The blow-fly genus *Lucilia* Robineau-Desvoidy (Diptera, Calliphoridae) in Norway

KNUT ROGNES

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Norwegian material of the genus *Lucilia* Robineau-Desvoidy, 1830 in the collections of The Royal Norwegian Society of Sciences — The Museum, Trondheim; Tromsø Museum, Tromsø; Museum of Zoology, Bergen; Museum of Zoology, Oslo; and the author have been examined and revised. A key to the eight *Lucilia* species known at present from Norway, viz. *L. sericata* (Meigen, 1826), *L. regalis* (Meigen, 1826), *L. richardsi* Collin, 1926, *L. fuscipalpis* (Zetterstedt, 1845), *L. silvarum* (Meigen, 1826), *L. bufonivora* Moniez, 1876, *L. caesar* (L.) and *L. illustris* (Meigen, 1826), is given. Some new features are incorporated. The male frons and terminalia of most species are figured. Lists of records for all species are given, and their distribution mapped in terms of the 50 km squares of the European Invertebrate Survey system for Norway.

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INTRODUCTION

Blow-flies belonging to the genus *Lucilia* Robineau-Desvoidy, 1830 have a characteristic shining green metallic colour. This they share with certain members of the families Muscidae and Tachinidae but they are easily distinguished as calliphorids by the presence of a row of hypopleural setae and by the absence of a postscutellum. Adult members of the genus are further characterized by the following combination of characters: mouthparts normal, outermost posthumeral seta external to a longitudinal line through presutural seta, stem vein (common origin of subcosta and radius) naked above, propleuron and prosternum hairy, suprasquamal ridge with anterior and posterior tufts of hairs, thoracic squama bare on upper surface, squamopleuron (metapleuron) with short pubescence only, without hairs (Zumpt 1956).

The genus has received much interest mainly because of the suspected or proven significance of its members in the transmission and spread of certain diseases affecting man (poliomyelitis, enteric diseases), but also because of their ability to cause myiasis in mammals including man, birds and amphibians (Lundbeck 1927, MacLeod 1943a, 1943b, Zumpt 1956, Nuorteva 1959a, 1959b, 1959c, 1959d, 1959e, 1960, Schumann 1971, Smith 1973, Brinkmann 1976a, 1976b, Nielsen, Nielsen & Walhovd 1978).

The taxonomy of the genus has until quite recently been insufficiently known and only with the description published by Mihályi (1977) of the female of *L. pilosiventris* Kramer, 1910 and *L. regalis* (Meigen, 1826) may the taxonomy be regarded as settled.

Zumpt (1956) reports 14 species from the Palaearctic region, of which 10 (11?) occur in Europe. The species occurring in Denmark, Sweden and Finland and their distribution are rather well known (Lundbeck 1927, Cragg 1950, Ringdahl 1952, Nuorteva 1959a, 1959d, 1963, 1964, Nuorteva, Kotimaa, Pohjolainen & Räsänen 1964, Nuorteva & Laurikainen 1964, Nuorteva & Vesikari 1966, Nielsen, Nielsen & Walhovd 1978). The same cannot be said about Norway. Species recorded from that country by different authors are tabulated in Table 1. For reasons mentioned above most of the early records are highly unreliable.

During the past three years I have collected and received as gifts species of this genus, and new species and new localities for previously reported ones have been discovered. A revision of the existing Norwegian material of the genus therefore seems useful in order to obtain basic knowledge as to the specific composition and distribution of the Norwegian *Lucilia* fauna.

MATERIAL AND METHODS

The following museum material of the genus *Lucilia* were revised: 18 specimens in the Royal Norwegian Society of Sciences — The Museum,

Table 1. Species of *Lucilia* Robineau-Desvoidy, 1830 occurring in Norway according to previously published sources.

Source	*sericata* (Meigen)	*fuscipalpis* [1] (Zetterstedt)	*silvarum* (Meigen)	*caesar* (L.)	*illustris* (Meigen)	*cornicina* [2] (Fabr.)	*splendida* [3] (Meigen)	*ruficeps* [4] (Meigen)
Zetterstedt (1845)	—	X	—	—	X	—	—	—
Siebke (1877)	X	X	—	X	X	X	X	—
Storm (1891, 1895, 1907)	X	—	—	X	—	—	—	—
Bidenkap (1892)	—	—	X	X	—	X	—	X
Strand (1900)	—	—	—	X	—	X	—	—
Bidenkap (1901)	—	—	—	X	—	X	—	—
Ringdahl (1944a)	—	—	—	—	X		—	—
Ringdahl (1944b)	—	—	—	X	X		—	—
Ringdahl (1951)	—	X	—	—	—		—	—
Ringdahl (1952)	—	X	—	—	X		—	—
Ringdahl (1954)	—	X	—	—	—		—	—
Ardø (1957)	X	—	—	—	—		—	—
Natvig (1950, 1959)	X	—	—	X	—		—	—
Brinkmann (1976a, 1976b)	—	—	—	X	X		—	—

1) Published by Zetterstedt in the genus *Sarcophaga* Meigen, by Ringdahl in the genus *Acrophagella* Ringdahl. 2) Muscidae. 3) *L. splendida* (Meigen) is a synonym to *L. caesar* (L.) (Aubertin 1933, Zumpt 1956). 4) *L. ruficeps* (Meigen) is a synonym to *L. caesar* (L.) according to Lundbeck (1927). The name is not mentioned by Zumpt (1956).

Trondheim (previously published by Ringdahl 1944a), 35 specimens in Tromsø Museum, Tromsø (mostly previously published by Ringdahl 1944b), 53 specimens in Museum of Zoology, Bergen (previously unpublished), and 40 specimens in Museum of Zoology, Oslo (some previously published by Siebke 1877). In addition 14 females were left unidentified (see Note below).

From the author's private collection 202 specimens were examined. All the latter ones have been caught individually with a hand net, and most have as a matter of routine been mounted with the terminalia exposed. Thus a total of 348 identified specimens from Norway form the basis of the present study.

Identifications follow Richards & Collin (1926), Lundbeck (1927), Aubertin (1933), Spence (1954), Emden (1954), Zumpt (1956), Schumann (1971) and Mihályi (1977).

The key, presented below, has been based on all available Norwegian material, as for *L. regalis* (Meigen) also on my own material of that species from Denmark (see below). For some species certain new features have been included. This applies to the hairiness of the beret (i.e. ridge on upper part of hypopleuron between anterior end of posterior spiracle and upper posterior corner of sternopleuron), position of anteriormost frontal seta relative to ptilinal suture and eye margin, the extent of the basal excavation of the abdomen, hairiness of the fourth tergite (apparent third) in the female, and length of third antennal segment in comparison with greatest length of an eye viewed exactly in profile.

