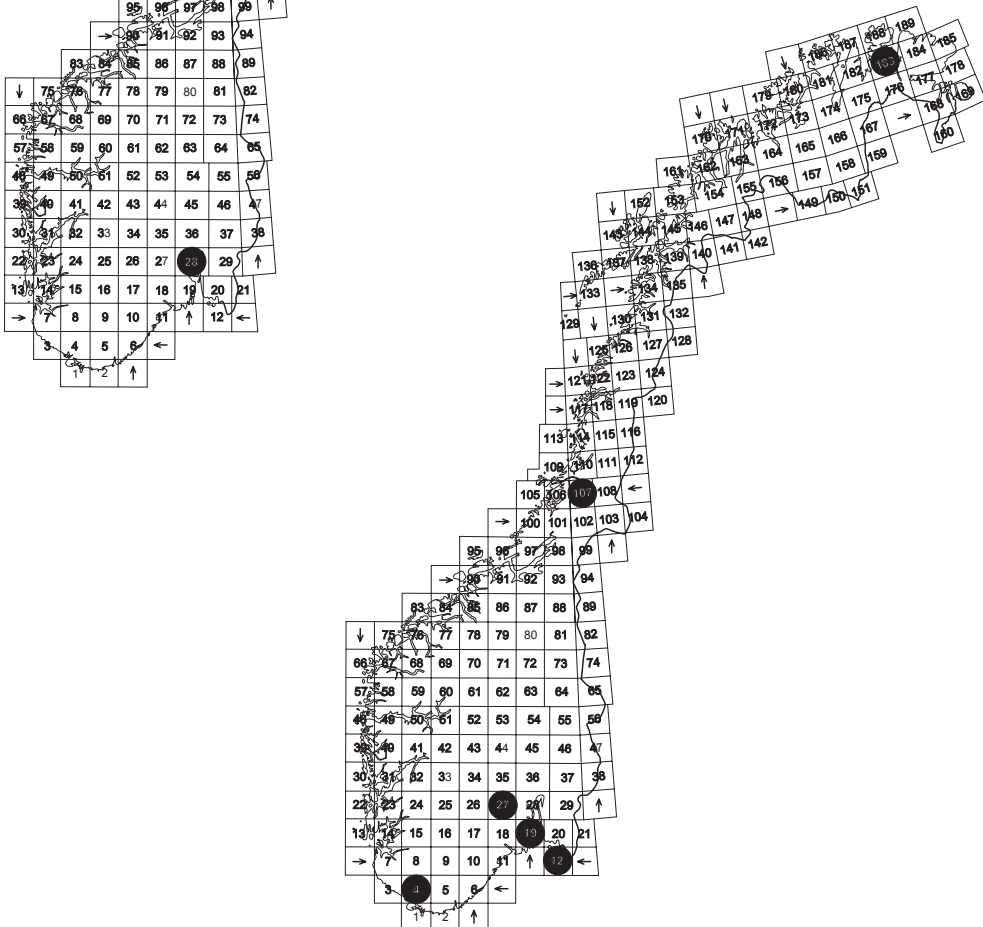


FIGURE 13. Distribution of *Cerodontha (Dizygomyza) morosa* (Meigen, 1830) in Norway.

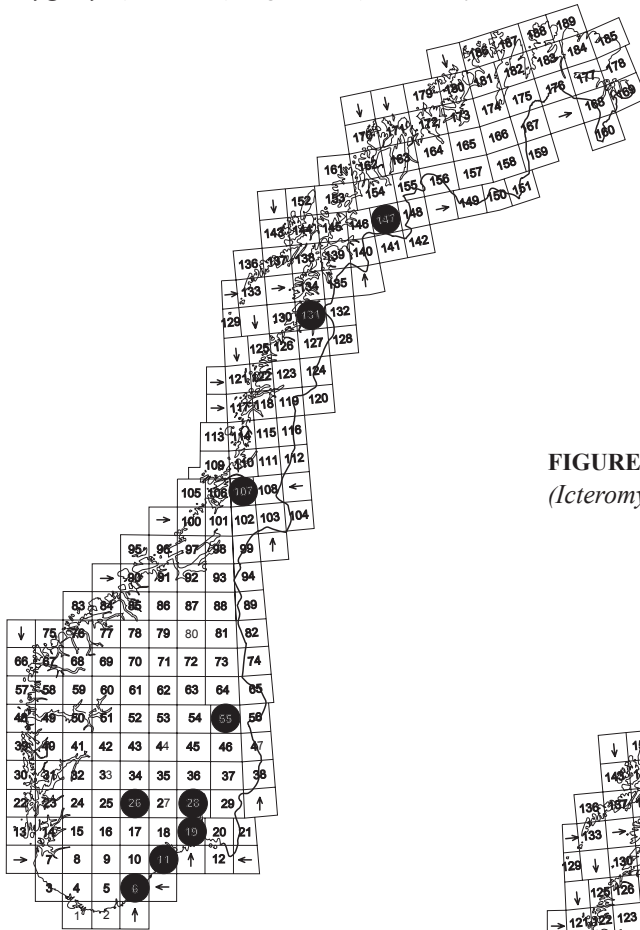


FIGURE 14. Distribution of *Cerodontha (Icteromyza) capitata* (Zetterstedt,

FIGURE 15. Distribution of *Cerodontha (Phytagromyza) flavocingulata* (Strobl, 1909) in Norway.

