On the Agromyzidae (Diptera) in Norway, Part 3 – with a check-list for Norwegian Agromyzidae

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The present paper comments on forty-three species belonging to four Agromyzidae genera. Nine of the species are reported new to the Norwegian fauna. The species are *Agromyza marionae* Griffiths, 1963, *Agromyza reptans* Fallén, 1823, *Agromyza sulfuriceps* Strobl, 1898, *Liriomyza artemisicola* de Meijere, 1924, *Liriomyza buhri* Hering, 1937, *Liriomyza lutea* (Meigen, 1830), *Liriomyza sonchi* Hendel, 1931, *Liriomyza suecica* Rydén, 1956, and *Liriomyza virgula* Frey, 1946. In addition, new regional data is given for thirty-four 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. The Norwegian checklist for Agromyzidae now consist of 240 species.

Key words: Agromyzidae, biology, *Agromyza*, *Liriomyza*, *Ophiomyia*, *Phytoliriomyza*, Diptera, distribution, Norway.

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Introduction

The larvae of Agromyzidae mine in leaves, stems, seeds and roots of plants. Accordingly, many Agromyzidae species are important pests in cultural plants. During the last 25 years, some data have been published on the Norwegian fauna of Agromyzidae (Andersen & Jonassen 1994, Bland 1995, Bland & von Tschirnhaus 1998, Andersen *et al.* 2004, Gibbs & von Tschirnhaus 2005, Andersen 2011, 2012, 2013, Hansen & Bjureke 2012), but still the Norwegian fauna of this dipterous family is poorly known.

Agromyzidae is represented in Norway by sixteen genera belonging to two subfamilies, with 231 species recorded so far. This paper is the third in a series on the fauna of Agromyzidae in Norway, and presents new data from the genera *Agromyza* Fallén, 1810, *Liriomyza* Mik, 1894, *Ophiomyia* Braschnikov, 1897 and *Phytoliriomyza* Hendel, 1931.

Materials and methods

The present report deals with material collected during several projects and collecting trips in many parts of Norway, but mainly in meadows with a rich flora in southeast Norway. If a species has been found more than once in the same district or EIS square, only data from the first record is given. In such cases, the total number of specimens investigated of the species is indicated. Most of the flies were netted by the author, and the material has been stored in 70% ethanol in the author's collection. However, a large part of the collection has already been donated to the Natural History Museum in Oslo, and over time, the whole collection will be donated there. In a few cases the flies were caught in a yellow water-trap or in a Malaise-trap. Localities are given using the revised Strand-system (Økland 1981) and the EIS system (Endrestøl 2005). All published data is included in the maps.

During identification, the flies were kept in 70% ethanol in small Petri dishes and handled with needles and soft tweezers. In most cases, the identification was done by using the tables and drawings of genitalia in Spencer 1976.

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.

GENUS AGROMYZA FALLÉN, 1810

***Agromyza albipennis* Meigen, 1830** (Figure 1)

New material (n = 33). **AK**, Ås: Ås kirke (EIS 28), 15 March-10 April 1991, 5♂♂; **OS**, Gausdal: Kittilbu (EIS 54), 12 June 2003, 1♂; **TEY**, Kragerø: Jomfruland (EIS 11), 25 August 2002, 1♂; **VAY**, Flekkefjord: Hidra, Veisdal (EIS 4), 12 June 2004, 2♂♂; **NSY**, Bodø: Vågønes (EIS 131), 13 June 2002, 1♂.

Distribution and biology. *A. albipennis* has been found in most parts of Norway except along the west coast and the furthest north, most common in coastal areas. It is widespread in most of Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2016). The larva is oligophagous on many Poaceae genera, forming a mine near the tip of the leaf (Spencer 1990, Ellis 2016, Pitkin *et al.* 2016).

***Agromyza cinerascens* Masquart, 1835** (Figure 2)

New material (n = 146). **Ø**, Sarpsborg: Skjeberg, Rokkeveien (EIS 20), 5 June 2001, 1♂; Aremark: Bøen sætre (EIS 21), 23 May 2012, 4♂♂; **AK**, Aurskog-Høland: Mikkelrud (EIS 29), 30 May 2011, 1♂; **BØ**, Kongsberg: Ullebergåsen (EIS 27), 17 May 2009, 4♂♂; **TEY**, Skien: Vestre Marker (EIS 18), 14 May 2011, 2♂♂.

Distribution and biology. *A. cinerascens* has been found only in southeast Norway. In the rest of Europe, it is widespread, including Fennoscandia and Denmark (Spencer 1976, Martinez 2016). The larva is oligophagous on Poaceae, and the mine is most commonly found in leaves of cock's-foot (*Dactylis glomerata*) and rye (*Secale cereale*) (Ellis 2016, Pitkin *et al.* 2016).

***Agromyza filipendulae* Spencer, 1976** (Figure 3)

New material (n = 5). **HEN**, Åmot: Rena (EIS 55), 17 September 2003, 2♂♂; **NSY**, Bodø: Bertnes (EIS 131), 13 June 2002, 1♂.

Distribution and biology. *A. filipendulae* has been found spread, but not common, in south and central Norway. It is present in many European countries, not including the other Fennoscandian countries (Martinez 2016). The larva is oliphagous on Rosaceae, mining in the leaves (Pitkin *et al.* 2016). Most often, it is found on meadowsweet (*Filipendula ulmaria*).

***Agromyza idaeiana* Hardy, 1853** (Figure 4)

New material (n = 5). **BØ**, Kongsberg: Ullebergåsen (EIS 27), 23 June 2009, 1♂; **TEI**, Hjartdal: Ambjørndalen (EIS 26), 27 May 2012, 1♂; **NSY**, Bodø: Vågønes (EIS 131), 13 June 2002, 1♂.

Distribution and biology. *A. idaeiana* has been found in most of Norway, excluding only the most northern parts. It is common in most of Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2016). The larva is oligophagous on Rosaceae, and forms a blotch mine in the leaf (Ellis 2016, Pitkin *et al.* 2016).

***Agromyza luteitarsis* (Rondani, 1875)** (Figure 5)

New material (n = 11). **AK**, Ås: Ås kirke (EIS 28), 25 June 1996, 1♂; **VE**, Horten: Bastøy, Buvika (EIS 19), 27 April 2007, 1♂.

Distribution and biology. *A. luteitarsis* has been found spread, but not common, in southeast Norway. It is widespread but local in much of Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2016). The larva is narrowly oligophagous on Poaceae, forming a blotch mine in leaves of for instance six-rowed barley (*Hordeum vulgare*), rye (*Secale cereale*) and wheat (*Triticum aestivum*) (Ellis 2016, Pitkin *et al.* 2016).

**** Agromyza marionae*** Griffiths, 1963 (Figure 6)

Material. NSY, Bodø: Straumøy, Seines (EIS 131), 16 June 2002, 1♂.

Distribution and biology. *A. marionae* has been found in only one location in north Norway. It is present in most of Europe, including Sweden and Finland (Spencer 1976, Dyntaxa 2016, Martinez 2016), but it is not common. The larva is narrowly oligophagous, forming an external stem mine in the leaves of *Vicia* species (Spencer 1990, Pitkin *et al.* 2016).

***Agromyza mobilis* Meigen, 1830** (Figure 7)

New material (n = 22). **AK**, Frogn: Håøya (EIS 28), 16-27 June 1984, 1♂ (caught in a Malaise-trap by Fred Midtgaard); Nannestad: Søndre Kringler (EIS 37), 1 June 2011, 1♂; **BV**, Sigdal: Solumsmoen (EIS 27), 3 June 2002, 1♂; **BØ**, Hurum: Rokkestad (EIS 28), 26 May 2002, 1♂; **VE**, Horten: Borrevann, Mellom-Semb (EIS 19), 29 May 2014, 1♂; **RI**, Forsand: Oanes (EIS 7), 4 August 2003, 2♂♂; **NTI**, Høylandet: Tverråa (EIS 107), 30 July 1987, 1♂ (caught in Malaise trap by Terje Jonassen); **NSY**, Bodø: Ausvika (EIS 131), 14 June 2002, 1♂; **TRY**, Flakstad: Nusfjord (EIS 133), 5 July 2006, 2♂♂; **FØ**, Sør-Varanger: Svanhovd (EIS 169), 2 July 2012, 2♂♂.

Distribution and biology. *A. mobilis* has been found widespread in Norway, but not very common. It is widespread throughout most of Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2016). The larva is broadly oligophagous on Poaceae, forming a mine in the leaves. Normally there are several larvae in one mine (Ellis 2016, Pitkin *et al.* 2016).

***Agromyza nana* Meigen, 1830** (Figure 8)

New material (n = 234). **Ø**, Sarpsborg: Skjeberg (EIS 20), 5 June 2001, 3♂♂; Aremark: Bøen sætre (EIS 21), 12 June 2011, 1♂; **AK**, Nannestad: Søndre Kringler (EIS 37), 26 May 2012, 4♂♂; **OS**, Gausdal: Kittilbu (EIS 54), 12 July 2003, 1♂; **ON**, Dovre: Dombåshaugen (EIS 71), 4 July 2011, 2♂♂; **BØ**, Kongsberg: Ullebergåsen (EIS 27), 18 June 2010, 1♂; **BV**, Sigdal: Nermoen (EIS 35), 3 June 2002, 1♂; **VE**, Larvik: Tvetene gartneri (EIS 12), 9 July 2011, 2♂♂; Horten: Borrehaugene (EIS 19), 8 June 2002, 3♂♂; **TEY**, Kragerø: Jomfruland (EIS 11), 25 August 2002, 1♂; Skien: Vestre Marker (EIS 18), 13 June 2011, 1♂; **TEI**, Seljord: Nord-Blika (EIS 26), 20 June 2010, 2♂♂; **AAY**, Grimstad: Homborøy (EIS 6), 3 June 2011, 1♂; V**AY** Farsund: Lista fyr (EIS 1), 29 July 2003, 1♂; **RY**, Randaberg: Tungesnes (EIS 7), 7 August 2003, 2♂♂; **RI**, Forsand: Oanes (EIS 7), 4 August 2003, 1♂; **SFI**, Aurland: Gudvangen (EIS 50), 12 July 1995, 1♂; **MRI**, Rauma: Kroksetgjerdet (EIS 77), 6 July 2011, 1♂; Rauma: Staurset (EIS 78), 6 July 2011, 2♂♂; Sunndal: Svøu (EIS 79), 5 July 2011, 1♂; **STI**, Trondheim: Byneset kirke (EIS 92), 16 July 2003, 2♂♂; **NSY**, Brønnøy: Brønnøysund (EIS 114), 2 July 2006, 1♂; Bodø: Ausvika (EIS 131), 14 June 2002, 4♂♂; **NSI**, Beiarn: Arstad (EIS 126), 16 June 2002, 1♂; Saltdal: Medby (EIS 127), 15 June 2002, 5♂♂; **NNØ**, Sørfold: Straumen (EIS 132), 15 June 2002, 1♂; **TRY**, Flakstad: Nusfjord (EIS 133), 5 July 2006, 2♂♂; **FV**, Alta: Smedhagen (EIS 173), 22 June 2004, 1♂; **FN**, Porsanger: Lakselv (EIS 174), 24 June 2004, 1♂; **FØ**, Sør-Varanger: Hesseng (EIS 168), 30 June 2012, 1♂; Sør-Varanger: Indre Lanabukt (EIS 169), 5 July 2012, 1♂.

Distribution and biology. *A. nana* has been found widespread and very common all over Norway, even in the far north. It is widespread and common all over Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2016). The larva is oligophagous on Fabaceae, forming a bloc mine in the leaves of among others red clover (*Trifolium pretense*) and white clover (*Trifolium repens*) (Ellis 2016, Pitkin *et al.* 2016).

***Agromyza nigrella* (Rondani, 1875)** (Figure 9)

New material. **AK**, Nannestad: Søndre Kringler (EIS 37), 1 June 2011, 3♂♂.

Distribution and biology. *A. nigrella* has been found spread, but not common in Norway. It is common and widespread throughout most of Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2016). The larva is oligophagous on Poaceae, forming a mine in the leaves (Ellis 2016, Pitkin *et al.* 2016).

***Agromyza nigripes* Meigen, 1830** (Figure 10)

New material (n = 221). **Ø**, Sarpsborg, Rokkeveien, Skjeberg (EIS 20), 5 June 2001, 1♂, **AK**, Nannestad: Søndre Kringler (EIS 37), 21 June 2012, 3♂♂; **HES**, Stange: Stange sentrum (EIS

46), 11 July 2003, 3♂♂; **ON**, Vågå: Tessanden (EIS 70), 30 June 1996, 1♂; **BØ**, Kongsberg: Ullebergåsen (EIS 27), 30 May 2009, 4♂♂; **VE**, Horten: Borrevann, Kongsodden (EIS 19), 30 May 2014, 5♂♂; **TEY**, Skien: Vestre Marker (EIS 18), 28 June 2012, 1♂; **TEI**, Hjartdal: Ambjørndalen (EIS 26), 19 June 2012, 2♂♂; **VAY**, Flekkefjord: Hidra, Langeland (EIS 4), 12 June 2004, 1♂; **HOI**, Kvinnherad: Varaldsøy, Gjuvlandsli (EIS 31), 4 May 2014, 1♂; **STI**, Røros: Sølendet (EIS 88), 27 July 2011, 1♂; Trondheim: Byneset, Busklein (EIS 92), 16 July 2003, 2♂♂; **NSY**, Bodø: Bertnes (EIS 131), 13 June 2002, 2♂♂; **TRY**, Flakstad: Nusfjord (EIS 133), 5 July 2006, 9♂♂; Tromsø: Holt (EIS 162), 21 June 2004, 2♂♂; **FV**, Alta: Smedhagen (EIS 173), 22 June 2004, 3♂♂; **FN**, Porsanger: Lakselv (EIS 174), 24 June 2004, 1♀; **FØ**, Sør-Varanger: Elveli (EIS 160), 8 July 2012, 3♂♂; Sør-Varanger: Langvasseid (EIS 168), 6 July 2012, 4♂♂; Sør-Varanger: Indre Lanabukt (EIS 169), 5 July 2012, 12♂♂; Sør-Varanger: Bugøyfjord (EIS 177), 6 July 2012, 1♂.