Certain ratios also are presented. In the males the width of frons has been measured at its narrowest point, the head width as the horizontal distance between the two most distant points of the head, and the parafacialia along an imaginary line starting at the insertion of the arista and meeting the inner eye margin at right angles. In the females measurements of the width of frons, parafrontalia and interfrontal stripe have been made at level of the anteriormost orbital seta. All measurements have been made with a Wild wide field measuring eyepiece (10 x, with scale 12 mm : 120 and crosshair).

The figures have been prepared by means of a Wild M8 drawing tube from pinned specimens.

In the lists of localities Løken's (1973) modification of Strand's (1943) system has been used. All lists give the EIS square number (see below) for the locality in question. The name of the collector is stated except when this is the author. The following abbreviations indicate the site of deposition: DKNVS = Royal Norwegian Society of Sciences—The Museum, Trondheim, TM = Tromsø Museum, Tromsø, ZMB = Museum of Zoology, Bergen, ZMO = Museum of Zoology, Oslo. No indication is given for specimens depo-

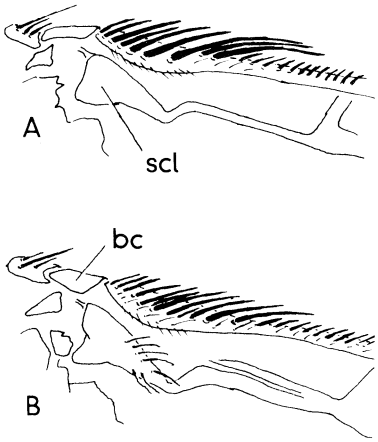

Fig. 1. Base of left wing from below showing basicosta (bc) and subcostal sclerite (scl). A) *Lucilia sericata* (Meigen, 1826), male. B) *L. caesar* (L.), male.

sited in the author's collection, neither for unverified records.

The maps of Norway show the distribution of the species according to new, revised and unverified reliable records in terms of the 189 numbered 50 km squares of the European Invertebrate Survey system for Norway (cf. Økland 1977). *Lucilia* species have been recorded from a total of 44 EIS squares.

Key to species of *Lucilia* Robineau-Desvoidy recorded from Norway

The key covers the eight species up to now found in Norway. For the identification of the remaining two European species, *L. pilosiventris* Kramer, 1910 and *L. ampullacea* Villeneuve, 1922 the reader is referred to Mihályi (1977). *L. pilosiventris* has neither been caught in Sweden (Ringdahl 1952), Finland (W. Hackman, Helsinki, in litt.), Denmark (S. Andersen, Co-

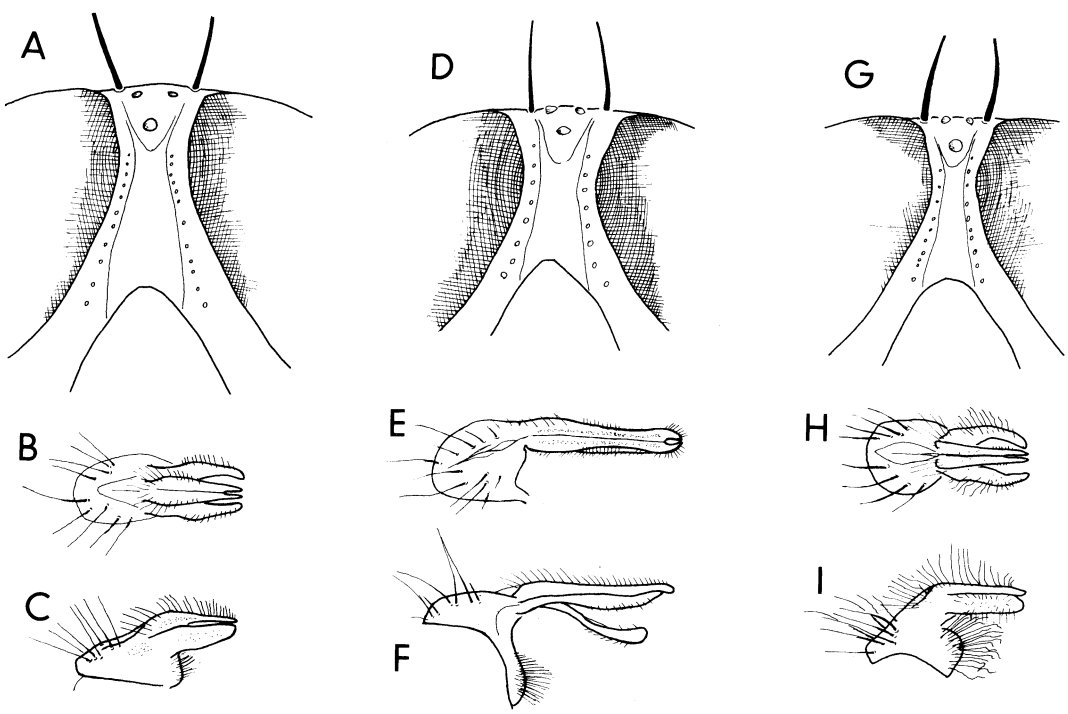

Fig. 2. Male frons (A, D, G), and male terminalia seen from behind (B, E, H) and in profile (C, F, I). A—C) *Lucilia sericata* (Meigen, 1826). D—F) *L. regalis* (Meigen, 1826). G—I) *L. richardsi* Collin, 1926.

penhagen, in litt.) nor Great Britain (Emden 1954). Cragg (1950:70—71), however, reports to have trapped 39 females in Denmark (East Jutland, Mols mountains). As the female of this species has been unknown until quite recently (Mihályi 1977), this record cannot be accepted without reservation. *L. ampullacea* has been recorded from Skåne and Gotland in Sweden (Ringdahl 1952), from Denmark (Lundbeck 1927, S. Andersen, Copenhagen, in litt.) and Great Britain (Emden 1954), but not from Finland (W. Hackman, Helsinki, in litt.), and may very well be found in Norway.

1 (6) Basicosta white or yellow; subcostal sclerite with microscopic pubescence only, without black setulae near apex (Fig. 1A); three postsutural acrostichal setae; ♂♂: frons broader than parafacialia; ♀♀: basal dorsal excavation of abdomen broadly separated from hind margin of second tergite.

2 (3) A single anterodorsal seta on middle tibia; palpi yellow or brown; median marginal setae of third tergite weak, sometimes hairlike, adpressed, about as strong as paramedian ones, equal to or shorter than half the length of fourth tergite; ♂♂: frons 0.12—0.14 times head width (Fig. 2A); surstyli short, apically rounded; lower part of epandrium with hairs not curly at tip (Fig. 2B, C); ♀♀: abdominal dusting strong, divided at midline according to direction of light; parafrontalia half as wide as interfrontal stripe..... ..... 1. *Lucilia sericata* (Meigen, 1826)

3 (2) Two or more anterodorsal setae on middle tibia (occasionally a single one on one side); palpi darker.