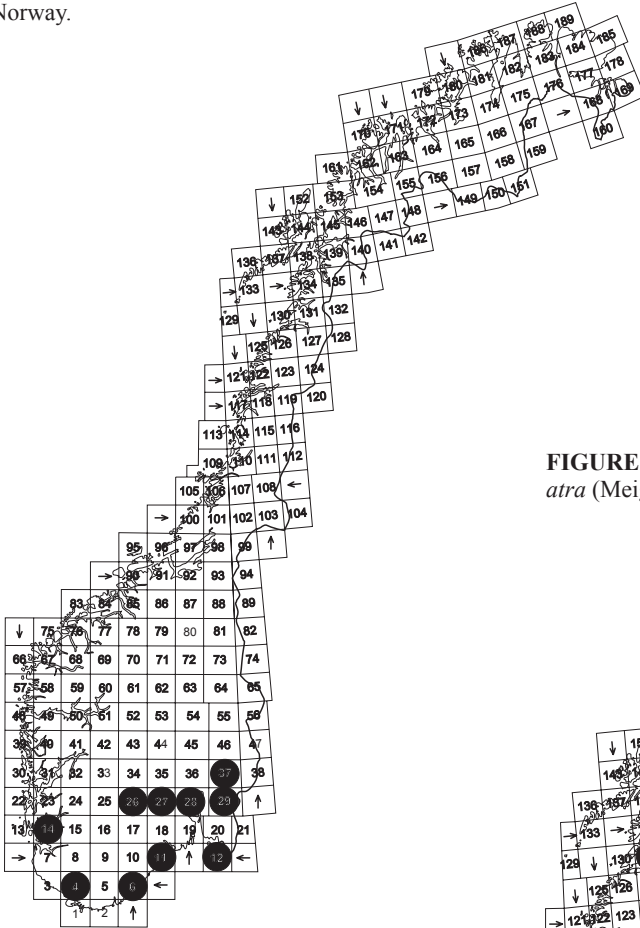


FIGURE 16. Distribution of *Cerodontha (Poemyza) atra* (Meigen, 1830) in Norway.

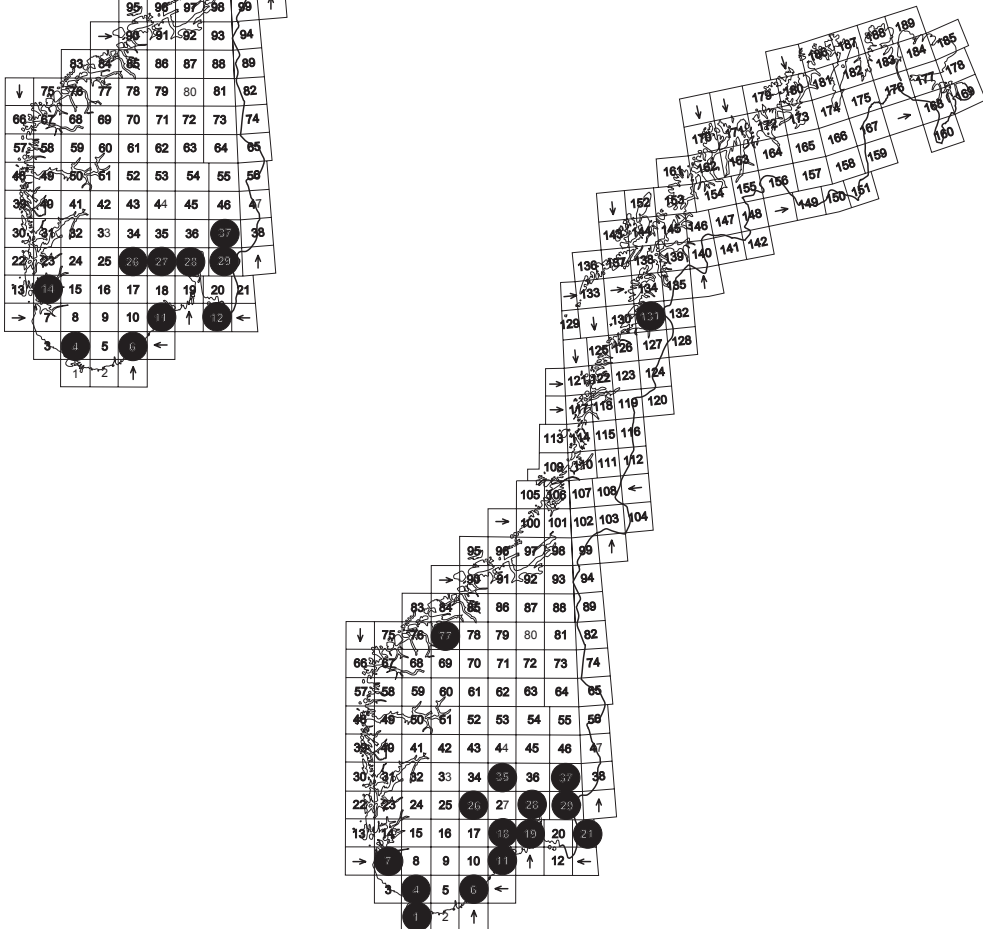


FIGURE 17. Distribution of *Cerodontha (Poemyza) calamagrostidis* Nowakowski, 1967 in Norway.