Distribution and biology. *A. nigripes* has been found widespread and very common in Norway, even in the far north. It is also widespread and common in most of Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2016). The larva is oligophagous on Poaceae, forming a mine that starts in the tip of the leaf. It is most commonly found on *Glyceria* and *Holcus* species (Ellis 2016, Pitkin *et al.* 2016).

**** Agromyza reptans* Fallén, 1823** (Figure 11)

Material. **VE**, Horten: Borrevann, Søndre Vik (EIS 19), 16 June 2015, 1♂.

Distribution and biology. *A. reptans* was found in only one locations in southeast Norway. Spencer 1976 mentions a dubious record from Norway, which is not included here. It is present in most European countries, including Fennoscandia and Denmark (Spencer 1976, Kahanpää 2014, Dyntaxa 2016, Martinez 2016). The larva is oliphagous on Urticaceae, mainly found in the leaves of common nettle (*Urtica dioica*) (Ellis 2016, Pitkin *et al.* 2016).

***Agromyza rondensis* Strobl, 1900** (Figure 12)

New material (n = 10). **VE**, Horten: Borrevann, Søndre Vik (EIS 19), 16 June 2015, 2♂♂; **NTI**, Stjørdal: Værnes (EIS 92), 8 July 1991, 1♂.

Distribution and biology. *A. rondensis* has been found spread in south and central Norway. It is also present in most of Europe, including Sweden (Spencer 1976, Dyntaxa 2016). The larva is broadly oligophagous on Poaceae, forming a blotch mine in the leaves. (Ellis 2016, Pitkin *et al.* 2016).

**** Agromyza sulfuriceps* Strobl, 1898** (Figure 13)

Material. VE, Horten: Bastøy båthavn (EIS 19), 29 July 2011, 1♂.

Distribution and biology. *A. sulfuriceps* has been found in only one location in southeast Norway. It is widespread in Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2016). The larva is oligophagous on Rosaceae, forming a blotch mine in the leaf (Ellis 2016, Pitkin *et al.* 2016).

***Agromyza viciae* Kaltenbach, 1872** (Figure 14)

New material (n = 18). **VE**, Horten: Borrevann, Eikelund (EIS 19), 30 May 2014, 3♂♂.

Distribution and biology. *A. viciae* has been found only around the Oslo fiord. It has been reported from many European countries, including Finland and Denmark (Gibbs & von Tschirnhaus 2005). The larva is narrowly oligophagous on Fabaceae, forming a mine in the leaves of *Vicia* species (Gibbs & von Tschirnhaus 2005, Ellis 2016).

***Agromyza vicifoliae* Hering, 1932** (Figure 15)

New material (n = 334). **Ø**, Aremark: Bøen sætre (EIS 21), 7 June 2012, 11♂♂; Askim: Askim sentrum (EIS 29), 18 June 2001, 3♂♂; **AK**, Nannestad: Søndre Kringler (EIS 37), 16 June 2011, 4♂♂; **ON**, Lom: Tronoberget (EIS 70), 29 June 1996, 1♂; Dovre: Dombåshaugen (EIS 71), 4 July 2011, 3♂♂; **BØ**, Hurum: Verket (EIS 28), 26 May 2002, 2♂♂; **BV**, Sigdal: Solumsmoen (EIS 27), 3 June 2002, 1♂; Rollag: Gvammen (EIS 35), 23 May 2011, 1♂; **VE**, Horten: Borrevann, Åkerholmen (EIS 19), 29 May 2014, 7♂♂; **TEI**, Hjartdal: Ambjørndalen (EIS 26), 20 June 2010,

2♂♂; **AAY**, Grimstad: Marivold (EIS 6), 7 July 2003, 5♂♂; **MRI**, Rauma: Kroksetgjerdet (EIS 77), 6 July 2011, 5♂♂; **NSY**, Brønnøy: Brønnøysund (EIS 114), 2 July 2006, 3♂♂; Bodø: Straumøy, Seines (EIS 131), 16 June 2002, 2♂♂; **NSI**, Beiarn: Storjord (EIS 126), 16 June 2002, 1♂; Saltdal: Storjord (EIS 127), 15 June 2002, 2♂♂; **NNØ**, Sørfold: Straumen (EIS 132), 15 June 2002, 7♂♂; **TRY**, Tromsø: Kvaløya, Straumhella (EIS 162), 21 June 2004, 1♂, **FV**, Alta: Bukta-Udnesbukta (EIS 173), 23 June 2004, 8♂♂; **FN**, Porsanger: Lakselv (EIS 174), 24 June 2004, 2♂♂; Tana: Skiippagurra (EIS 176), 7 July 2012, 2♂♂; **FØ**, Sør-Varanger: Sandnes (EIS 168), 5 July 2012, 3♂♂; Sør-Varanger: Skrukkebukta (EIS 169), 2 July 2012, 4♂♂.

Distribution and biology. *A. vicifoliae* has been found widespread and very common all over Norway, even in the far north. It is also widespread and common in most of Europe, including Fennoscandia (Spencer 1976, Martinez 2016). The larva is narrowly oligophagous on Fabaceae, forming a blotch mine in the leaves of *Vicia* species (Ellis 2016, Pitkin *et al.* 2016).

GENUS *LIRIOMYZA* MIK,1894

*** *Liriomyza artemisicola* de Meijere, 1924** (Figure 16)

Material (n = 30). **Ø**, Sarpsborg: Greåker (EIS 20), 2 June 2003, 5♂♂; **AK**, Oslo: Skullerud (EIS 28), 21 June 2003, 2♂♂; Enebakk: Orderud (EIS 29), 18 August 1998, 1♀ (identified by Michael von Tschirnhaus); **VE**, Larvik: Tvetene (EIS 12), 9 July 2011, 3♂♂; Horten: Steinsnes (EIS 19), 25 June 2003, 5♂♂; **AAY**, Grimstad: Landvik (EIS 6), 7 July 2003, 1♂.

Distribution and biology. *L. artemisicola* was found only in southeast Norway. It is common in most countries of northwest Europe, including Fennoscandia and Denmark (Spencer 1976, Petersen & Meier 2001, Dyntaxa 2016, Martinez 2016). The larva is narrowly oligophagous on Asteraceae, forming a mine in the leaves of *Artemisia* species (Ellis 2016, Pitkin *et al.* 2016).

*** *Liriomyza buhri* Hering, 1937** (Figure 17)

Material. **AK**, Nannestad: Søndre Kringler (EIS 37), 21 June 2012, 2♂♂; **VE**, Horten: Bastøy (EIS 19), 4 June 2010, 1♂1♀; **TEI**, Seljord: Nord-Blika (EIS 26), 20 May 2011, 1♂; **VAY**, Flekkefjord: Hidra, Husøy (EIS 4), 3 August 2003, 1♂; **MRI**, Rauma: Flatmark (EIS 77), 6 July 2011, 1♀.

Distribution and biology. *L. buhri* has been found spread, but not common, in south Norway. It is present in several countries in northwest Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2016). The larva is oligophagous on Campanulaceae, forming a whitish, external stem mine mainly on *Campanula* species (Spencer 1990).

***Liriomyza centaureae* Hering, 1927** (Figure 18)

New material (n = 2). **VE**, Horten: Karljohansvern, Vollene (EIS 19), 1 August 2015, 1♂.

Distribution and biology. *L. centaureae* has been found in only two localities close to each other in southeast Norway. It is common and widespread in most of Europe, including Sweden and Denmark (Spencer 1976, Martinez 2016). The larva is narrowly oligophagous on Asteraceae, mainly on *Centaurea* species. It forms a linear mine in the leaf (Ellis 2016, Pitkin *et al.* 2016).

***Liriomyza congesta* (Becker, 1903)** (Figure 19)

New material (n = 149). **Ø**, Sarpsborg: Greåker (EIS 20), 2 June 2003, 3♂♂; **AK**, Nannestad: Søndre Kringler (EIS 37), 26 May 2012, 1♂; **BØ**, Lier: Kjellstadveien 42 (EIS 28), 21 June 2003, 1♂; **VE**, Horten: Møringa (EIS 19), 10 June 2012, 1♂; **TEY**, Skien: Vestre Marker (EIS 18), 6 June 2012, 1♂; **TEI**, Seljord: Nord-Blika (EIS 26), 27 May 2012, 4♂♂; **AAY**, Grimstad: Marivold (EIS 6), 7 July 2003, 4♂♂; Risør: Indre Søndeled (EIS 10), 6 July 2003, 1♂; **VAY**, Farsund: Lista fyr (EIS 1), 29 July 2003, 3♂♂; **VAI**, Kvinesdal: Kvinesdal sentrum (EIS 4), 10 June 2004, 1♂; **HOI**, Kvinnherad: Varaldsøy, Gjuvlandsli (EIS 31), 4 May 2014, 1♂; **NTI**, Frosta: Evenhus (EIS 97), 15 July 2003, 2♂♂; **NSY**, Brønnøy: Brønnøysund (EIS 114), 2 July 2006, 2♂♂; Bodø: Bliksvær (EIS 131), 14 June 2002, 3♂♂; **NSI**, Beiarn: Storjord (EIS 126), 16 June 2002, 1♂; **FV**, Alta: Smedhagen (EIS 173), 22 June 2004,

6♂♂.

Distribution and biology. *L. congesta* was found widespread and common all over Norway. It is also widespread and common throughout most of Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2016). The larva is broadly oligophagous on Fabaceae, forming a linear mine in the leaves (Ellis 2016, Pitkin *et al.* 2016).

***Liriomyza flaveola* (Fallén, 1823)** (Figure 20)

New material (n = 553). **Ø**, Skjeberg: Rokkeveien (EIS 20), 5 June 2001, 6♀♀; Aremark: Bøen sætre (EIS 21), 23 May 2012, 1♀; **HES**, Løten: Løten kirke (EIS 46), 14 September 2003, 5♂♂3♀♀; **HEN**, Åmot: Rena (EIS 55), 14 September 2003, 8♂♂12♀♀; **OS**, Gausdal: Kittilbu (EIS 54), 12 July 2003, 1♂; Sør-Fron: Espedal fjellkirke (EIS 62), 13 July 2003, 1♀; **ON**, Dovre: Dombås (EIS 71), 15 September 2003, 2♂♂8♀♀; **BØ**, Kongsberg: Ullebergåsen (EIS 27), 23 June 2009, 1♂; Lier: Espedal gartneri (EIS 28), 21 June 2003, 1♀; Hole: Røyse (EIS 36), 19 June 1996, 1♀; **BV**, Sigdal: Prestfoss (EIS 35), 3 June 2002, 1♀; **VE**, Horten: Borrevann, Vassbånn (EIS 19), 7 June 1997, 1♂4♀♀; **TEY**, Bamble: Valle, Djupvik (EIS 11), 23 August 2002, 2♀♀; Skien: Vestre Marker (EIS 18), 13 June 2011, 4♀♀; **TEI**, Hjartdal: Ambjørndalen (EIS 26), 9 July 2010, 1♀; **AAY**, Grimstad: Marivold (EIS 6), 7 July 2003, 1♂; Risør: Søndeled (EIS 10), 6 July 2003, 1♂6♀♀; **VAY**, Farsund: Lista fyr (EIS 1), 29 July 2003, 1♀; Flekkefjord: Hidra, Vågen (EIS 4), 3 August 2003, 1♀; **VAI**, Kvinesdal: Kvinesdal sentrum (EIS 4), 10 June 2004, 1♀; **RY**, Hå: Brusand (EIS 3), 18 June 1996, 1♂ (caught in yellow water-trap by May-Guri Sæthre); Stavanger: Forus (EIS 7), 22 May 1996, 1♂ (caught in yellow water-trap by May-Guri Sæthre); Finnøy: Tjul (EIS 14), 8 September 1985, 1♂ (leg. Terje Jonassen); **RI**, Forsand: Forsand skule (EIS 7), 11 September 1982, 1♀ (leg. Terje Jonassen); **HOI**, Kvinnherad: Varaldsøy, Gjuvlandsli (EIS 31), 4 May 2014, 1♂; **MRI**, Rauma: Marstein (EIS 77), 6 July 2011, 1♀; Sunndal: Svisdalshaugane (EIS 79), 5 July 2011, 1♀; **STI**, Røros: Sølendet (EIS 88), 27 July 2011, 2♂♂4♀♀; Trondheim: Byneset kirke (EIS 92), 16 July 2003, 6♀♀; **NTI**, Frosta: Tautra (EIS 97), 15 July 2003, 1♀; Høylandet: Tverråa (EIS 107), 20 August 1986, 1♂ (caught in Malaise trap by Terje Jonassen); **NSY**, Brønnøy: Brønnøysund (EIS 114), 2 July 2006, 10♀♀; Bodø: Bertnes (EIS 131), 13 June 2002, 20♂♂21♀♀; **NSI**, Saltdal: Storjord (EIS 127), 15 June 2002, 1♂2♀♀; Fauske: Nes (EIS 132), 15 June 2002, 1♀; **FV**, Alta: Tverrelvdalen (EIS 173), 25 June 2004, 1♀; **FN**, Tana: Skiippagurra (EIS 176), 7 July 2012, 1♀; **FØ**, Sør-Varanger: Neiden, Skoltebyen (EIS 168), 1 July 2012, 1♂; Sør-Varanger: Bjørnstad (EIS 169), 5 July 2012, 1♀.