4 (5) Fifth tergite with strong discal setae intermingled with short hairs less than half as long as the discal setae, shortest hairs about as long as or shorter than hairs covering disc of fourth tergite; two or four median marginal setae on third tergite strong, erect, longer than half the length of fourth tergite; beret naked, occasionally with one or two small thin hairs; palpi yellowish to black; ♂♂: frons 0.16—0.19 times head width (Fig. 2D); cerci and surstyli very long and slender (Fig. 2E, F); ♀♀: abdominal dusting rather strong, divided at midline according to direction of light; disc of fourth tergite with adpressed short hairs except about midline where they are erect; parafrontalia about half as wide as interfrontal stripe..... ..... 2. *Lucilia regalis* (Meigen, 1826)

5 (4) Fifth tergite without strong discal setae, with long hairs of rather uniform length only, shorter hairs longer than hairs covering disc of fourth tergite; median marginal setae on third tergite weak, more or less adpressed, shorter than half the length of fourth tergite; beret with three to six small thin hairs; palpi greyish brown; ♂♂: frons 0.10—0.11 times head width (Fig. 2G); surstyli rather short, parallel-sided, apically rounded, lower part of epandrium with long hairs, curly at tip (Fig. 2H, I); ♀♀: abdominal dusting very

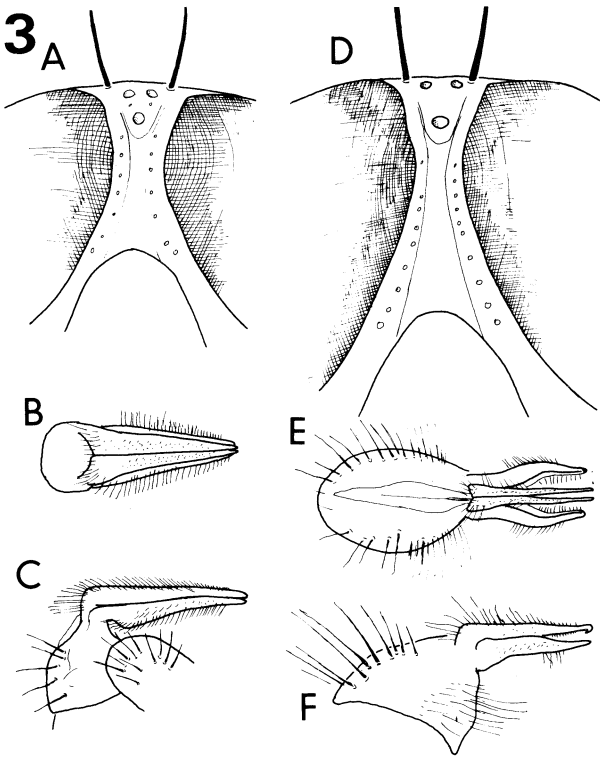

Fig. 3. Male frons (A, D), and male terminalia seen fron behind (B, E) and in profile (C, F). A—C) *Lucilia fuscipalpis* (Zetterstedt, 1845). D—F) *L. silvarum* (Meigen, 1826).

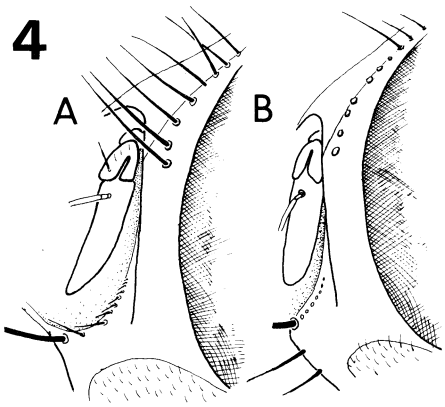

Fig. 4. Left parafacial and neighbouring regions showing position of anteriormost frontal seta. A) *Lucilia silvarum* (Meigen, 1826), male. B) *L. bufonivora* Moniez, 1876, male.

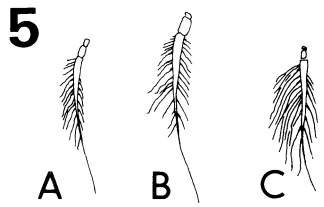

Fig. 5. Left arista. A—B) *Lucilia fuscipalpis* (Zetterstedt, 1845); A, male, B, female. C) *L. silvarum* (Meigen, 1826), male.

weak, abdomen shining; disc of fourth tergite with semierect short hairs all over; parafrontalia much less than half as wide as interfrontal stripe . . . . . 3. *Lucilia richardsi* Collin, 1926.

6 (1) Basicosta dark brown or black.

7 (12) Subcostal sclerite with microscopic pubescence only, without black setulae near apex (as in Fig. 1A); fifth tergite with discal setae; second tergite black, contrasting strongly with green colour of succeeding tergites; palpi greyish brown to black; ♂♂: frons broader than parafacialia; ♀♀: basal dorsal excavation of abdomen broadly separated from hind margin of second tergite.

8 (9) Arista with short hairs, naked on outer third or half, somewhat swollen at base (Fig. 5A, B); presutural intraalar seta absent; three postsutural acrostichal setae; one or two anterodorsal setae on middle tibia; palpi greyish brown; median marginal seta on third tergite not very strong, nor strikingly different from paramedian ones, semierect, half as long as fourth tergite or shorter; third antennal segment more than half as long greatest length of eye viewed in profile; ♂♂: frons 0.14 times head width (Fig. 3A); face strongly protruding; beret naked; cerci and surstylus rather long, tapering, surstylus slightly curved (Fig. 3B, C); ♀♀: third antennal segment very large; in front of suture between acrostichal and dorsocentral rows of setae a thin longitudinal pruinose line on each side, extending backwards slightly behind transverse suture. . . . . 4. *Lucilia fuscipalpis* (Zetterstedt, 1845).

9 (8) Arista normal, with long hairs (Fig. 5C); presutural intraalar seta present; a single anterodorsal seta on middle tibia; two or four median marginal setae on third tergite strong, strikingly different from paramedian ones, erect, as long as or longer than half the length of fourth tergite; third antennal segment half as long as greatest length of eye viewed in profile, or less.