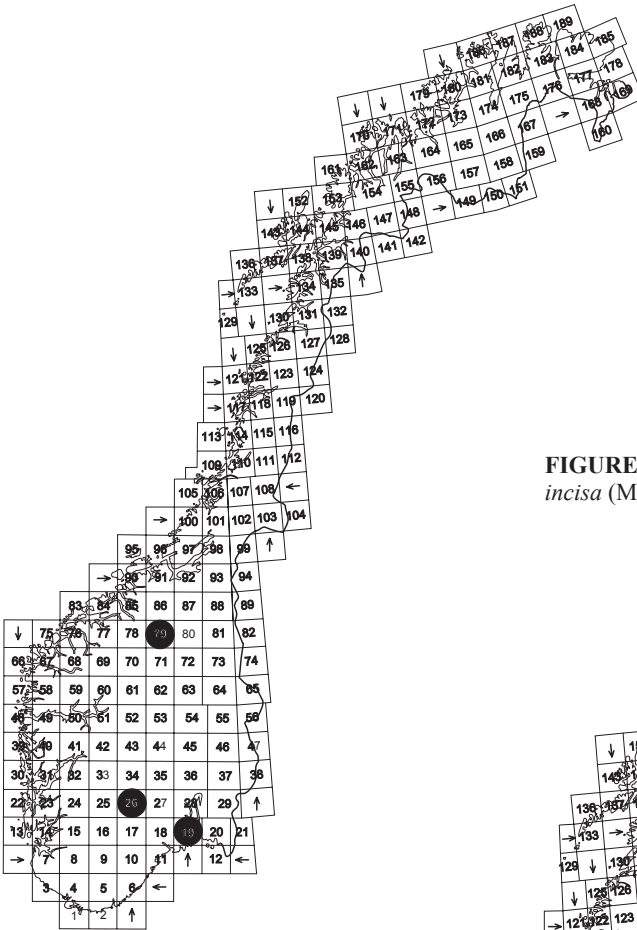


FIGURE 18. Distribution of *Cerodontha (Poemyza) incisa* (Meigen, 1830) in Norway.

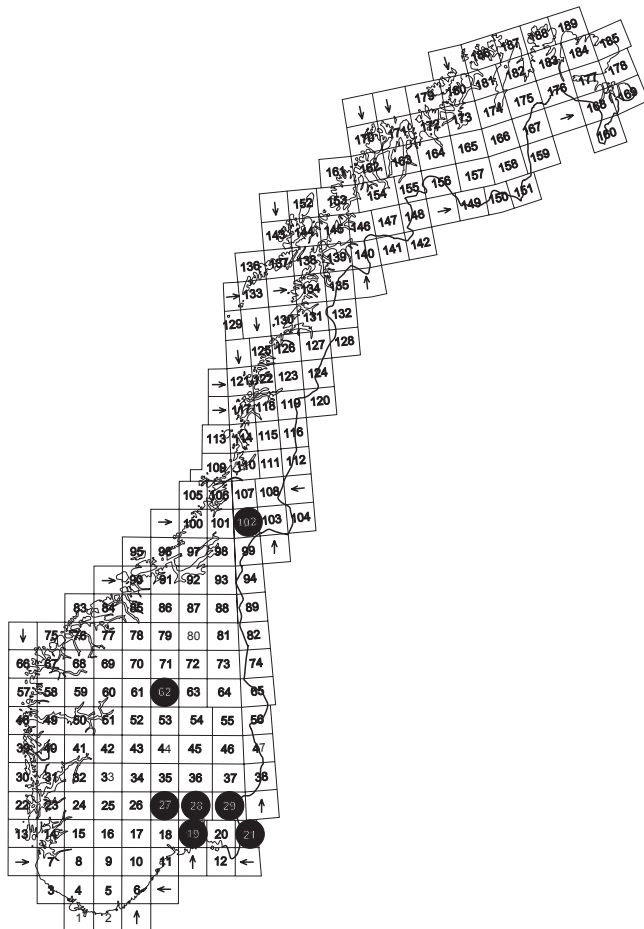


FIGURE 19. Distribution of *Cerodontha (Poemyza) lapplandica* (Rydén, 1956) in Norway.

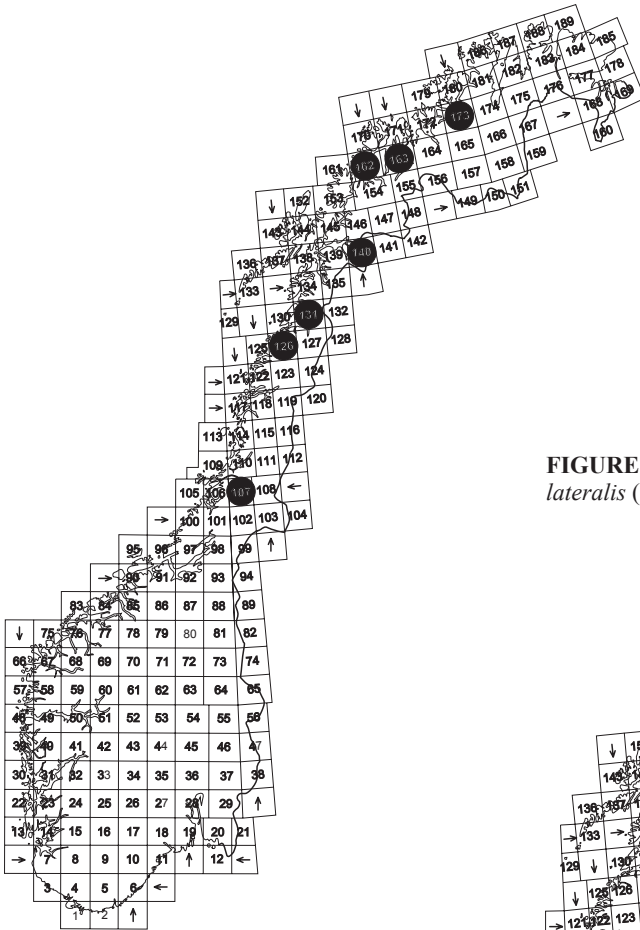


FIGURE 20. Distribution of *Cerodontha (Poemyza) lateralis* (Macquart, 1835) in Norway.