Distribution and biology. *L. flaveola* was found widespread and very common all over Norway. It is also common throughout Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2016). The larva is widely oligophagous on Poaceae, forming a narrow, whitish linear mine in the leaf (Ellis 2016, Pitkin *et al.* 2016).

***Liriomyza hieracii* (Kaltenbach, 1862)** (Figure 21)

New material. **AK**, Enebakk: Haugstein (EIS 29), 2 September 1998, 1♂ (identified by Michael von Tschirnhaus); **VE**, Horten: Drasund (EIS 19), 11 June 2015, 1♂.

Distribution and biology. *L. hieracii* has been found spread, but not common in Norway. It is present in most countries in northwest Europe, including Fennoscandia (Spencer 1976, Martinez 2016). The larva is narrowly oligophagous on Asteraceae, forming a blotch mine in the leaves of *Hieracium* species (Ellis 2016, Pitkin *et al.* 2016).

***Liriomyza huidobrensis* (Blanchard, 1926)**

Material. RY, Hå: Brusand, (EIS 3), 19 September 1995, 3♂♂.

Distribution and biology. This strongly polyphagous species (Ellis 2016) originates from South America, but has infested greenhouse cultures in Norway several times during the last twenty years. In some cases, flies have escaped into nearby fields and natural areas during the summer, and natural infections have occurred in wild plants. For instance, in one locality in Østfold, southeast Norway 2002, high populations

of the species were established outside an infested greenhouse, and adult flies were caught up to 500 m away from the greenhouses. However, the species has never been found again in the nature during the next summer (Andersen, unpublished data). Since *L. huidobrensis* seems to be unable to survive the Norwegian winter, it is not included in the Norwegian fauna. It has been reported from many other European countries, not including Fennoscandia (Martinez 2016).

***Liriomyza infuscata* Hering, 1926** (Figure 22)

New material (n = 257). **Ø**, Skjeberg: Rokkeveien (EIS 20), 5 June 2001, 2♂♂; Aremark: Bøen sætre (EIS 21), 7 June 2012, 2♂♂; **AK**, Nannestad: Søndre Kringler (EIS 37), 1 June 2011, 2♂♂; **BØ**, Hurum: Verket (EIS 28), 26 May 2002, 2♂♂; **VE**, Horten: Borrevann, Vassbånn (EIS 19), 7 June 1997, 3♂♂; **TEY**, Skien: Vestre Marker (EIS 18), 13 June 2011, 1♂; **TEI**, Seljord: Laukereini (EIS 26), 1 June 2010, 1♂; **AAY**, Grimstad: Homborøy (EIS 6), 3 June 2011, 1♂; **VAY**, Kvinesdal: Kvinesdal sentrum (EIS 4), 10 June 2004, 1♂; **HOY**, Os: Vaktdal (EIS 31), 2 May 2014, 2♂♂; **FØ**, Sør-Varanger: Skrukkebukta (EIS 169), 2 July 2012, 1♂.

Distribution and biology. *L. infuscata* has been found widespread and common all over Norway. It is widespread in most countries of Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2016). The host of the larva is unknown, but it probably belongs to the Gramineae (Spencer 1976).

***Liriomyza intonsa* Spencer, 1976** (Figure 23)

New material (n = 4). **BØ**, Lier: Espedal gartneri (EIS 28), 27 June 2003, 2♂♂; **VE**, Horten: Borrevann, Mellom-Semb (EIS 19), 2 July 2014, 1♂.

Distribution and biology. *L. intonsa* has been found only in southeast Norway. It is present in some countries in west Europe, including Sweden and Denmark (Spencer 1976, Dyntaxa 2016, Martinez 2016). The host of the larva is unknown.

*** *Liriomyza lutea* (Meigen, 1830)** (Figure 24)

Material (n = 10). **Ø**, Råde: Andersens gartneri (EIS 20), 27 June 2003, 2♀♀; **VE**, Horten: Møringa (EIS 19), 20 May 2012, 1♂; **TEY**, Skien: Vestre Marker (EIS 18), 6 June 2012, 3♂♂1♀; **TEI**, Seljord: Nord-Blika (EIS 26), 13 June 2011, 1♀.

Distribution and biology. *L. lutea* has been found only in southeast Norway. It is widespread but local in many European countries, including Fennoscandia and Denmark (Spencer 1976, Martinez 2016). The larva is oligophagous on Apicaeae, feeding in the seedheads (Pitkin *et al.* 2016).

***Liriomyza occipitalis* Hendel, 1931** (Figure 25)

New material (n = 49). **Ø**, Sarpsborg: Greåker (EIS 20), 2 June 2003, 4♂♂; **VE**, Horten: Møringa (EIS 19), 20 May 2012, 14♂♂; **FV**, Alta: Flaten (EIS 173), 22 June 2004, 5♂♂.

Distribution and biology. *L. occipitalis* has been found spread, but not common, mainly in southeast Norway, and in one location far north. It has been reported from some other countries in north Europe, including Sweden and Finland (Spencer 1976, Dyntaxa 2016, Martinez 2016). The larva is monophagous, mining in the narrow branches of Field Horsetail (*Equisetum arvense*) (Spencer 1976, Pitkin *et al.* 2016).

***Liriomyza orbona* (Meigen, 1830)** (Figure 26)

New material (n = 71). **VE**, Horten: Bastøy, Nordbukta (EIS 19), 17 May 2007, 2♂♂; **RY**, Hå: Brusand (EIS 3), 22 May 1996, 1♀.

Distribution and biology. *L. orbona* has been found only in southeast and south Norway. It is widespread in most of Europe, including Fennoscandia and Denmark (Spencer 1976, Kahanpää 2014, Martinez 2016). The larva is probably oligophagous on Poaceae (Ellis 2016, Pitkin *et al.* 2016).

***Liriomyza phryne* Hendel, 1931** (Figure 27)

New material (n = 104). **Ø**, Sarpsborg: Greåker (EIS 20), 2 June 2003, 1♀; Aremark: Bøen sætre (EIS 21), 19 May 2011, 1♂; Eidsberg: Slitu (EIS 29), 16 August 1999, 1♂; **AK**, Nannestad: Søndre Kringler (EIS 37), 26 May 2012, 8♀♀; **BØ**, Hurum: Storsand (EIS 28), 18 May 2002, 2♀♀; **BV**, Rollag: Gvammen (EIS 35), 23 May 2011, 3♂♂1♀; **VE**, Horten: Borre kirke (EIS 19),

9 May 2008, 1♂; **TEY**, Kragerø: Kalstadkilen (EIS 11), 24 August 2002, 3♀♀; Skien: Vestre Marker (EIS 18), 6 June 2012, 2♂♂5♀♀; **TEI**, Seljord: Laukereini (EIS 26), 1 June 2010, 1♂; **AAY**, Grimstad: Reddal (EIS 6), 7 July 2003, 1♂; **VAY**, Flekkefjord: Hidra, Veisdal (EIS 4), 12 June 2004, 3♀♀; **VAI**, Kvinesdal: Kvinesdal sentrum (EIS 4), 10 June 2004, 2♂♂; **FV**, Alta: Tverrelvdalen (EIS 173), 25 June 2004, 1♂1♀; **FØ**, Sør-Varanger: Elveli (EIS 160), 8 July 2012, 3♂♂3♀♀.

Distribution and biology. *L. phryne* has been found widespread and relatively common in southeast and the far north of Norway. It is widespread and not uncommon in most of Europe, including Sweden (Spencer 1976, Martinez 2016). The larva is oligophagous on Poaceae (Ellis 2016, Pitkin *et al.* 2016).

***Liriomyza ptarmicae* de Meijere, 1925** (Figure 28)

New material (n = 490). **Ø**, Rygge: Dilling (EIS 19), 19 June 2003, 1♂; Råde: Andersens gartneri (EIS 20), 27 June 2003, 1♂; **AK**, Oslo: Hovedøya (EIS 28), 11 May 2011, 1♂; Nannestad: Søndre Kringler (EIS 37), 16 June 2011, 1♂; **HES**, Stange: Stange sentrum (EIS 46), 11 July 2003, 1♂; **HEN**, Åmot: Rena (EIS 55), 14 September 2003, 1♂; **BØ**, Lier: Kjellstadveien 42 (EIS 28), 21 June 2003, 11♂♂; **BV**, Rollag: Gvammen (EIS 35), 23 May 2011, 4♂♂; **VE**, Horten: Røre (EIS 19), 8 June 2003, 3♂♂; **TEY**, Bamble: Valle, Djupvik (EIS 11), 25 August 2002, 2♂♂; Skien: Vestre Marker (EIS 18), 13 June 2011, 5♂♂; **TEI**, Seljord: Laukereini (EIS 26), 27 May 2012, 1♂; **AAY**, Risør: Indre Søndeled (EIS 10), 6 July 2003, 8♂♂; **AAI**, Valle: Valle sentrum (EIS 16), 13 June 2004, 5♂♂; **VAY**, Farsund: Lista fyr (EIS 1), 29 July 2003, 7♂♂; Flekkefjord: Hidra, Husøy (EIS 4), 3 August 2003, 8♂♂; **VAI**, Kvinesdal: Kvinesdal sentrum (EIS 4), 10 June 2004, 12♂♂; Sirdal: Tonstad (EIS 8), 10 June 2004, 3♂♂; **RI**, Forsand: Oanes (EIS 7), 4 August 2003, 4♂♂; **STI**, Røros: Sølendet (EIS 88), 27 July 2011, 1♂; **NNØ**, Sørfold: Straumen (EIS 132), 15 June 2002, 1♂; **FV**, Alta: Tverrelvdalen (EIS 173), 25 June 2004, 2♂♂; **FN**, Porsanger: Lakselv (EIS 174), 24 June 2004, 4♂♂; **FØ**, Sør-Varanger: Langvasseid (EIS 168), 6 July 2012, 2♂♂; Sør-Varanger: Svanhovd (EIS 169), 2 July 2012, 3♂♂.

Distribution and biology. *L. ptarmicae* has been found widespread and very common in most of Norway. It is common also in northwest Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2016). The larva is oligophagous on Asteraceae, forming a narrow, linear mine in the leaves (Ellis 2016, Pitkin *et al.* 2016).

***Liriomyza pusio* (Meigen, 1830)** (Figure 29)

New material. **BV**, Sigdal: Solumsmoen (EIS 27), 3 June 2002, 1♂; **AAY**, Grimstad: Hesnesøy (EIS 6), 25 June 2011, 1♂.

Distribution and biology. *L. pusio* has been found only in southeast Norway. It is found in many European countries, including Fennoscandia and Denmark, but it is not common (Spencer 1976, Dyntaxa 2016, Martinez 2016). The larva is monophagous on Poaceae, forming a linear mine in the leaves of False Oat-grass (*Arrhenatherum elatius*) (Ellis 2016, Pitkin *et al.* 2016).

*** *Liriomyza sonchi* Hendel, 1931** (Figure 30)

Material. Ø, Eidsberg: Slitu (EIS 29), 24 June 1999, 1♂.

Distribution and biology. *L. sonchi* was found in only one location in southeast Norway. It is widespread and common in many European countries, including Fennoscandia and Denmark (Spencer 1976, Martinez 2016). The larva is oligophagous on Asteraceae. It forms a blotch mine, often with several larvae feeding together (Ellis 2016, Pitkin *et al.* 2016).

***Liriomyza strigata* (Meigen, 1830)** (Figure 31)

New material (n = 57). **Ø**, Eidsberg: Slitu (EIS 29), 19 July 1999, 1♂; **AK**, Nannestad: Søndre Kringler (EIS 37), 26 May 2012, 10♂♂; **HEN**, Åmot: Rena (EIS 55), 17 July 2003, 1♂; **ON**, Nord-Fron: Vinstra (EIS 62), 30 May 1995, 1♂; **BV**, Rollag: Gvammen (EIS 35), 23 May 2011, 1♂; **VE**, Horten: Borrehaugene (EIS 19), 7 July 2010, 1♂; **TEY**, Porsgrunn: Berg (EIS 11), 21 August 2002, 3♂♂; **TEI**, Bø: Bø sentrum (EIS 18), 13 June 2004, 2♂♂; Seljord: Nord-Blika (EIS 26), 1 June 2010, 1♂; **AAY**, Grimstad: Landvik (EIS 6), 7 July 2003, 2♂♂; **STI**, Trondheim:

Byneset, Busklein (EIS 92), 16 July 2003, 5♂♂; **NTI**, Levanger: Litløya ved Sunndalen (EIS 97), 15 July 2003, 2♂♂; **FV**, Alta: Aronnes (EIS 173), 22 June 2004, 2♂♂.

Distribution and biology. *L. strigata* has been found in most of Norway, except on the west coast. It is widespread and common all over Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2016). The larva is broadly polyphagous on dicotyledons, mining in the leaves (Ellis 2016, Pitkin *et al.* 2016).

*** *Liriomyza suecica* Rydén 1956** (Figure 32)

Material (n = 48). **TRY**, Tromsø: Kvaløya, Straumhella (EIS 162), 21 June 2004, 2♂♂; **FV**, Alta: Tverrelvdalen (EIS 173), 25 June 2004, 7♂♂; **FN**, Porsanger: Lakselv (EIS 174), 24 June 2004, 4♂♂.

Distribution and biology. *L. suecica* has been found only in north Norway, where it is not uncommon. Previously in Europe it has been found only once in Sweden. The species has a Holarctic distribution, also known from Alberta and British Colombia, Canada (Spencer 1976, Martinez 2016). The host of the larva is unknown.