10 (11) Three postsutural acrostichal setae; palpi brown, black on outer third or half; beret naked, occasionally with a single hair; distance in front of suture between acrostichal rows of setae equal to distance between acrostichal and dorsocentral rows; ♂♂: frons 0.08—0.11 times head width (Fig. 3D); head at lunula not protruding; anteriormost frontal seta as distant from eye margin as

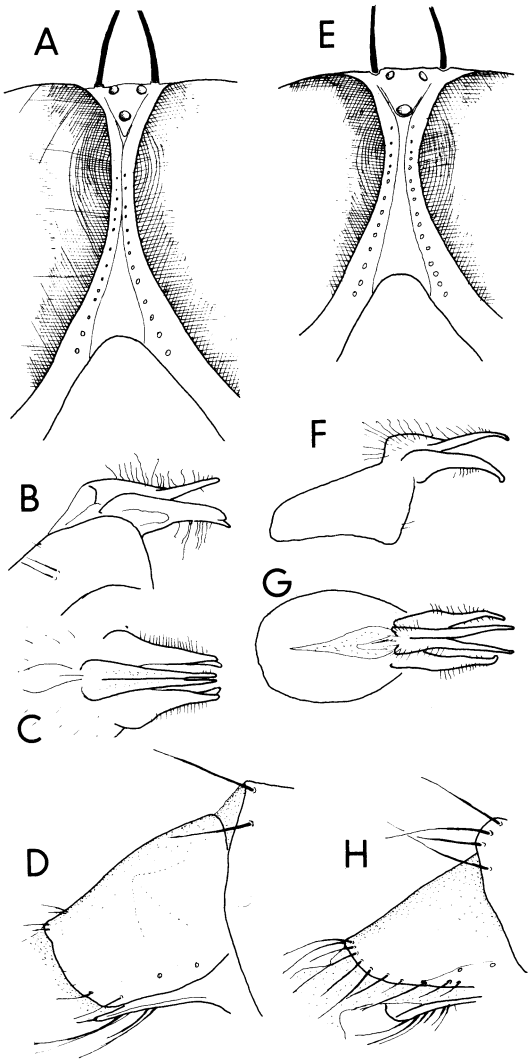

Fig. 6. Male frons (A, E), male terminalia seen in profile (B, F) and from behind (C, G), and sixth tergite of female seen in profile (D, H). A—D) *Lucilia caesar* (L.). E—H) *L. illustris* (Meigen, 1826).

from ptilinal suture, or slightly closer to the latter (Fig. 4A); cerci narrow, cleft to middle, each arm with a slight knob at apex, surstyli six times longer than broad, apical half tapering (Fig. 3E, F). . . . . 5. *Lucilia silvarum* (Meigen, 1826)

11 (10) Two postsutural acrostichal setae; palpi brown; beret with one to five short thin hairs; distance in front of suture between acrostichal rows of setae distinctly less than distance between acrostichal and dorsocentral rows; ♂♂: frons 0.09 times head width; head at lunula somewhat

protruding; anteriormost frontal seta twice as distant from eye margin as from ptilinal suture (Fig. 4B); surstyli four times longer than broad, almost parallel-sided (Mihályi 1977). . . . . 6. *Lucilia bufonivora* Moniez, 1876

12 (7) Subcostal sclerite with small black setulae near apex in addition to microscopic pubescence (Fig. 1B); two postsutural acrostichal setae; a single anterodorsal seta on middle tibia; second tergite shining green, sometimes dark but not contrasting strongly with colour of succeeding tergites; palpi yellow; ♂ ♂: median marginal setae of third tergite generally somewhat more erect than paramedian ones, though similar in size; ♀ ♀: median marginal setae on third tergite rather weak, not different from paramedian ones in size or direction, adpressed, shorter than half the length of fourth tergite; basal dorsal excavation of abdomen narrowly but distinctly separated from hind margin of second tergite.

13 (14) ♂ ♂: frons distinctly narrower than parafacialia, 0.03—0.05 times head width (Fig. 6A); epandrium large, swollen, shining, broader than length of fifth tergite at midline; surstyli with two-pointed apex (Fig. 6B, C); ♀ ♀: sixth tergite (innermost segment of postabdomen) with short marginal setae at middorsal line and ventrally on each side, middle section of hind margin at each side naked; viewed in profile middorsal edge more or less convex (Fig. 6D). . . . . 7. *Lucilia caesar* (L.)

14 (13) ♂ ♂: frons about as broad as parafacialia, 0.05—0.09 times head width (Fig. 6E); epandrium of normal shape and size, narrower than length of fifth tergite at midline; cerci cleft to about middle, distal arms diverging; surstylus tapering, curved, with a slight knob apically (Fig. 6F, G); ♀ ♀: sixth tergite with long marginal setae along the whole hind margin, no naked sections; viewed in profile middorsal edge straight (Fig. 6H) . . . . . 8. *Lucilia illustris* (Meigen 1826)

SYSTEMATIC LIST

1. *Lucilia sericata* (Meigen, 1826)

Total material examined: 22 ♂ ♂ and 33 ♀ ♀.

New and revised records:

ØSTFOLD: Ø: Fredrikstad, Øra, EIS 20, 1 ♂ 24 June 1979, G. N. Rognes; 1 ♂ 1 ♀ 24 June 1979, A. Rognes; 1 ♀ 24 June 1979.

AKERHUS: AK: Bærum, Høvik, EIS 28 1 ♀ 29 Aug. 1848, ?leg., ZMO no. 6115 (positioned as *L. caesar);* Oslo, ?loc., EIS 28, 3 ♂ ♂ 23 ♀ ♀ 14 July 1936, F. C. Bishopp No. 26 497, ZMO nos. 6191, 6193—6212, 6214—6217 (D.G. Hall det.), 6529.

BUSKERUD: Bø: Kongsberg, Kongsberg, EIS 27, 1 ♂ 1 ♀ 27 June 1979, A. Rognes; 12 ♂ ♂ 4 ♀ ♀ 27 June 1979; 3 ♂ ♂ 1 ♀ 28 June 1979; Hvittingfoss, EIS 19, 1 ♂ 6 Aug. 1979.

ROGALAND: Ry: Klepp, Vik, EIS 7, 1 ♀ 16 Aug. 1963, T. Nielsen, ZMB.

Unverified records:

AKERSHUS: AK: Nesodden, Langøyene, EIS 28 (Natvig 1959: 174, cf. Natvig 1950: 171, where no reference to *L. sericata* is made).

ROGALAND: Ry: Klepp, ?loc., EIS 7, ?sex, 20 July 1953, P. Ardø (Ardø 1957: 164).

Siebke (1877: 97) reports *L. sericata* from Sarpsborg, Oslo, and Romsdal. These records are totally unreliable considering the fact that the only specimen in the collections of ZMO determined by Siebke as *L. sericata* is a female *L. illustris* (ZMO no. 6149) (Brinkmann 1976a: 327). Storm (1895: 238, 1907: 4) reports *L. sericata* from «Stadsbygden og Rissen» (STy: Rissa) and Trondheim (STi: Trondheim). The only specimen labelled *sericata* in what remains of Storm's collection in DKNVS, however, is a male specimen of *L. illustris* (Ringdahl 1944a, and below).