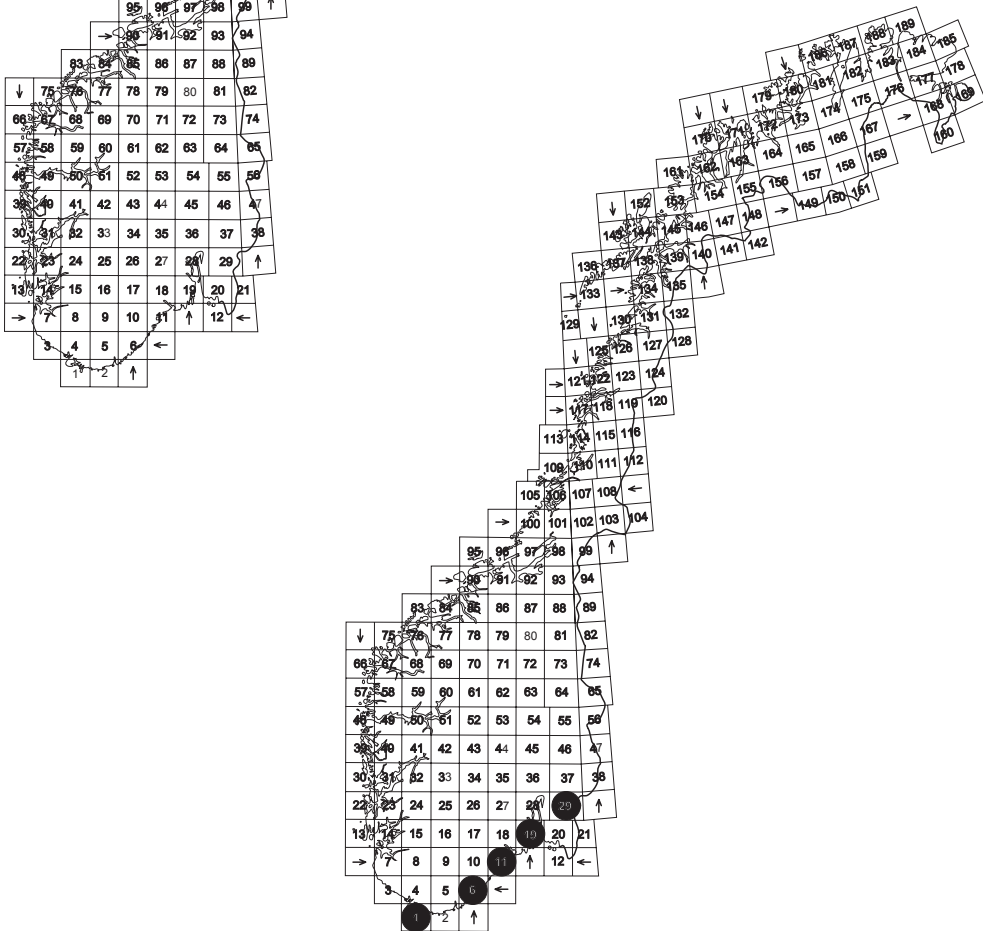


FIGURE 21. Distribution of *Cerodontha (Poemyza) muscina* (Meigen, 1830) in Norway.

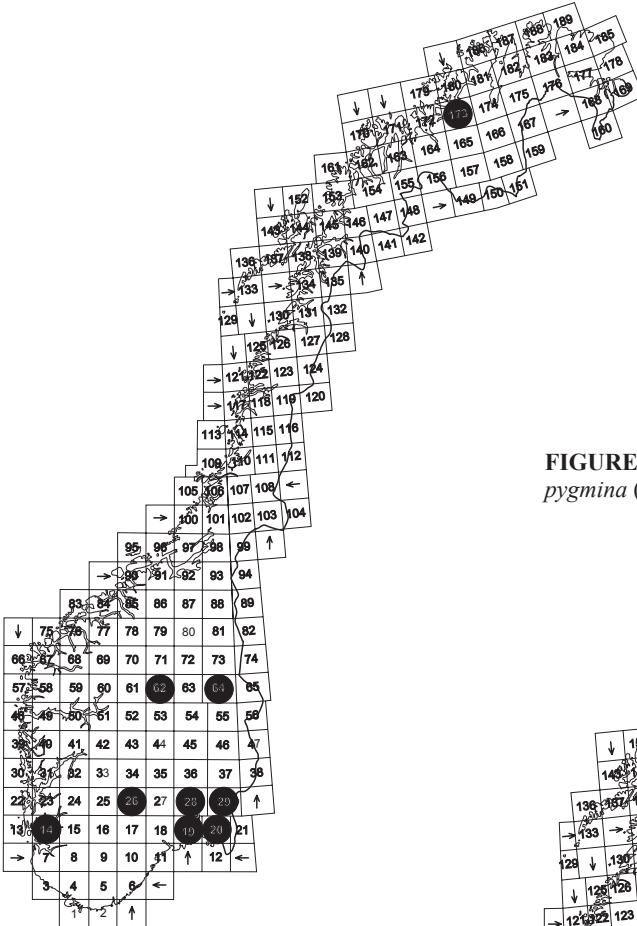


FIGURE 22. Distribution of *Cerodontha (Poemyza) pygmina* (Hendel, 1931) in Norway.