***Liriomyza taraxaci* Hering, 1927** (Figure 33)

New material (n = 112). **Ø**, Eidsberg: Slitu (EIS 29), 27 May 1999, 1♂; **AK**, Enebakk: Haugstein (EIS 29), 15 June 1998, 1♂ (identified by Michael von Tschirnhaus); Nannestad: Søndre Kringler (EIS 37), 26 May 2012, 2♂♂; **BØ**, Hurum: Tofte (EIS 28), 18 May 2002, 1♂; **VE**, Horten: Steinsnes (EIS 19), 25 June 2003, 3♂♂ **TEI**, Bø: Bø sentrum (EIS 18), 13 June 2004, 3♂♂; **TEI**, Hjartdal: Ambjørndalen (EIS 26), 19 June 2012, 3♂♂; **AAY**, Grimstad: Landvik (EIS 6), 7 July 2003, 1♂; Risør: Indre Søndeled (EIS 10), 6 July 2003, 3♂♂; **VAY**, Farsund: Lista fyr (EIS 1), 29 July 2003, 5♂♂; **VAY**, Flekkefjord: Hidra, Veisdal (EIS 4), 12 June 2004, 1♂; **VAI**, Sirdal: Tonstad (EIS 8), 10 June 2004, 1♂; **RI**, Forsand: Oanes (EIS 7), 4 August 2003, 2♂♂; **HOI**, Kvinnherad: Varaldsøy, Gjuvlandsli (EIS 31), 4 May 2014, 3♂♂; **STI**, Trondheim: Byneset, Spongdal (EIS 92), 16 July 2003, 2♂♂; **NTI**, Stjørdal: Værnes (EIS 93), 8 August 1994, 1♂; **TRY**, Tromsø: Holt (EIS 162), 21 June 2004, 11♂♂; **FV**, Alta: Flaten (EIS 173), 22 June 2004, 8♂♂; **FN**, Porsanger: Lakselv (EIS 174), 24 June 2004, 2♂♂; **FØ**, Sør-Varanger: Svanhovd (EIS 169), 2 July 2012, 2♂♂.

Distribution and biology. *L. taraxaci* has been found widespread and common all over Norway. It is widespread in Europe, including Fennoscandia and Denmark (Spencer 1976, Kahanpää 2014). The larva is narrowly oligophagous on Asteraceae, forming an irregular, elongate blotch mine in the leaves (Ellis 2016, Pitkin *et al.* 2016).

***Liriomyza valerianae* Hendel, 1932** (Figure 34)

New material. **STI**, Røros: Sølendet (EIS 88), 22 June 2012, 1♂.

Distribution and biology. *L. valerianae* has been found only in central Norway. It is local but common in most countries in northwest Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2016). The larva is oligophagous on Caprifoliaceae, forming an irregular linear mine in the leaves (Ellis 2016, Pitkin *et al.* 2016).

***Liriomyza virgo* (Zetterstedt, 1838)** (Figure 35)

New material (n = 5). **VE**, Horten: Borrevann, Ødegården (EIS 19), 30 May 2014, 1♂; **NSI**, Beiarn: Storjord (EIS 126), 16 June 2002, 1♀.

Distribution and biology. *L. virgo* has been found in only three locations in Norway. It is widespread but local in northwest Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2016). The larva is narrowly oligophagous on Equisetaceae, forming an external stem mine in *Equisetum* species (Pitkin *et al.* 2016).

*** *Liriomyza virgula* Frey, 1946** (Figure 36)

Material (n = 15). **VE**, Horten: Borrevann, Verket (EIS 19), 9 June 2014, 4♂♂; **AAY**, Grimstad: Hesnesøy (EIS 6), 3 June 2011, 2♂♂.

Distribution and biology. *L. virgula* has been found only in two locations in southeast Norway. It has been reported from only a few countries in north Europe, including Sweden and Finland (Spencer 1976, Dyntaxa 2016, Martinez 2016). The host of the larva is unknown.

GENUS *OPHIOMYIA* BRASCHNIKOV, 1897

***Ophiomyia nasuta* (Melander, 1913)** (Figure 37)

New material. **TEI**, Bø: Bø sentrum (EIS 18), 13 June 2004, 1♂.

Distribution and biology. *O. nasuta* has been found only in southeast Norway. It is also present in many European countries, including Fennoscandia and Denmark (Spencer 1976, Martinez 2016). The larva is monophagous on Asteraceae, forming a mine in the leaves of common dandelion (*Taraxacum officinale*) (Ellis 2016, Pitkin *et al.* 2016).

***Ophiomyia orbiculata* (Hendel, 1931)** (Figure 38)

New material. **VAY**, Flekkefjord: Hidra, Veisdal (EIS 4), 12 June 2004, 2♂♂; **NSI**, Saltdal: Storjord (EIS 127), 15 June 2002, 2♂♂.

Distribution and biology. *O. orbiculata* has been found in only three locations in Norway, spread from the south coast to north Norway. It is widespread in most of west Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2016). The larva is oligophagous on Fabaceae, forming a stem mine (Pitkin *et al.* 2016).

***Ophiomyia pinguis* (Fallén, 1820)** (Figure 39)

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

Distribution and biology. *O. pinguis* has been found only in southeast Norway. It is present in most of west Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2016). The larva is oligophagous on Asteraceae, forming a mine in the basal leaves (Ellis 2016, Pitkin *et al.* 2016).

***Ophiomyia pulicaria* (Meigen, 1830)** (Figure 40)

New material. **VE**, Sande: Valle (EIS 28), 25 May 2000, 1♂ (identified by Michael von Tschirnhaus).

Distribution and biology. *O. pulicaria* has been found only in southeast Norway. It is also present in most of Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2016). The larva is oligophagous on Asteraceae, forming a mine normally along the midrib of the leaf (Ellis 2016, Pitkin *et al.* 2016).

GENUS *PHYTOLIRIOMYZA* HENDEL, 1931

***Phytoliriomyza arctica* (Lundbeck, 1901)** (Figure 41)

New material. **AAY**, Grimstad: Roresand (EIS 6), 7 July 2003, 1♂.

Distribution and biology. *P. arctica* has been found in only two locations in southeast Norway. It is widespread in Europe, including Fennoscandia and Denmark (Spencer 1976, Dyntaxa 2016, Martinez 2016). The larva is oligophagous on Asteraceae, forming an external stem mine (Pitkin *et al.* 2016).

***Phytoliriomyza hilarella* (Zetterstedt, 1848)** (Figure 42)

New material. **AK**, Aurskog-Høland: Mikkelrud (EIS 29), 30 May 2011, 1♂; **BØ**, Kongsberg: Ullebergåsen (EIS 27), 21 June 2008, 1♂.

Distribution and biology. *P. hilarella* has been found only in southwest and southeast Norway. It is present in most countries in north Europe, including Fennoscandia and Denmark (Spencer 1976, Martinez 2016). The larva is forming a mine in leaves of plant species in Dennstaedtiaceae and Polypodidaceae (Ellis 2016, Pitkin *et al.* 2016).

***Phytoliriomyza variegata* (Meigen, 1830)** (Figure 43)

New material. **VE**, Horten: Møringa (EIS 19), 10 June 2012, 1♂.

Distribution and biology. *P. variegata* has been found only in southeast Norway. It is widespread an often common in much of Europe, including Sweden and Denmark (Spencer 1976, Martinez 2016). The larva is oligophagous on Fabaceae, forming a mine in the leaf (Ellis 2016, Pitkin *et al.* 2016).

Discussion

The Norwegian fauna of Agromyzidae has increased to 240 species when the species reported in this article are included (Appendix 1). Still it

is reasonable to assume that a large percentage of the species present in Norway has not been discovered. Already Spencer in 1976 reported 385 Agromyzidae species present in Denmark and Fennoscandia, and the most up to date number of species reported from the other Fennoscandian countries are 271 in Denmark (Petersen & Meijer 2001), 279-280 in Finland (Kahanpää 2014) and 308 in Sweden (Dyntaxa 2015). If we expect roughly the same number of species in Norway as in our neighboring countries, there should be at least 50 more species to detect. Especially many areas in western, middle and northern Norway need more investigation. In addition, mountainous areas are generally less investigated than coastal areas.

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APPENDIX 1. Check-list of Agromyzidae (Diptera) in Norway

Family Agromyzidae Fallén, 1823
Number of species published from Norway by 2016: 240.

Subfamily Agromyzinae Fallén, 1823

***Agromyza* Fallén, 1810**
Agromyza abiens Zetterstedt, 1848
Agromyza albipennis Meigen, 1830
Agromyza albitarsis Meigen, 1830
Agromyza alnibetulae Hendel, 1931
Agromyza alnivora Spencer, 1969
Agromyza anthracina Meigen, 1830
Agromyza cinerascens Macquart, 1835
Agromyza demeijerei Hendel, 1920
Agromyza erythrocephala Hendel, 1920
Agromyza felleri Hering, 1941
Agromyza filipendulae Spencer, 1976
Agromyza frontella (Rondani, 1875)
Agromyza idaeiana (Hardy, 1853)
Agromyza igniceps Hendel, 1920
Agromyza intermittens (Becker, 1907)
Agromyza johannae de Meijere, 1924
Agromyza lucida Hendel, 1920
Agromyza luteitarsis (Rondani, 1875)
Agromyza marionae Griffiths, 1963
Agromyza mobilis Meigen, 1830
Agromyza nana Meigen, 1830
Agromyza nigrella (Rondani, 1875)
Agromyza nigrescens Hendel, 1920
Agromyza nigripes Meigen, 1830
Agromyza pittodes Hendel, 1931
Agromyza pseudoreptans Nowakowski, 1967
Agromyza reptans Fallén, 1823
Agromyza rondensis Strobl, 1900
Agromyza salicina Hendel, 1922
Agromyza spiraeoidearum Hering, 1954
Agromyza sulfuriceps Strobl, 1898
Agromyza viciae Kaltenbach, 1872
Agromyza vicifoliae Hering, 1932
Agromyza woerzi Groschke, 1957

***Melanagromyza* Hendel, 1920**
Melanagromyza nigrissima Spencer, 1976

***Ophiomyia* Braschnikov, 1897**
Ophiomyia cunctata (Hendel, 1920)
Ophiomyia labiatarum Hering, 1937
Ophiomyia longilingua (Hendel, 1920)
Ophiomyia maura (Meigen, 1838)
Ophiomyia melandryi de Meijere, 1924
Ophiomyia nasuta (Melander, 1913)
Ophiomyia orbiculata (Hendel, 1931)
Ophiomyia pinguis (Fallén, 1820)
Ophiomyia pulicaria (Meigen, 1830)

Subfamily Phytomyzinae Fallén, 1823

***Amauromyza* Hendel, 1931**
Amauromyza (A.) morionella (Zetterstedt, 1848)
Amauromyza (Cephalomyza) chenopodivora Spencer, 1971
Amauromyza (C.) flavifrons (Meigen, 1830)
Amauromyza (C.) gyrans (Fallén, 1823)
Amauromyza (C.) labiatarum (Hendel, 1920)
Amauromyza (C.) luteiceps (Hendel, 1920)
Amauromyza (C.) monfalconensis (Strobl, 1909)
Amauromyza (C.) verbasci (Bouché, 1847)

***Aulagromyza* Enderlein, 1936**
Aulagromyza buhri (de Meijere, 1938)
Aulagromyza cornigera (Griffiths, 1973)
Aulagromyza fulvicornis (Hendel, 1935)
Aulagromyza hendeliana (Hering, 1926)
Aulagromyza heringii (Hendel, 1920)
Aulagromyza luteoscutellata (de Meijere, 1924)
Aulagromyza populi (Kaltenbach, 1864)
Aulagromyza similis (Brischke, 1880)
Aulagromyza tremulae (Hering, 1956)
Aulagromyza tridentata (Loew, 1858)
Aulagromyza trivittata (Loew, 1873)

***Calycomyza* Hendel, 1931**
Calycomyza artemisiae (Kaltenbach, 1856)

***Cerodontha* Rondani, 1861**
Cerodontha (Butomomyza) angulata Loew, 1869)
Cerodontha (Butomomyza) rohdendorfi Nowakowski, 1967
Cerodontha (B.) scirpi (Karl, 1926)
Cerodontha (B.) scutellaris (von Roser, 1840)
Cerodontha (C.) denticornis (Panzer, 1806)
Cerodontha (C.) fulvipes (Meigen, 1830)
Cerodontha (C.) stackelbergi Nowakowski, 1972
Cerodontha (Dizygomyza) bimaculata (Meigen, 1830)
Cerodontha (D.) bulbiseta (Hendel, 1931)
Cerodontha (D.) caricicola (Hering, 1926)

Cerodontha (D.) fasciata (Strobl, 1880)
Cerodontha (D.) iraeos (Robineau-Desvoidy, 1851)
Cerodontha (D.) luctuosa (Meigen, 1830)
Cerodontha (D.) morosa (Meigen, 1830)
Cerodontha (Icteromyza) capitata (Zetterstedt, 1848)
Cerodontha (Phytagromyza) flavocingulata (Strobl, 1909)
Cerodontha (Poemyza) atra (Meigen, 1830)
Cerodontha (P.) calamagrostidis Nowakowski, 1967
Cerodontha (P.) calosoma (Hendel, 1931)
Cerodontha (P.) hammi Spencer, 1971
Cerodontha (P.) incisa (Meigen, 1830)
Cerodontha (P.) lapplandica (Rydén, 1956)
Cerodontha (P.) lateralis (Macquart, 1835)
Cerodontha (P.) muscina (Meigen, 1830)
Cerodontha (P.) pygmaea (Meigen, 1830)
Cerodontha (P.) pygmina (Hendel, 1931)
Cerodontha (Xenophytomyza) atronitens (Hendel, 1920)
Cerodontha (X.) biseta (Hendel, 1920)
Cerodontha (X.) venturii Nowakowski, 1967