Remarks on the localities:

All the specimens from Kongsberg were taken on flowers bordering a parking lot in the centre of the city, except two (A. Rognes leg.) which were caught at a camp site close to the city's centre. Those from Øra and Hvittingfoss were caught not far from industrial plant areas and human habitations, respectively. The specimens reported by Natvig (1959) from Langøyene were from the refuse depot of the city of Oslo in use before the Second World War. The records from Klepp by Ardö (1957) were from a sandy beach at the «dune ridge».

Distribution and ecology (Fig. 7A):

L. sericata obviously is a southern synanthropic species in Norway. The northernmost record is from about 60° N. In Sweden the northernmost reports are from Bohuslän, Östergötland and Västergötland (Ringdahl 1952), all apparently south of 59° N. In Finland the northern limit of its normal range is about 61° N (Nuorteva 1959a), but an occasional find as far north as 62° 53' N has been reported (Nuorteva et al. 1964).

A very high dependence on human settlements is shown for *L. sericata* in Finland (Nuorteva 1963).

Remarks on biology:

L. sericata is the primary cause of sheep myiasis in Europe (Haddow & Thomson 1937, MacLeod 1943a, 1943b, Cragg 1950, Emden 1954, Schumann 1971). The species is not involved in sheep strike in Norway (Brinkmann 1976a, 1976b).

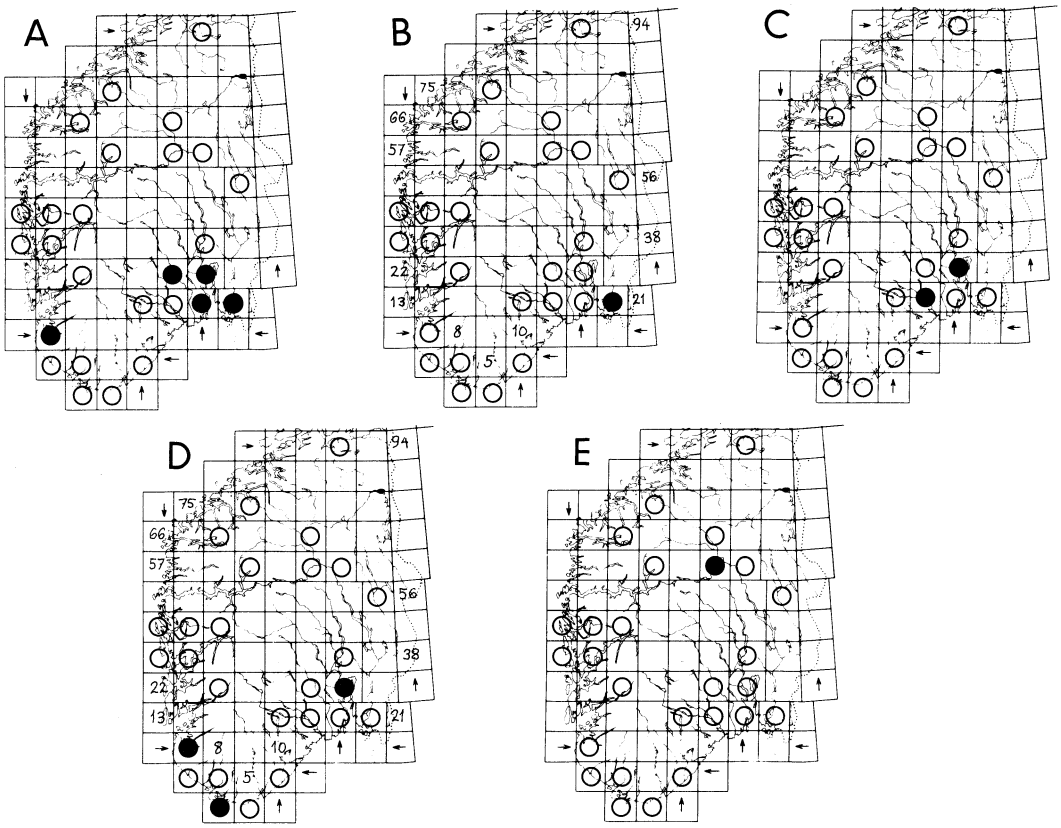

Fig. 7. Records from Norway (filled circles) of A) *Lucilia sericata* (Meigen, 1826), B) *L. regalis* (Meigen, 1826), C) *L. richardsi* Collin, 1926, D) *L. silvarum* (Meigen, 1826), and E) *L. bufonivora* Moniez, 1876.
Open circles indicate squares where other *Lucilia* species have been recorded.

2. *Lucilia regalis* (Meigen, 1826)

Total material examined: 1 ♂ (Norway); 5 ♂ ♂ and 1 ♀ (Denmark).

New record:

ØSTFOLD: Ø: Fredrikstad, Øra, EIS 20, 1 ♂ 24 June 1979. This is the first record from Norway.

Remarks on the locality: The specimen was caught in a meadow on the flowers of a plant belonging to Apiacea. The locality is some distance away from an industrial plant area.

Distribution (Fig. 7B):
In Sweden Ringdahl (1952) reports it from Skåne. Lundbeck (1927) does not record it from Denmark, but in my collection are 6 specimens caught on the beach about 7 km NE of the centre of the city of Århus, East Jutland (Dania, EJ, NH 73, Tålfor Strand, 1 ♂ 1 ♀ 22 July 1977, A. & K. Rognes; 4 ♂ ♂ 7 July 1979, A. & Ø. & K. Rognes). S. Andersen, Copenhagen, also reports it from Denmark (in litt.). It has not been recorded from Finland (W. Hackman, Helsinki, in litt.). The record from Øra (59° 11' N) is the northernmost European record.

3. *Lucilia richardsi* Collin, 1926

Total material examined: 3 ♂ ♂ and 1 ♀.

New records:

AKERSHUS: AK: Bærum, Nordby gård, EIS 28, 1 ♀ 21 June 1979.
VESTFOLD: VE: Hof, Thorrud, EIS 28, 2 ♂ ♂ 28 July 1979.
TELEMARK: TEi: Sauherad, Nordagutu, EIS 18, 1 ♂ 26 July 1979, K. & A. & Ø. & T. Rognes. These are the first records from Norway.