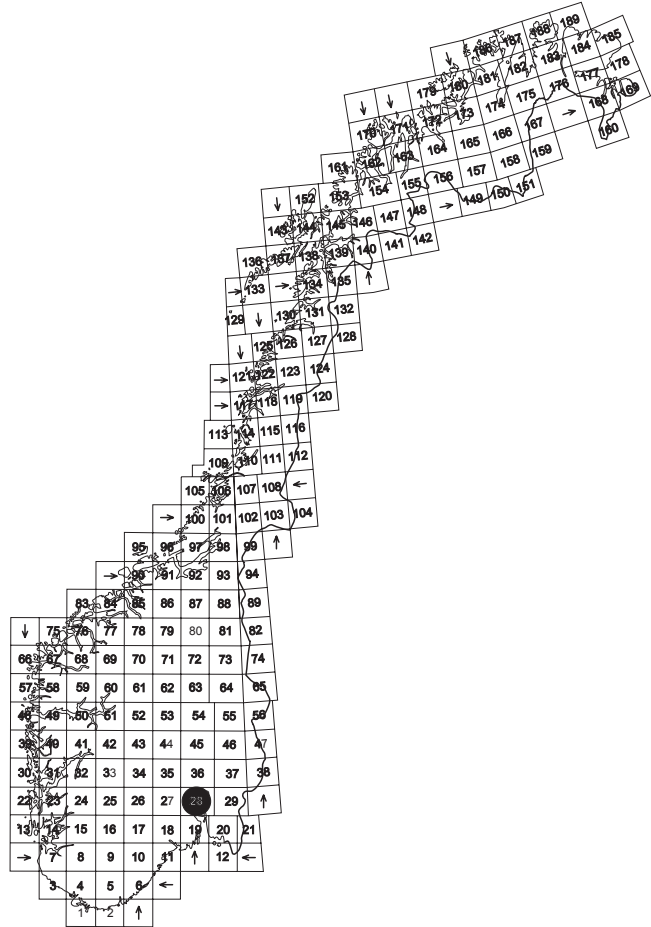


FIGURE 23. Distribution of *Cerodontha (Xenophytomyza) aronitens* (Hendel, 1920) in Norway.

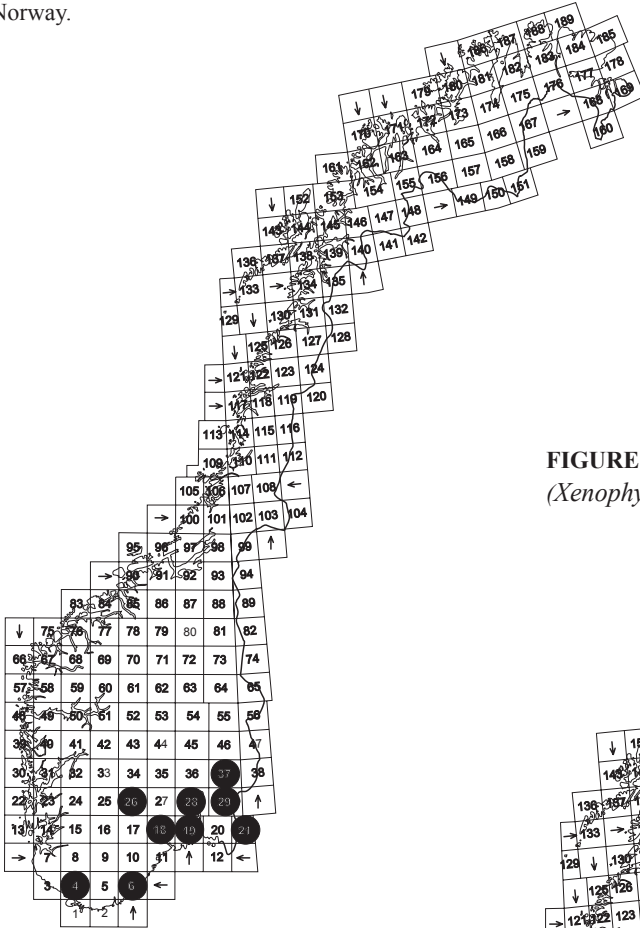


FIGURE 24. Distribution of *Cerodontha (Xenophytomyza) biseta* (Hendel, 1920) in Norway.

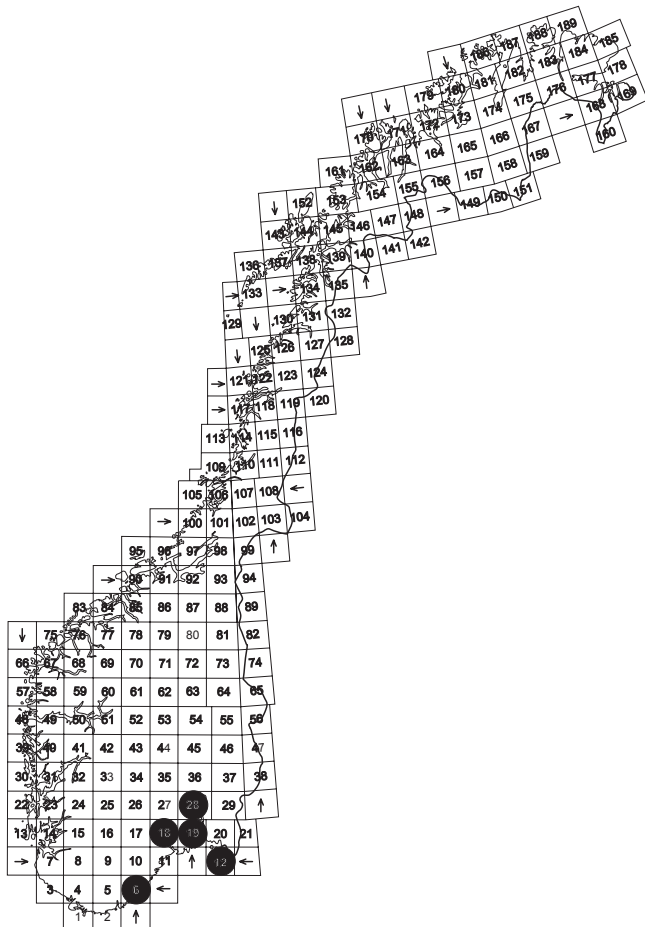


FIGURE 25. Distribution of *Cerodontha (Xenophytomyza) venturii* Nowakowski, 1967 in Norway.