***Chromatomyia* Hardy, 1849**
Chromatomyia ciliata (Hendel, 1935)
Chromatomyia farfarella (Hendel, 1935)
Chromatomyia fuscula (Zetterstedt, 1838)
Chromatomyia glacialis (Griffiths, 1964)
Chromatomyia horticola (Goureau, 1851)
Chromatomyia isicae (Hering, 1962)
Chromatomyia lonicerae (Robineau-Desvoidy, 1851)
Chromatomyia luzulae (Hering, 1924)
Chromatomyia milii (Kaltenbach, 1864)
Chromatomyia nigra (Meigen, 1830)
Chromatomyia norwegica (Rydén, 1957)
Chromatomyia opacella (Hendel, 1935)
Chromatomyia periclymeni (Hendel, 1922)
Chromatomyia primulae (Robineau-Desvoidy, 1851
Chromatomyia ramosa (Hendel, 1923)
Chromatomyia tschirnhausi Griffiths, 1980

***Galiomyza* Spencer, 1981**
Galiomyza morio (Brischke, 1880)
Galiomyza violiphaga (Hendel, 1932)

***Liriomyza* Mik, 1894**
Liriomyza artemisicola de Meijere, 1924
Liriomyza bryoniae (Kaltenbach, 1858)
Liriomyza buhri Hering, 1937
Liriomyza centaureae Hering, 1927
Liriomyza congesta (Becker, 1903)
Liriomyza equiseti de Meijere, 1924
Liriomyza eupatorii (Kaltenbach, 1873)
Liriomyza flaveola (Fallén, 1823)
Liriomyza gudmanni Hering, 1928
Liriomyza hieracii (Kaltenbach, 1862)
Liriomyza infuscata Hering, 1926
Liriomyza intonsa Spencer, 1976
Liriomyza lutea (Meigen, 1830)
Liriomyza occipitalis Hendel, 1931
Liriomyza orbona (Meigen, 1830)
Liriomyza pedestris Hendel, 1931
Liriomyza phryne Hendel, 1931
Liriomyza ptarmicae de Meijere, 1925
Liriomyza pusio (Meigen, 1830)
Liriomyza richteri Hering, 1927
Liriomyza sonchi Hendel, 1931
Liriomyza strigata (Meigen, 1830)
Liriomyza suecica Rydén, 1956
Liriomyza tanaceti de Meijere, 1925
Liriomyza taraxaci Hering, 1927
Liriomyza valerianae Hendel, 1932
Liriomyza virgo (Zetterstedt, 1838)
Liriomyza virgula Frey, 1946

***Metopomyza* Enderlein, 1936**
Metopomyza flavonotata (Haliday, 1833)
Metopomyza scutellata (Fallén, 1823)
Metopomyza xanthaspioides (Frey, 1946)

***Napomyza* Westwood, 1840**
Napomyza achilleanella von Tschirnhaus, 1992
Napomyza elegans (Meigen, 1830)
Napomyza hirticornis (Hendel, 1932)
Napomyza lateralis (Fallén, 1823)
Napomyza nigriceps van der Wulp, 1871
Napomyza plumea Spencer, 1969

***Nemorimyza* Frey, 1946**
Nemorimyza posticata (Meigen, 1830)

***Phytobia* Lioy, 1864**
Phytobia carbonaria (Zetterstedt, 1848)

***Phytoliriomyza* Hendel, 1931**
Phytoliriomyza arctica (Lundbeck, 1900)
Phytoliriomyza dorsata (Siebke, 1863)
Phytoliriomyza hilarella (Zetterstedt, 1848)
Phytoliriomyza melampyga (Loew, 1869)
Phytoliriomyza oasis (Becker, 1907)

Phytoliriomyza perpusilla (Meigen, 1830)
Phytoliriomyza variegata (Meigen, 1830)
Phytoliriomyza venustula (Spencer, 1976)

***Phytomyza* Fallén, 1810**
Phytomyza abdominalis Zetterstedt, 1848
Phytomyza aconitophila Hendel, 1927
Phytomyza adjuncta Hering, 1928
Phytomyza affinis Fallén, 1823
Phytomyza albiceps Meigen, 1830
Phytomyza albipennis Fallén, 1823
Phytomyza anderi (Rydén, 1952)
Phytomyza angelicae Kaltenbach, 1872
Phytomyza angelicastri Hering, 1932
Phytomyza aprilina Goureau, 1851
Phytomyza aquilegiae Hardy, 1849
Phytomyza aquilonia Frey, 1946
Phytomyza arnicae Hering, 1925
Phytomyza artemisivora Spencer, 1971
Phytomyza atomaria Zetterstedt, 1848
Phytomyza buhriella Spencer, 1969
Phytomyza calthivora Hendel, 1934
Phytomyza calthophila Hering, 1931
Phytomyza chaerophylli Kaltenbach, 1856
Phytomyza continua Hendel, 1920
Phytomyza crassiseta Zetterstedt, 1860
Phytomyza dasyops Hendel, 1920
Phytomyza diversicornis Hendel, 1927
Phytomyza erigerophila Hering, 1927
Phytomyza evanescens Hendel, 1920
Phytomyza fallaciosa Brischke, 1880
Phytomyza flavicornis Fallén, 1823
Phytomyza flavofemorata Strobl, 1893
Phytomyza glabra Hendel, 1935
Phytomyza glechomae Kaltenbach, 1862
Phytomyza hedingi Rydén, 1953
Phytomyza hendeli Hering, 1923
Phytomyza heracleana Hering, 1937
Phytomyza hirsuta Spencer, 1976
Phytomyza hirta Rydén, 1957
Phytomyza ilicis Curtis, 1846
Phytomyza krygeri Hering, 1949
Phytomyza lappae Goureau, 1851
Phytomyza leucanthemi Hering, 1935
Phytomyza libanotidis Hering, 1928
Phytomyza marginella Fallén, 1823
Phytomyza melana Hendel, 1920
Phytomyza minuscula Goureau, 1851
Phytomyza nigrifemur Hering, 1934
Phytomyza nigripennis Fallén, 1823
Phytomyza nigritella Zetterstedt, 1848
Phytomyza nigritula Zetterstedt, 1838
Phytomyza obscurella Fallén, 1823
Phytomyza pedicularifolii Hering, 1960
Phytomyza pimpinellae Hendel, 1924
Phytomyza plantaginis Robineau-Desvoidy, 1851
Phytomyza ptarmicae Hering, 1937
Phytomyza pubicornis Hendel, 1920
Phytomyza pullula Zetterstedt, 1848
Phytomyza ranunculi (Schrank, 1803)
Phytomyza ranunculicola Hering, 1949
Phytomyza ranunculivora Hering, 1932
Phytomyza rapunculi Hendel, 1927
Phytomyza rhabdophora Griffiths, 1964
Phytomyza rhodiolae Griffiths, 1976
Phytomyza rostrata Hering, 1934
Phytomyza rufescens von Roser, 1840
Phytomyza rufipes Meigen, 1830
Phytomyza rydeni Hering, 1934
Phytomyza sedicola Hering, 1924
Phytomyza soenderupi Hering, 1941
Phytomyza soenderupiella Spencer, 1976
Phytomyza solidaginis Hendel, 1920
Phytomyza spinaciae Hendel, 1935
Phytomyza spoliata Strobl, 1906
Phytomyza spondylii Robineau-Desvoidy, 1851
Phytomyza subrostrata Frey, 1946
Phytomyza tanaceti Hendel, 1923
Phytomyza tenella Meigen, 1830
Phytomyfza trollii Hering, 1930
Phytomyza trolliivora Hering, 1935
Phytomyza tussilaginis Hendel, 1925
Phytomyza varipes Maquart, 1835
Phytomyza virgaureae Hering, 1926
Phytomyza wahlgreni Rydén, 1944

***Pseudonapomyza* Hendel, 1920**
Pseudonapomyza atra (Meigen, 1830)
Pseudonapomyza europaea Spencer, 1973

APPENDIX 2. Distribution maps of 43 species of Agromyzidae in the genera *Agromyza* Fallén, 1810, *Liriomyza* Mik, 1894, *Ophiomyia* Braschnikov, 1897 and *Phytoliriomyza* Hendel, 1931. The distribution is given as EIS-grid maps (European Invertebrate Survey).

FIGURE 1. Distribution of *Agromyza albipennis* Meigen, 1830 in Norway.

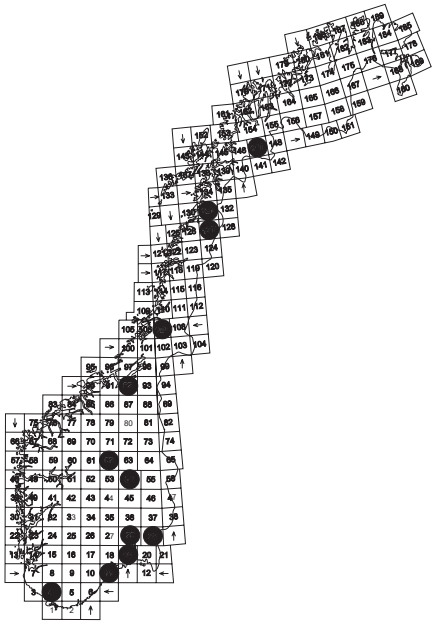

FIGURE 2. Distribution of *Agromyza cinerascens* Macquart, 1835 in Norway.

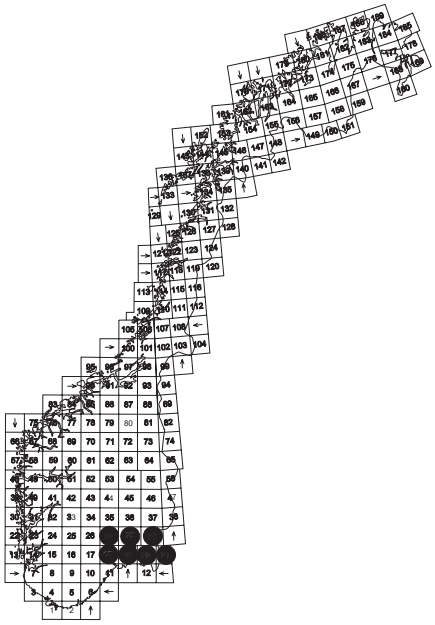

FIGURE 3. Distribution of *Agromyza filipendulae* Spencer, 1976 in Norway.

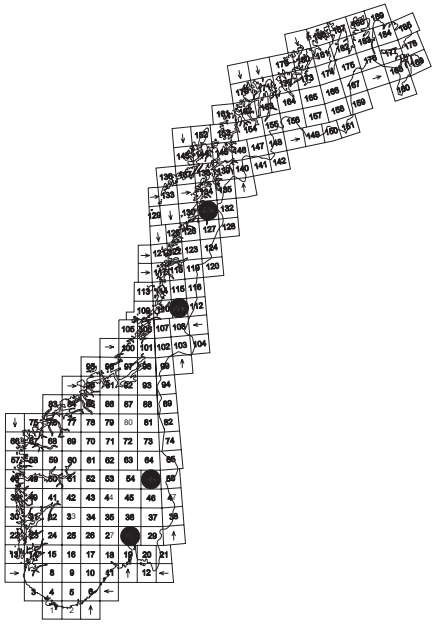

FIGURE 4. Distribution of *Agromyza idaeiana* (Hardy, 1853) in Norway.

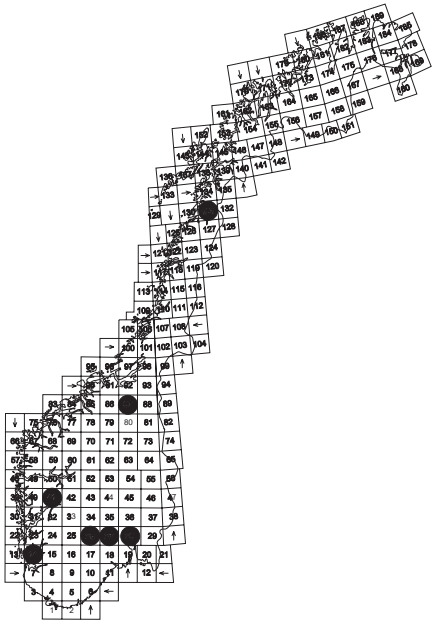

FIGURE 5. Distribution of *Agromyza luteitarsis* (Rondani, 1875) in Norway.

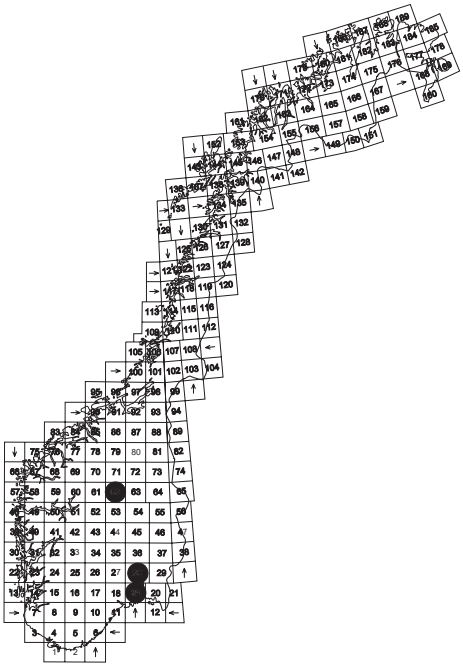

FIGURE 6. Distribution of *Agromyza marionae* Griffiths, 1963 in Norway.