Remarks on the localities:

The specimens from Nordby gård and Thorrud were caught in a meadow some distance away from farm

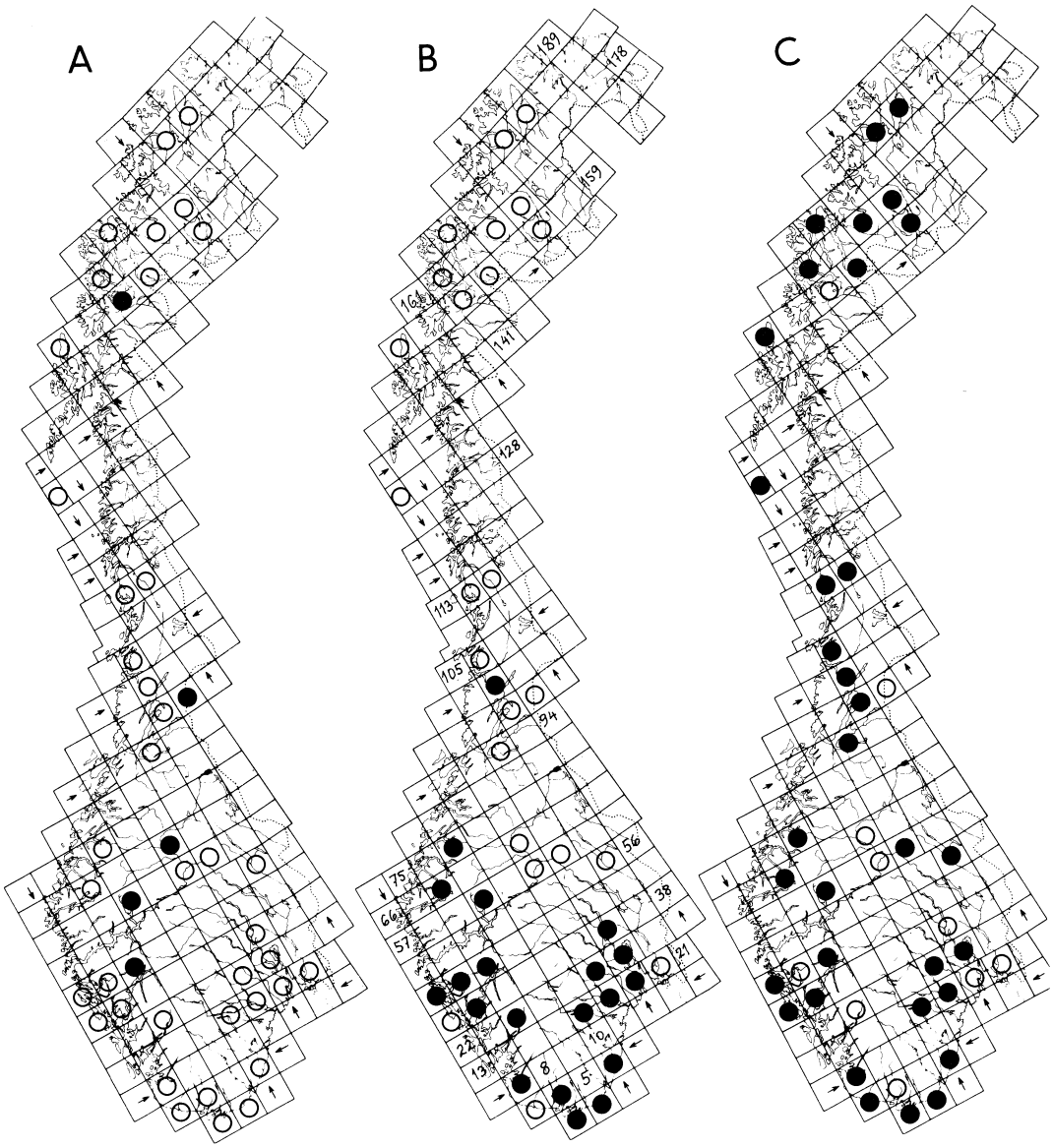

Fig. 8. Records from Norway (filled circles) of A) *Lucilia fuscipalpis* (Zetterstedt, 1845), B) *L. caesar* (L.) and C) *L. illustris* (Meigen, 1826). Open circles indicate squares where other *Lucilia* species have been recorded.

buildings. The specimen from Nordagutu was caught on plants growing in a gravel pit close to the road in mixed decidous and coniferous forest in a farm district.

Distribution and ecology(Fig. 7C):

L. richardsi is a southern species in Norway. From Sweden it is reported from Gotland (Nuorteva & Laurikainen 1964), and from Finland north to about 64° 13' N (Ostrobottnia kajanensis: Kajaani) (Nuorteva 1963: 18) (cf. also Nuorteva & Skarén 1960). S. Andersen, Copenhagen,

(in litt.), reports it from Denmark. According to Nuorteva (1963) it is much less synanthropic in Finland than *L. sericata*.

Remarks on biology:

Nuorteva (1959e) reports to have reared three males of *L. richardsi* in a case of wound myiasis in the nightjar (*Caprimulgus europaeus* L.).

4. *Lucilia fuscipalpis* (Zetterstedt, 1845)

Total material examined: 1 ♂ and 3 ♀ ♀.

New and revised records:

OPPLAND: On: Dovre, Fokstua (952 m a.s.l.), EIS 71, 1 ♀ 24 July 1853, H. Siebke, ZMO no. 6147 (Siebke 1877: 97, as *L. splendida* (Meigen). The date published differs from that on the label which is cited here).

HORDALAND: HOi: Voss, Rong (about 500 m a.s.l.), EIS 41, 1 ♀ 12 July 1964, A. Løken, ZMB.

TROMS: TRi: Balsfjord, Nordkjosbotn, EIS 154, 1 ♂ 1 ♀ 13—14 July 1979, I. & T. Nielsen.

Unverified records:

SOGN OG FJORDANE: SFi: Luster, Turtagrø (909 m a.s.l.), EIS 60, 1 ?sex 5—6 July 1949, O. Ringdahl, (Ringdahl 1954: 49, as *Acrophagella fuscipalpis* Zett.).

NORD-TRØNDELAG: NTi: Verdal, Sul, EIS 99?, 3 ♂ ♂ 3 ♀ ♀ 27 June—5 Aug. 1840, J.W. Zetterstedt, (Zetterstedt 1845: 1306, as *Sarcophaga fuscipalpis).* This latter record is repeated by Siebke (1877: 95) and probably also by Ringdahl (1951: 172, as *A. fuscipalpis* (Zett.), from «Norge»; 1952; 1954).