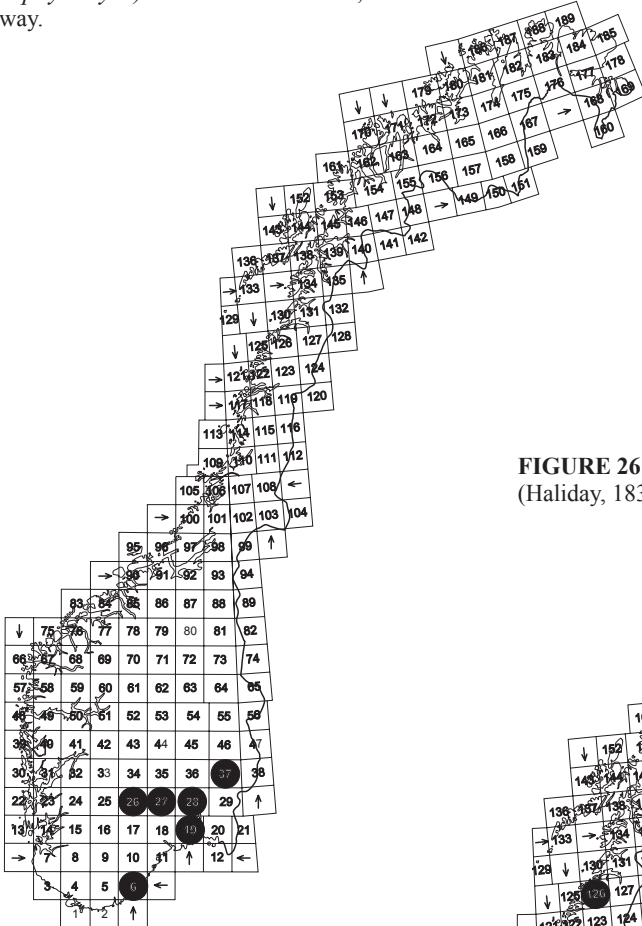


FIGURE 26. Distribution of *Metopomyza flavonotata* (Haliday, 1833) in Norway.

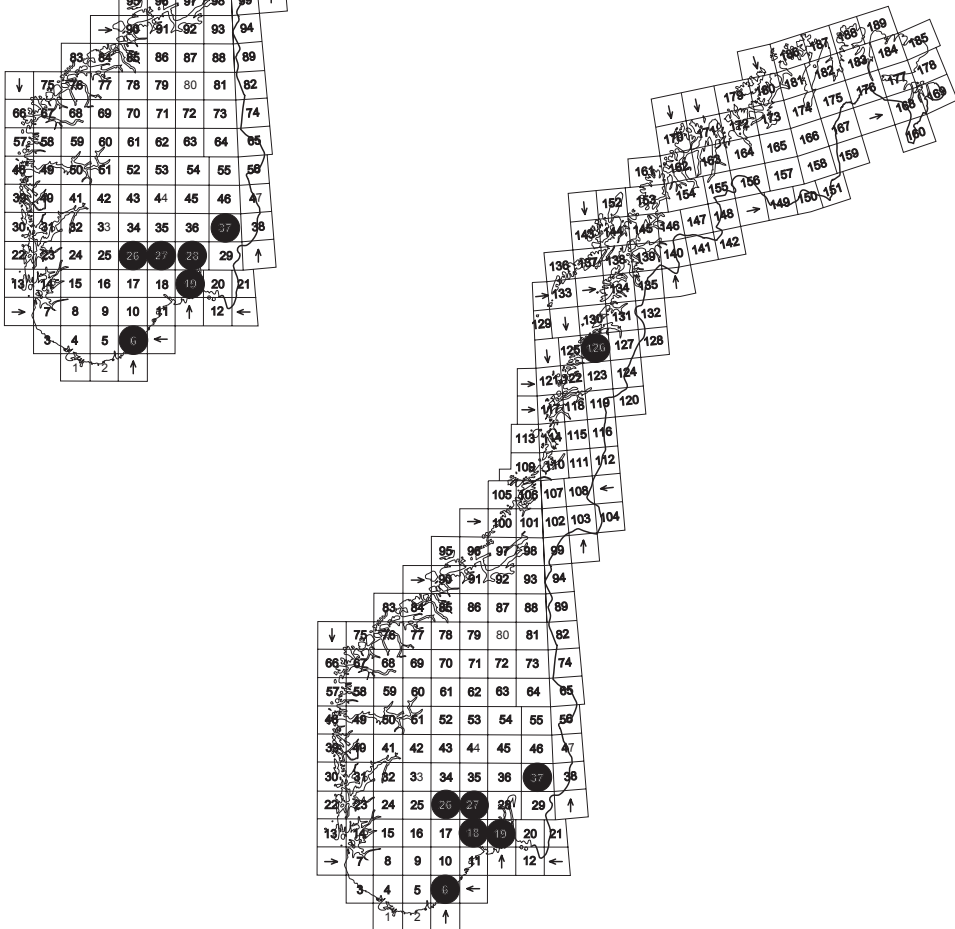


FIGURE 27. Distribution of *Metopomyza scutellata* (Fallén, 1823) in Norway.