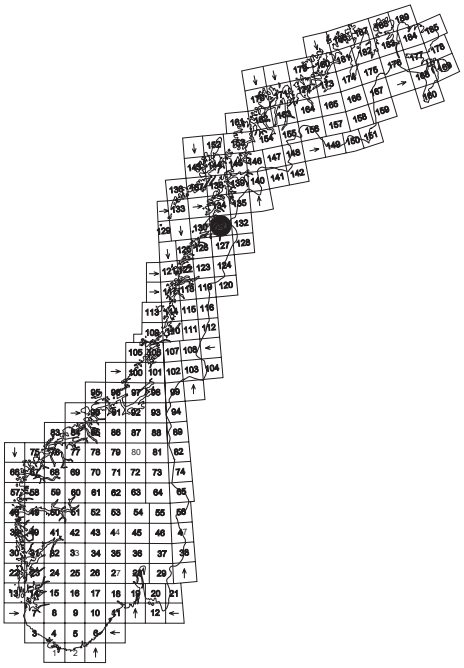

FIGURE 7. Distribution of *Agromyza mobilis* Meigen, 1830 in Norway.

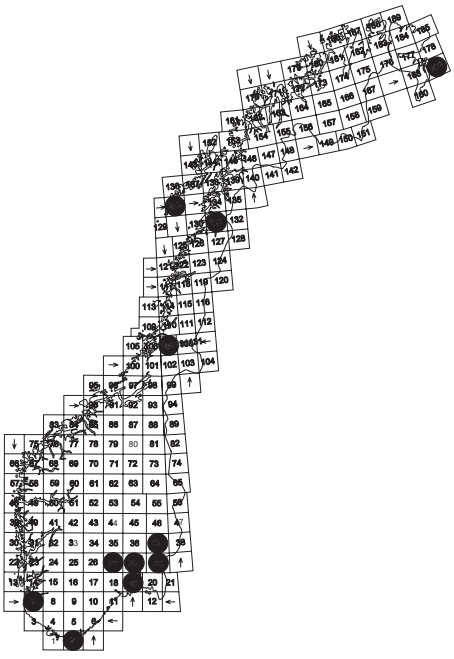

FIGURE 8. Distribution of *Agromyza nana* Meigen, 1830 in Norway.

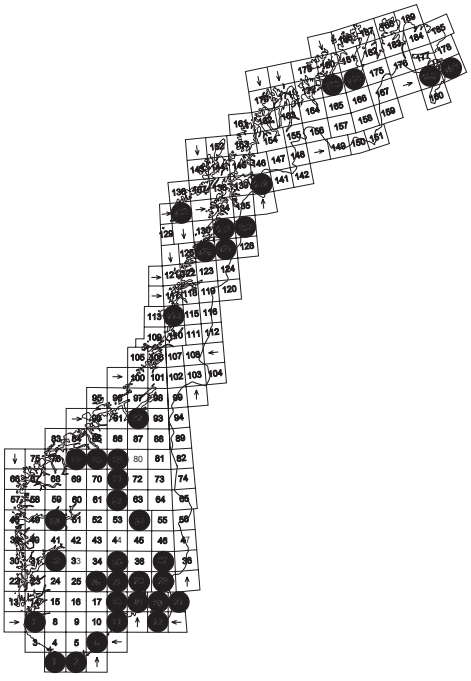

FIGURE 9. Distribution of *Agromyza nigrella* (Rondani, 1875) in Norway.

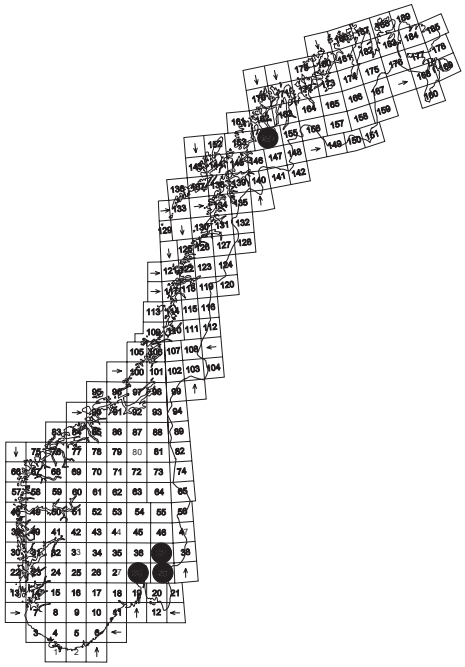

FIGURE 10. Distribution of *Agromyza nigripes* Meigen, 1830 in Norway.

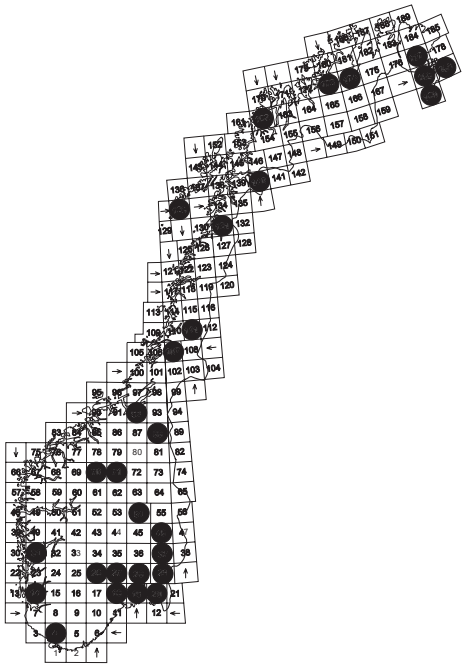

FIGURE 11. Distribution of *Agromyza reptans* Fallén, 1823 in Norway.

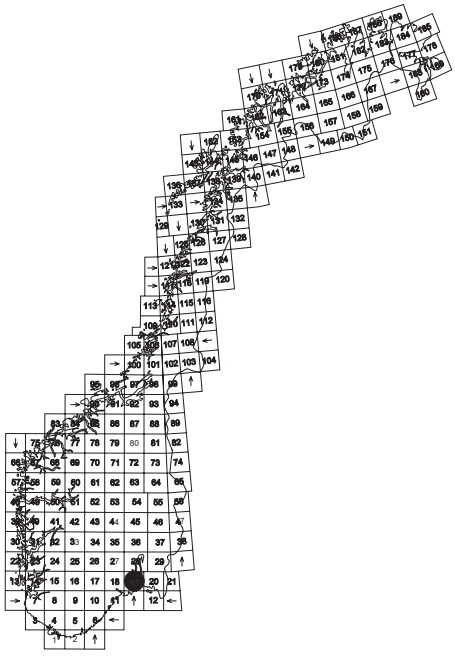

FIGURE 12. Distribution of *Agromyza rondensis* Strobl, 1900 in Norway.

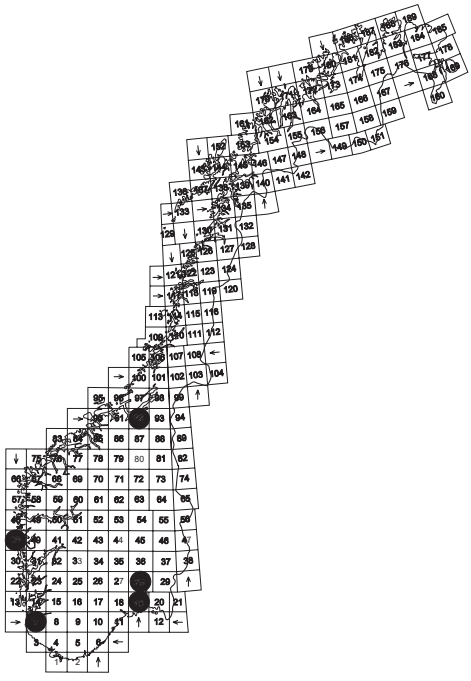

FIGURE 13. Distribution of *Agromyza sulfuriceps* Strobl, 1898 in Norway.

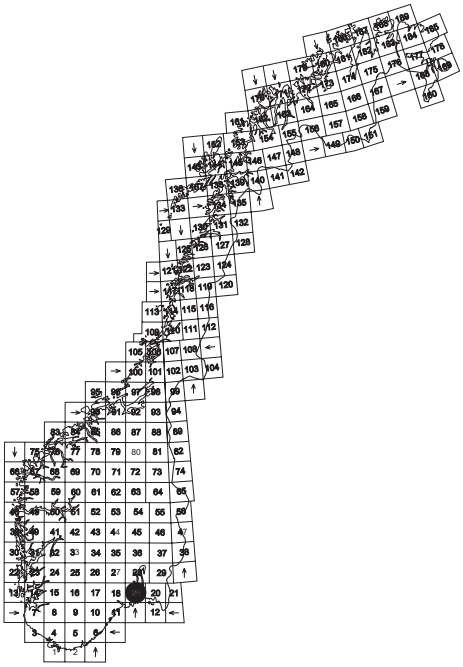

FIGURE 14. Distribution of *Agromyza viciae* Kaltenbach, 1872 in Norway.

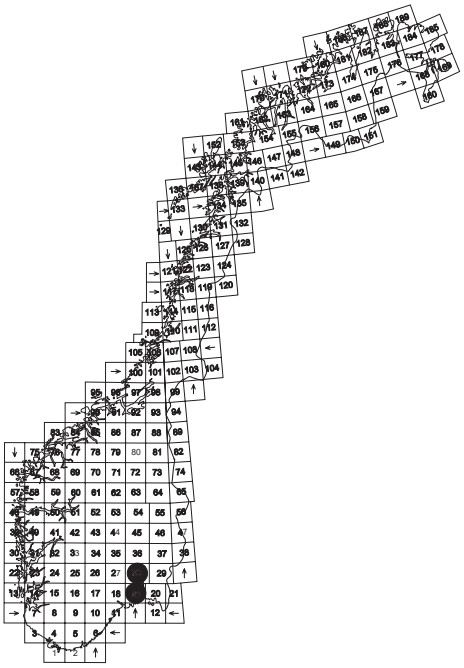

FIGURE 15. Distribution of *Agromyza vicifoliae* Hering, 1932 in Norway.

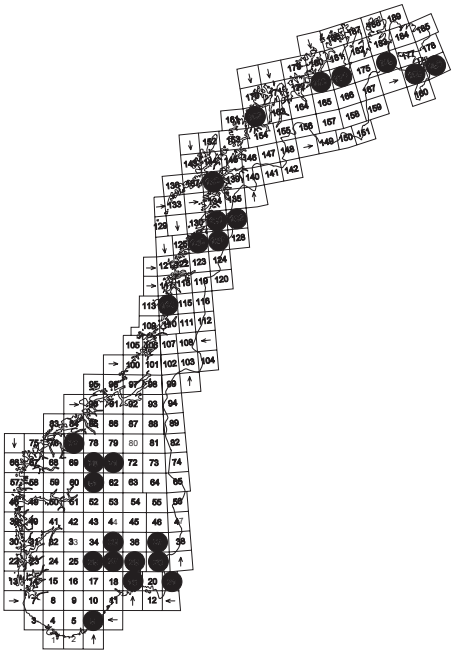

FIGURE 16. Distribution of *Liriomyza artemisicola* de Meijere, 1924 in Norway.

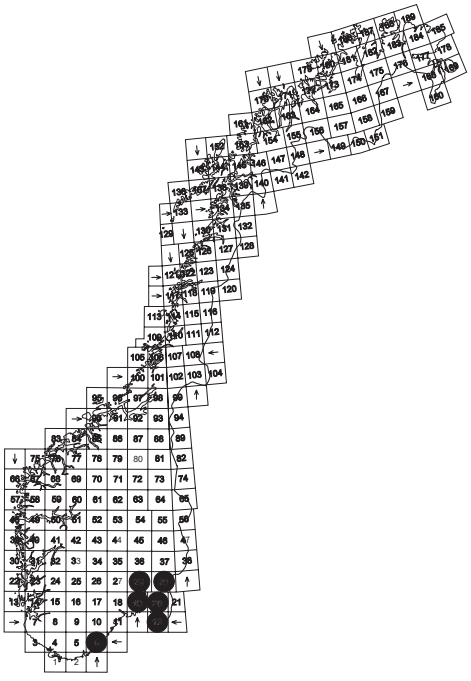

FIGURE 17. Distribution of *Liriomyza buhri* Hering, 1937 in Norway.

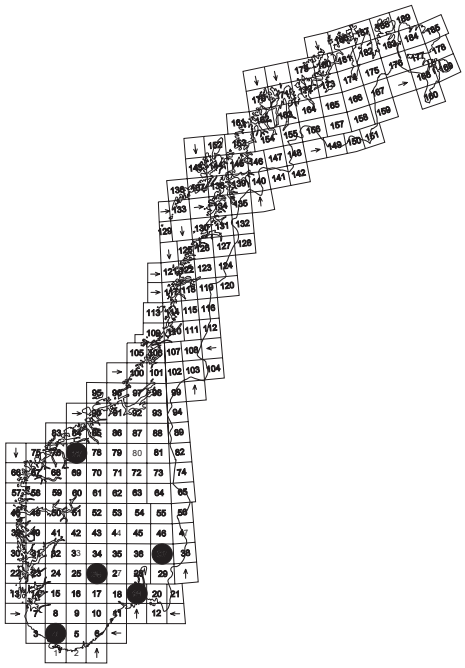

FIGURE 18. Distribution of *Liriomyza centaureae* Hering, 1927 in Norway.