Distribution and ecology (Fig. 8A):

In Finland *L. fuscipalpis* is not recorded south of 68° N (Nuorteva 1959a). In Sweden it is known from Torne Lappmark, Härjedalen and Jämtland (Ringdahl 1952). The Norwegian record from Rong (60°31' N) is the southernmost Scandinavian record. The species is not known in Europe outside Fennoscandia, but it occurs in Alaska (Zumpt 1956). Ringdahl (1951) regards the species as arctic-subarctic, and according to Nuorteva (1959a, 1963) it is purely asynanthropic.

5. *Lucilia silvarum* (Meigen, 1826)

Total material examined: 12 ♂ ♂ and 7 ♀ ♀.

Notes on taxonomy:

Some of the specimens from Øverland (see below) are aberrant with regard to the chaetotaxy of the thorax. One male specimen has four postsutural acrostichal setae on each side, two other ones have three such setae on the right side but only two on the left. Two females have only two pairs of postsutural acrostichal setae, resembling in this respect *L. bufonivora*.

New and revised records:

AKERSHUS: AK: Bærum, Øverland, EIS 28, 9 ♂ ♂ 7 ♀ ♀ 23 June 1979; Oslo, Tøyen, EIS 28, 1 ♂ 12 Aug. 1846, H. Siebke, ZMO no. 6119 (positioned as *L. cornicina).*

VEST-AGDER: VAy: Lindesnes, Jørgenstad, EIS 1, 1 ♂ 20 July 1979, T. Nielsen.

ROGALAND: Ry: Klepp, Frøyland bridge, EIS 7, 1 ♂ 20 Aug. 1978.

Unverified record:

The only previous record of *L. silvarum* from Norway is by Bidenkap (1892) from Vestfold (VE). A confusion with *L. bufonivora* Moniez, 1876 cannot be excluded since the distinguishing characters were first established by Villeneuve in 1914 according to Lundbeck (1927: 145). I have not put Bidenkap's record on the map.

Remarks on the localities:

The specimens from Øverland and Frøyland bridge were caught sunning themselves on leaves of low herbs along the road close to a river. Both localities are in rural districts.

Distribution and ecology (Fig. 7D):

L. silvarum seems to be a southern species in Norway as all known records are south of 60°N. In Sweden it is known northwards to Uppland (about 60°N) (Ringdahl 1952), and in Finland northwards to Ostrobotnia borealis (65°N) (Nuorteva 1959a). According to Nuorteva (1963) *L. silvarum* is clearly asynanthropic in the southern part of Finland. In the northern part, however, it is only recorded from cities, viz. Oulu (?), judging from map in Nuorteva (1959a: 8), and Kajaani (Nuorteva 1963). This might indicate that *L. silvarum* will be found further to the north in Norway.

6. *Lucilia bufonivora* Moniez, 1876

Total material examined: 2 ♂ ♂.

Notes on taxonomy:

Both specimens have only two postsutural acrostichal setae. This is exceptionally also the case with some specimens of *L. silvarum* (above; Spence 1954: 30—31). However, a number of other characters all mentioned in the above key, distinguish the two specimens from the specimens of *L. silvarum* examined by me.

The terminalia have not been examined.

New and revised records:

OPPLAND: On: Fron,? loc., EIS 62?, 1 ♂ ?date, H. Siebke, ZMO no. 6118 (positioned as *L. cornicina);* 1 ♂ 26 July 1850, H. Siebke, ZMO no. 6148 (Siebke 1877: 97, as *L. illustris* (Meigen), which is his only record of this species). Siebke gives the locality as «...horto botanico ad Christianiam...» (AK: Oslo, Tøyen), but this is obviously wrong as Siebke at the date given in fact was collecting insects in the valley of Gudbrandsdalen far north of Oslo (cf. Siebke 1853: 254) which is in accordance with the label which reads «Fron».
These are the first records from Norway.

Distribution and ecology (Fig. 7E):

In Sweden *L. bufonivora* is reported from Skåne and Öland (Ringdahl 1952), and in Finland from the southern part of the country north to about 64°N according to the map published by Nuorteva (1959a: 8). The species is asynanthropic in Finland which is quite natural in view of its biology (Nuorteva 1959a, 1963).

Remarks on biology:

L. bufonivora parasitizes anurans (Lundbeck 1927, Schumann 1971) and apparently also urodelans (Zumpt 1956: 45). According to the distribution maps of Norwegian amphibians given by Dolmen (1978), the host of the specimens found at Fron, in the valley of Gudbrandsdalen, may have been *Rana temporaria* or *Triturus vulgaris.*

7. *Lucilia caesar* (L.)

Total material examined: 74 ♂ ♂ and 33 ♀ ♀.

Notes on taxonomy:

The female of *L. caesar* is defined in this paper according to the distribution of the hairiness at the margin of the innermost segment of the postabdomen (sixth tergite). The quite naked section on each side is characteristic, as pointed out by Spence (1954) (Fig. 6D, and key). The short hairs at the middorsal line are sometimes longer and more numerous than shown in the figure. The middorsal edge viewed in profile is normally convex, though quite straight in one of the specimens. The numbers of hairs on the underside of the arista cannot be used to distinguish the females of *L. caesar* from those of *L. illustris,* as the number varies from 10 to 18 with a mean of 13.5. Spence (1954) and Emden (1954) give the range as 13—17 with a mean of 15, and Nuorteva (1959a) as 12—18.

New and revised records:

AKERSHUS: AK: Frogn, Sønderstøa — Degerud, EIS 28, 1 ♂ 8 Aug., 2 ♂ ♂ 9 Aug. 1935, T. Soot-Ryen, TM (Ringdahl 1944b: 6, as *L. caesar);* Asker, ? loc., EIS 28, 1 ♀ ?date, W.M.(?) Schøyen, ZMO no. 6110 (positioned as *L. caesar);* Bærum, Høvik, EIS 28, 1 ♂ 18 June, 1 ♂ 16 Aug. 1935, T. Soot-Ryen, TM (Ringdahl 1944b: 6, as *L. caesar);* Nordby gård, EIS 28, 1 ♂ 22 June 1979; ?loc., 1 ♀ ?date, W.M(?) Schøyen, ZMO no. 6108.

BUSKERUD: Bø: Ringerike, Løvlia, EIS 36, 1 ♂ 31 July 1977; Lier, Lahell, EIS 28, 2 ♂ ♂ 2 Aug. 1979; Øvre Eiker, Burud, EIS 27, 1 ♂ 1 ♀ 1 Aug. 1979; Kongsberg, Efteløt, EIS 27, 1 ♂ 1 ♀ 6 Aug. 1979; Gran, EIS 18, 1 ♂ 6 Aug., 1979; Hvittingfoss, EIS 19, 4 ♂ ♂ 1 ♀ 6 Aug. 1979; Komnes, EIS 19, 1 ♂ 6 Aug. 1979.

VESTFOLD: VE: Hof, Thorrud, EIS 28, 1 ♂ 28 July 1979.