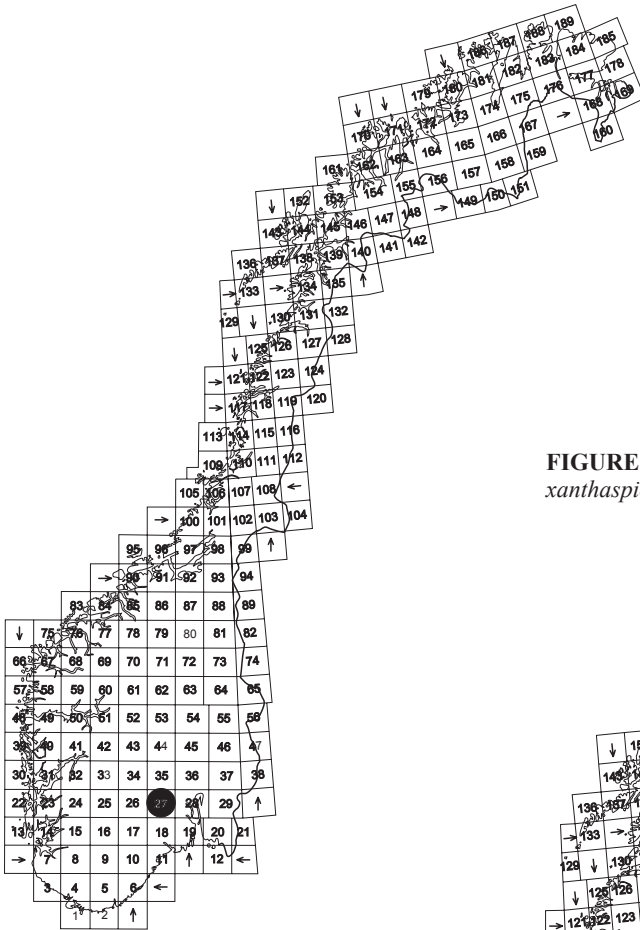


FIGURE 28. Distribution of *Metopomyza xanthaspoides* (Frey, 1946) in Norway.

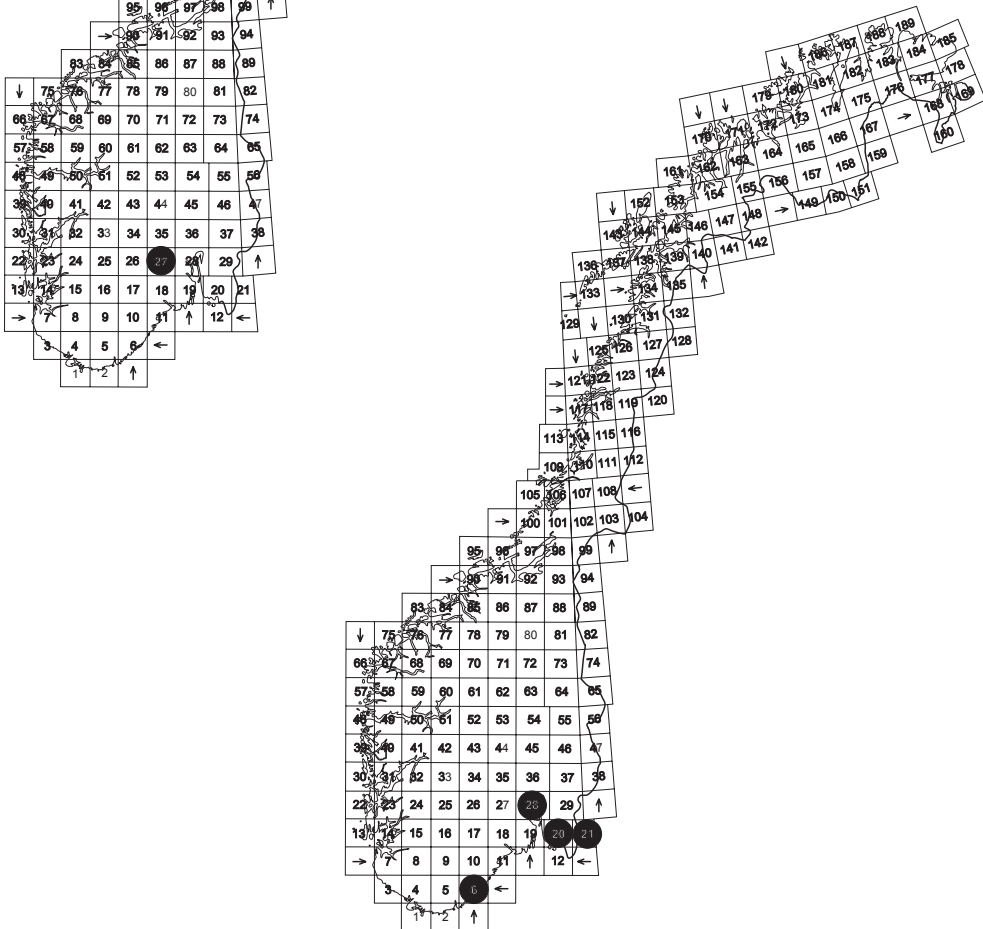


FIGURE 29. Distribution of *Calycomyza artemisiae* (Kaltenbach, 1856) in Norway.