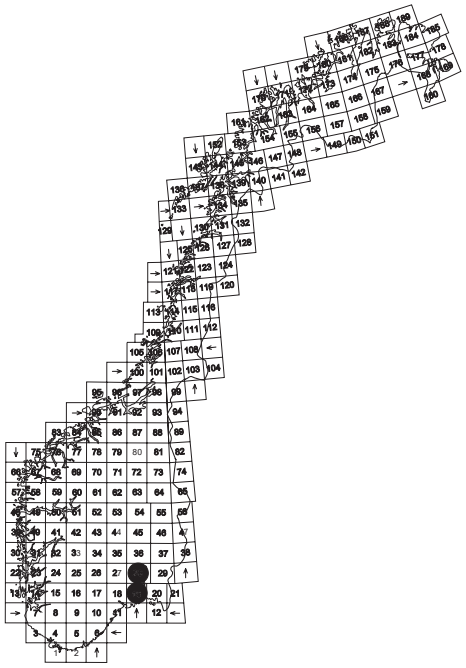

FIGURE 19. Distribution of *Liriomyza congesta* (Becker, 1903) in Norway.

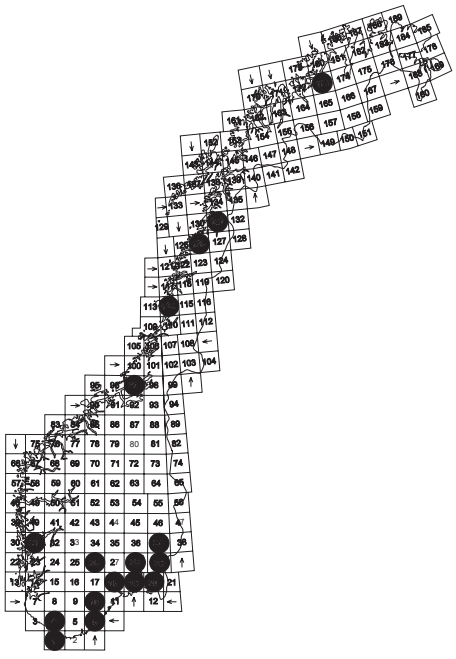

FIGURE 20. Distribution of *Liriomyza flaveola* (Fallén, 1823) in Norway.

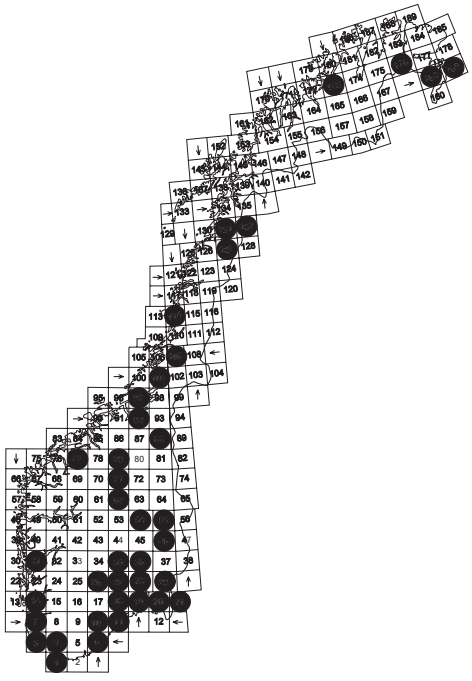

FIGURE 21. Distribution of *Liriomya hieracii* (Kaltenbach, 1862) in Norway.

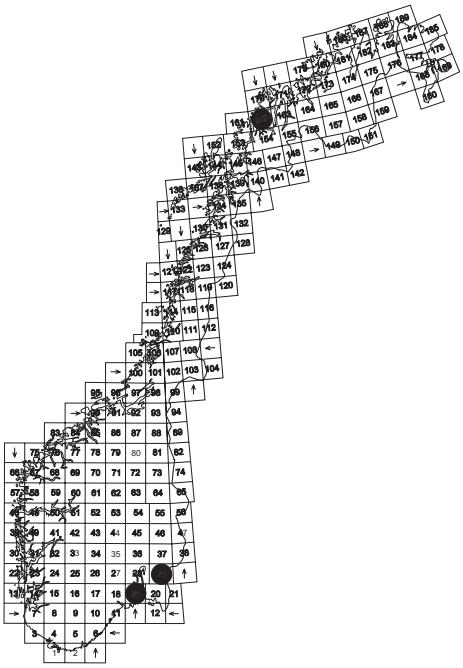

FIGURE 22. Distribution of *Liriomyza infuscata* Hering, 1926 in Norway.

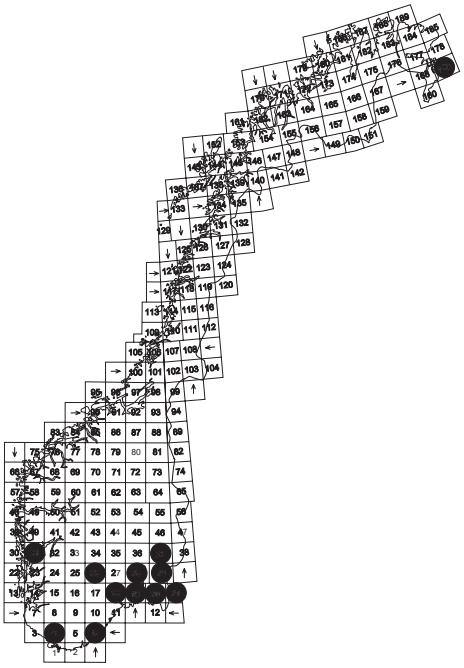

FIGURE 23. Distribution of *Liriomyza intonsa* Spencer, 1976 in Norway.

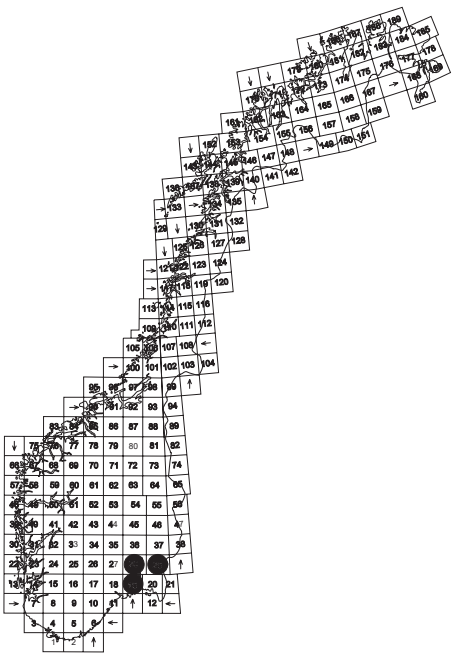

FIGURE 24. Distribution of *Liriomyza lutea* (Meigen, 1830) in Norway.

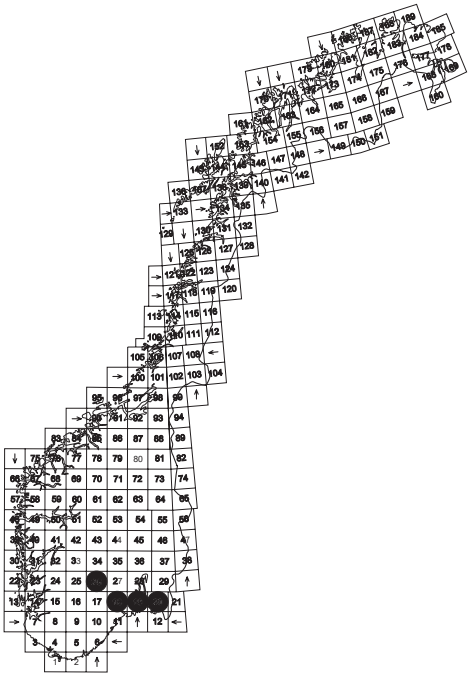

FIGURE 25. Distribution of *Liriomyza occipitalis* Hendel, 1931 in Norway.

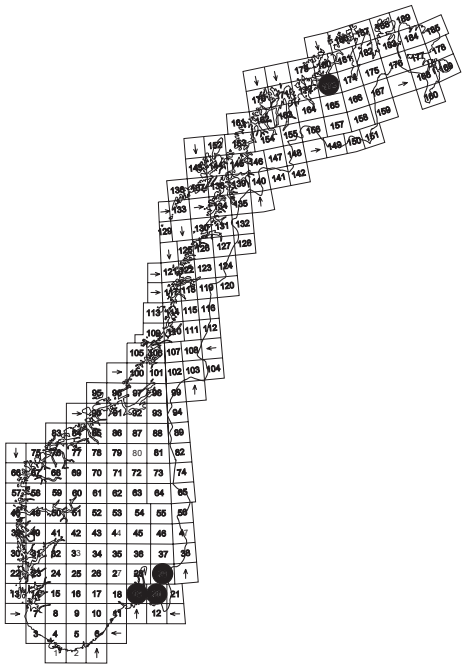

FIGURE 26. Distribution of *Liriomyza orbona* (Meigen, 1830) in Norway.

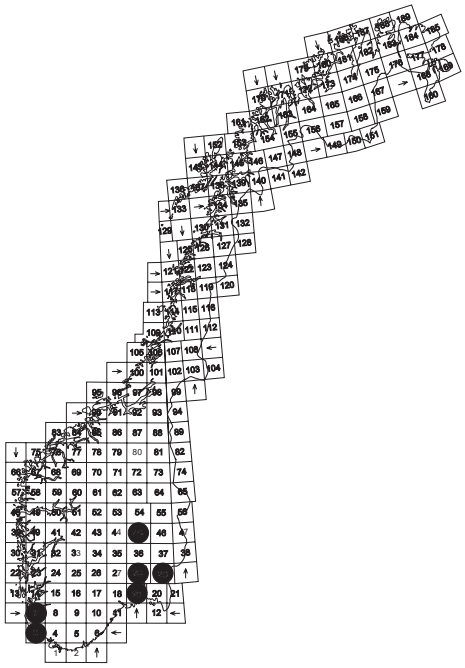

FIGURE 27. Distribution of *Liriomyza phryne* Hendel, 1931 in Norway.

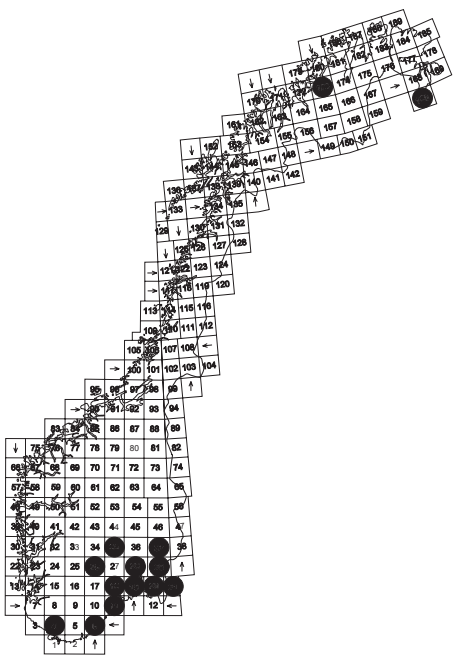

FIGURE 28. Distribution of *Liriomyza ptarmicae* de Meijere, 1925 in Norway.

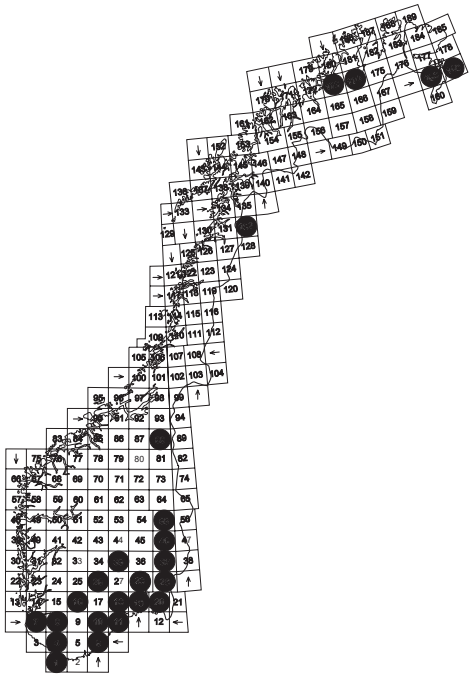

FIGURE 29. Distribution of *Liriomyza pusio* (Meigen, 1830) in Norway.

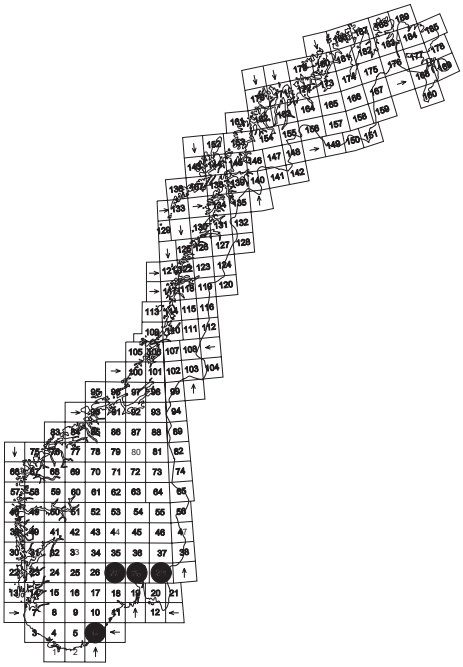

FIGURE 30. Distribution of *Liriomyza sonchi* Hendel, 1931 in Norway.

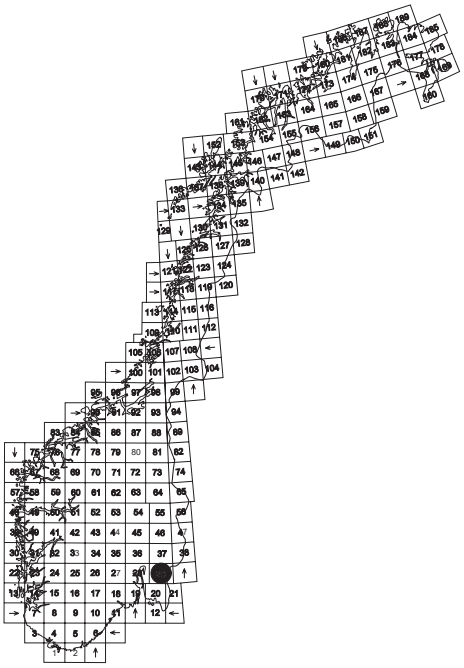

FIGURE 31. Distribution of *Liriomyza strigata* (Meigen, 1830) in Norway.