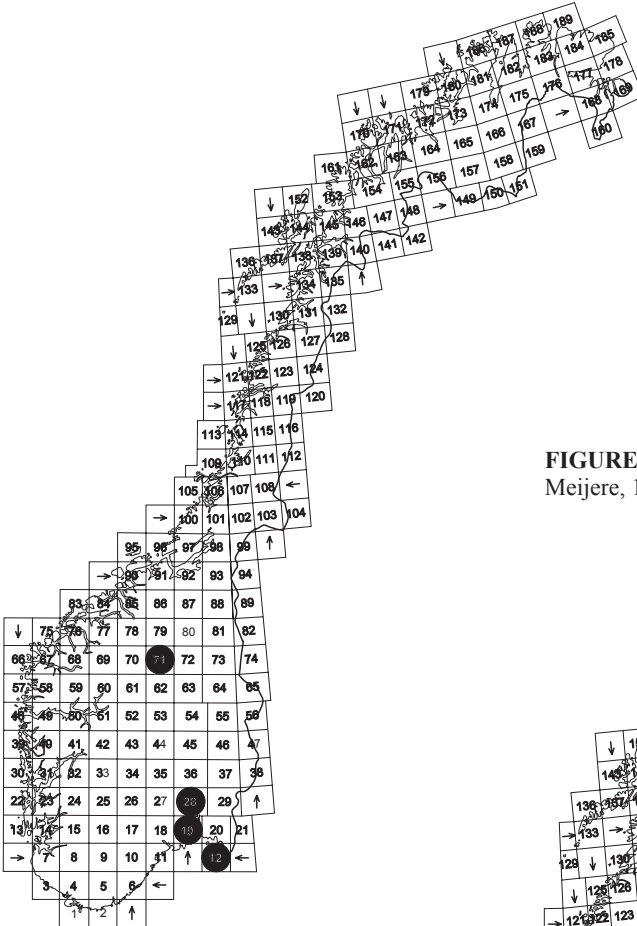


FIGURE 30. Distribution of *Aulagromyza buhri* (de Meijere, 1938) in Norway.

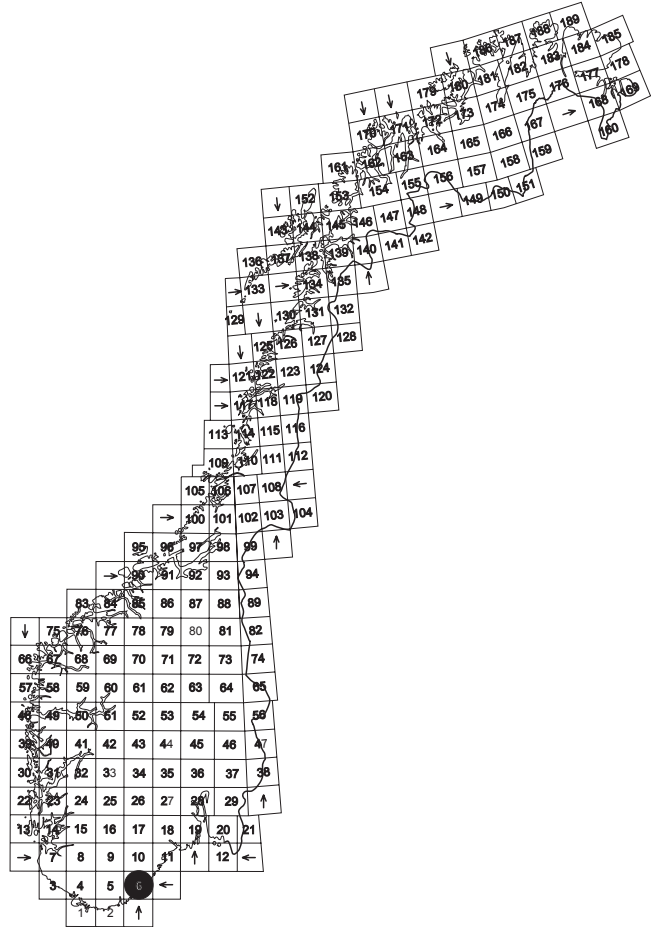


FIGURE 31. Distribution of *Aulagromyza trivittata* (Loew, 1873) in Norway.

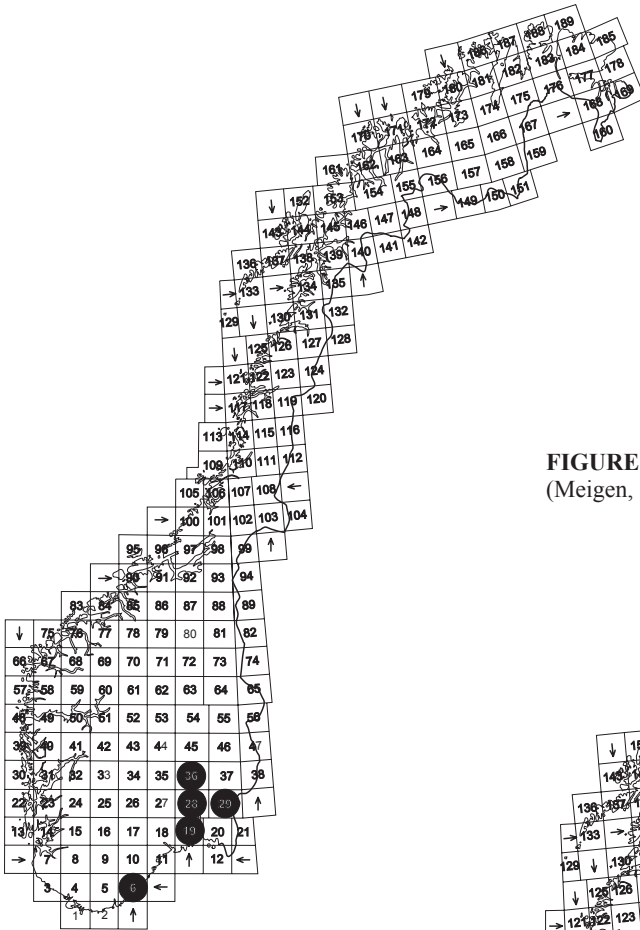


FIGURE 32. Distribution of *Pseudonapomyza atra* (Meigen, 1830) in Norway.