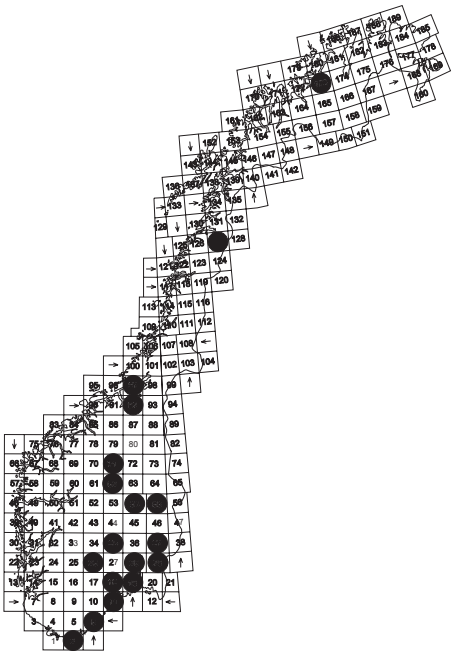

FIGURE 32. Distribution of *Liriomyza suecica* Ryden, 1956 in Norway.

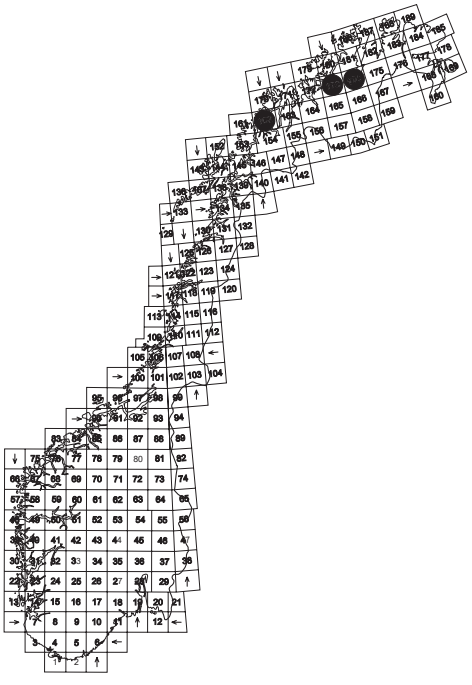

FIGURE 33. Distribution of *Liriomyza taraxaci* Hering, 1927 in Norway.

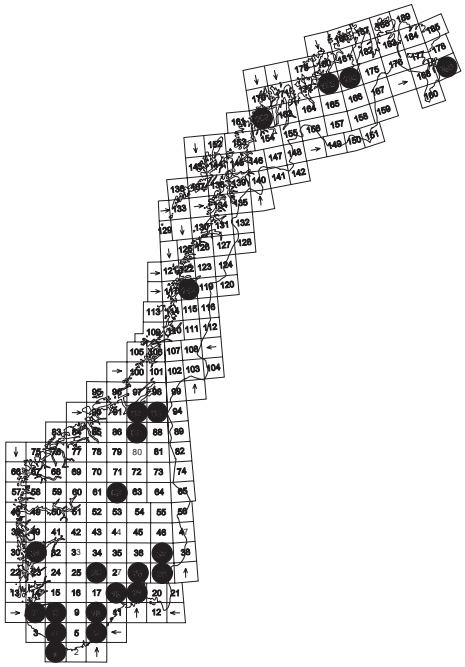

FIGURE 34. Distribution of *Liriomyza valerianae* Hendel, 1932 in Norway.

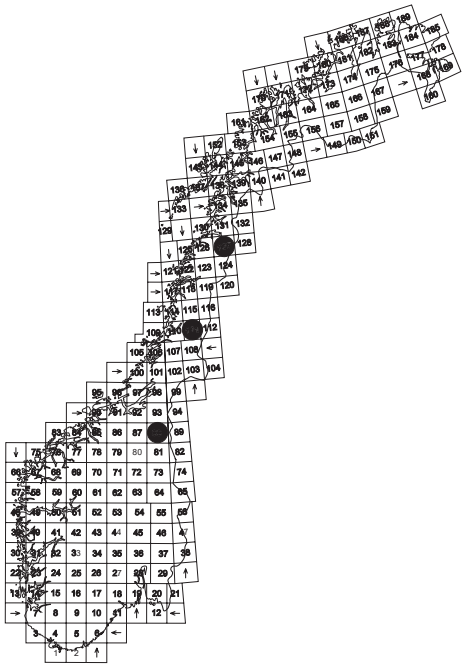

FIGURE 35. Distribution of *Liriomyza virgo* (Zetterstedt, 1838) in Norway.

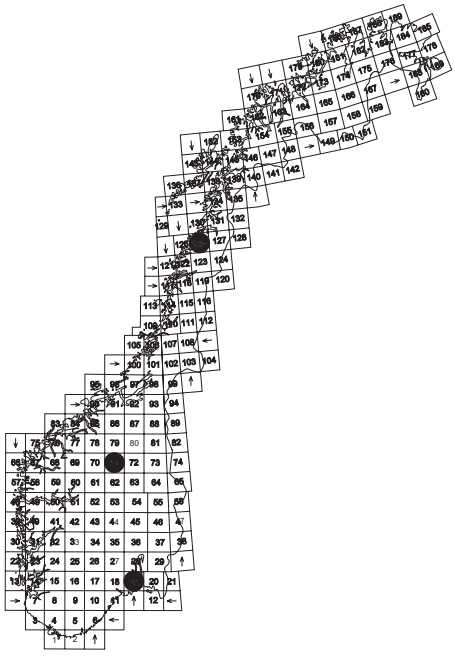

FIGURE 36. Distribution of *Liriomyza virgula* Frey, 1946 in Norway.

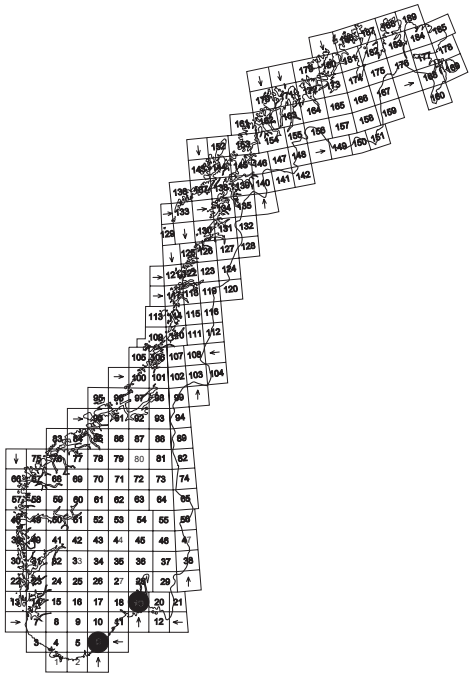

FIGURE 37. Distribution of *Ophiomyia nasuta* (Melander, 1913) in Norway.

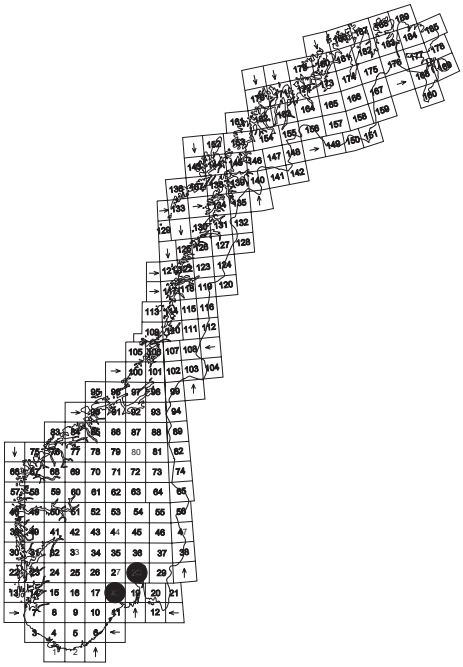

FIGURE 38. Distribution of *Ophiomyia orbiculata* (Hendel, 1931) in Norway.

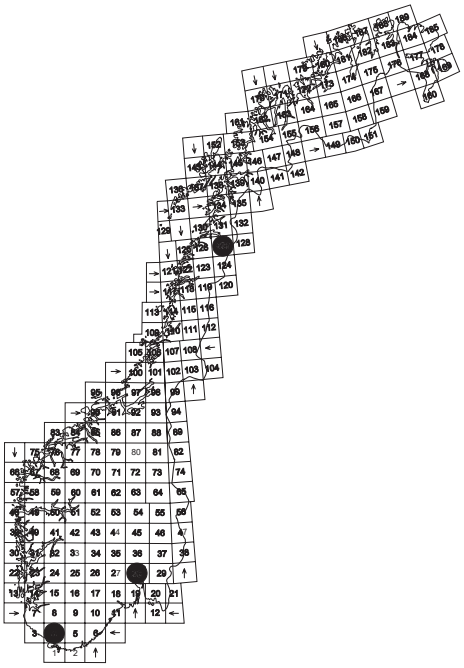

FIGURE 39. Distribution of *Ophiomyia pinguis* (Fallén 1820) in Norway.

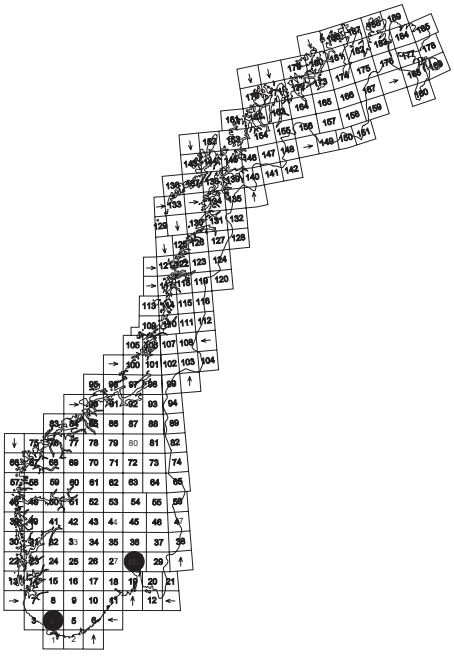

FIGURE 40. Distribution of *Ophiomyia pulicaria* (Meigen, 1830) in Norway.

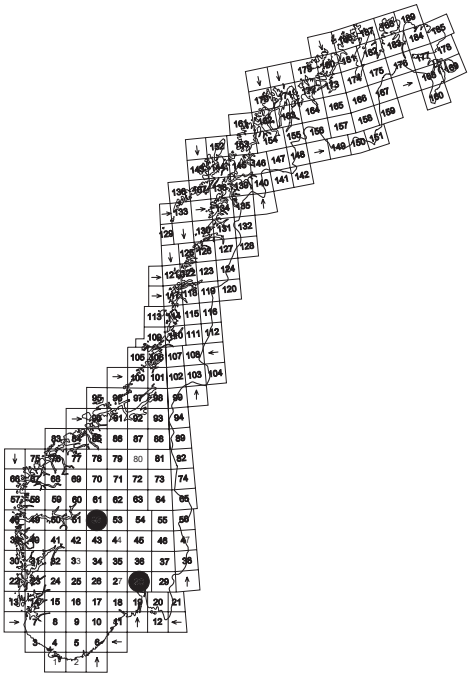

FIGURE 41. Distribution of *Phytoliriomyza arctica* (Lundbeck, 1901) in Norway.

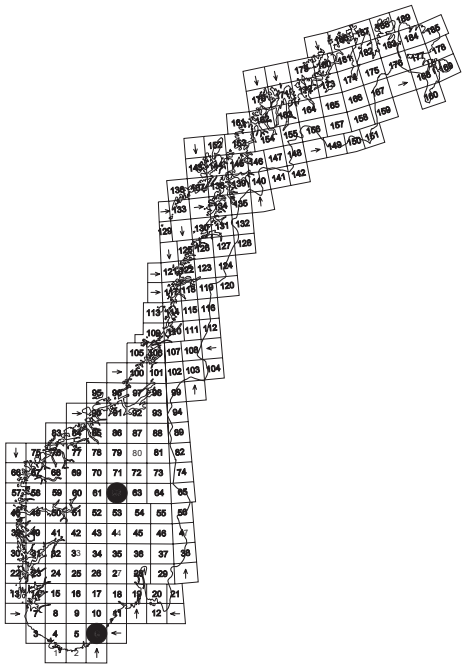

FIGURE 42. Distribution of *Phytoliriomyza hilarella* (Zetterstedt, 1848) in Norway.

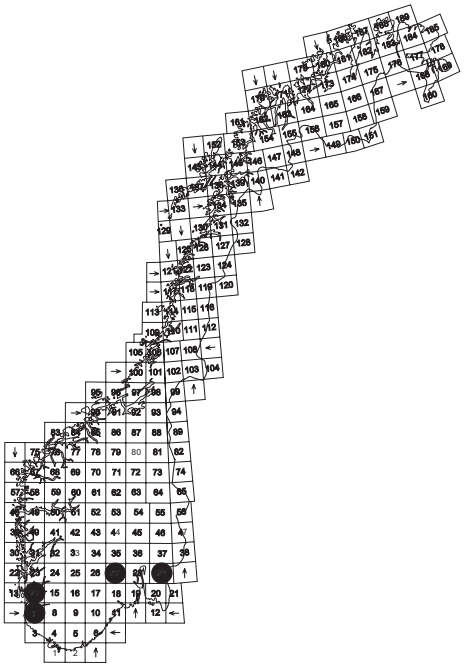

FIGURE 43. Distribution of *Phytoliriomyza variegata* (Meigen, 1830) in Norway.