TELEMARK: TEi: Bø, Øvrebø, EIS 18, 1 ♂ 25 July 1979; Seljord, Ulvenes, EIS 17, 3 ♂ ♂ 3 ♀ ♀ 25 July 1979; Kviteseid, Heggtveit, EIS 17, 1 ♂ 24 July 1979.

AUST-AGDER: AAy: Fjære, Fjære kirke, EIS 6, 1 ♂ 2 ♀ ♀ 27 June 1979, A. & K. Rognes; Landvik, Skiftenes, EIS 6, 2 ♂ ♂ 29 June, 1 ♂ 1 ♀ 30 June, 1 ♂ 1 ♀ 5 July 1971, E. Oug, ZMB.

VEST-AGDER: VAy: Kristiansand, Stangenes, EIS 2, 1 ♀ 24 Aug. 1975, 2 ♂ ♂ 23 June 1979, S. Svendsen; Mandal, Valand, EIS 2, 1 ♂ 5 July 1979; Lindesnes, Jørgenstad, EIS 1, 1 ♀ 21 July 1977, T. Nielsen. VAi: Kvinesdal, Gjemlestad, EIS 4, 1 ♂ 10 July 1945, N. Knaben, ZMB.

ROGALAND: Ry: Klepp, Frøyland bridge, EIS 7, 1 ♀ 20 Aug. 1978; Øksnevad, EIS 7, 1 ♀ 15 June 1978, 1 ♂ 1 Aug. 1979, T. Nielsen; Sandnes, Melsheia, EIS 7, 1 ♀ 14 June 1978; Stavanger, Byhaugen, EIS 7, 1 ♂ 9 June 1979; Forus, EIS 7, 1 ♀ 14 June 1978; Gosen, EIS 7, 1 ♂ 23 June 1977; Krossberg, EIS 7, 1 ♂ 23 June, 3 ♂ ♂ 11 July 1977, 3 ♂ ♂ 9 Aug. 1978, 2 ♂ ♂ 2 Sept. 1979; 4 ♂ ♂ 3 ♀ ♀ 4 July 1979, Ø. & K. Rognes; Sunde, EIS 7, 1 ♂ 1—15 Aug. 1979; Tjensvoll, EIS 7, 1 ♂ 5 July 1977; Ullandhaug, EIS 7, 2 ♂ ♂ 10 Aug. 1978, 1 ♂ 4 July, 1 ♂ 26 Aug. 1979. Ri: Suldal, Nesflaten, EIS 24, 1 ♀ 28 June 1935, T. Soot-Ryen, TM.

HORDALAND: HOy: Samnanger, Høyseter, EIS 40, 1 ♂ 19 July 1950, A. Tjønneland, ZMB; Bergen, Bellevue, EIS 39, 1 ♀ 15 Sept. 1936, N. Knaben, ZMB; Svartediket, EIS 39?, 1 ♂ 23 July 1950, A. Løken, ZMB; Askøy, Herdla, EIS 39, 1 ♂ 15 June, 1 ♂ 16 June 1936, 1 ♂ 1 ♀ 15 July 1937, N. Knaben, ZMB; 1 ♂ 4—7 June 1938, A. Brinkmann, ZMB; Åsane, Åstveit — Golfbanen, EIS 39, 1 ♂ 17 July 1966, A. Løken, ZMB; Åstveit, EIS 39, 1 ♂ 1 ♀ 12 July 1972, L. Greve, ZMB. HOi: Kvinnherad, Rosendal, EIS 31, 1 ♀ 1 June 1957, Museum of Zoology, Bergen, Excursion, ZMB; Skeie-Seimsfoss, EIS 31, 2 ♂ ♂ 20 Aug.

1944, H. Tambs-Lyche, ZMB; Kvam, Berge-Bergsberget, EIS 31, 1 ♂ 1 July, 1 ♀ 19 July, 1 ♂ 20 July 1971, H.R. Skjoldal, ZMB; Granvin, Eide, EIS 41, 1 ♂ 24 June, 1 ♂ 25 June 1935, T. Soot-Ryen, TM. (Ringdahl 1944b:6, as *L. caesar).*

SOGN OG FJORDANE: SFi: Luster, Sande, EIS 60, 3 ♂ ♂ 31 July 1945, N. Knaben, ZMB; Stryn, Innvik, EIS 68, 1 ♂ 1 ♀ 30 July 1978.

MØRE og ROMSDAL: MRi: Ørsta, Viddal, EIS 68, 1 ♀ Juli 1946, ?leg., ZMB; Rauma, Lerheim, EIS 77, 1 ♂ 2 ♀ ♀ 29 July 1978.

NORD-TRØNDELAG: NTi: Steinkjer, Gulbergaunet, EIS 101, 1 ♂ 2 ♀ ♀ 26 July 1978 (64°01'N).

Unverified records:

The records by Siebke (1877) are unreliable, as none of the specimens collected and indentified by him as *L.caesar* belong to that species. The specimen recorded as *L. splendida* (Meigen) (= *L. caesar* (L.) teste Aubertin 1933) belongs to *L. fuscipalpis* (see above). The records by Bidenkap from Vestfold (VE) and Tromsø (TRy: Tromsø «a single female specimen») (Bidenkap 1892, 1901, respectively) cannot be accepted, as a confusion with *L. illustris* is possible, and highly probable in the latter case. Bidenkap (1892) also reports *L. ruficeps* (Meigen) (= *L. caesar* (L.) teste Lundbeck 1927) from Vestfold. Bidenkap's own specimens are probably lost, but in ZMO is a specimen (ZMO no. 6117, L.M. (?) Esmark leg.) determined as *L. ruficeps* (by Bidenkap?, cf. Bidenkap 1892: 238, where he reports to have examined Siebke's and Esmark's specimens) which belongs to *L. illustris* (see below). Strand's (1900) record from «Aal» (Bv: Ål, Ål) also is unacceptable as are the records by Storm (1891:13, 1895: 232 and 1907: 4), (all *Lucilia* specimens in what remains of Storm's collection in DKNVS belong to *L. illustris* (Ringdahl 1944a, and below)). Natvig (1950: 171, 1959: 174) reports *L. caesar* from Norway without specifying localities.

Brinkmann (1973, 1976a, 1976b), who has studied the problem of blow-fly myiasis of sheep in Norway, bred *L. caesar* from larvae collected from sheep from the following localities: HOy: Fusa, Eikelandsosen (Koldal), EIS 31; Holdhus (Bjørndal), EIS 31; HOi: Kvinnherad, Rosendal, EIS 31; Varaldsøy (Midtstølen), EIS 31; Voss, Høyland n. of Lønavatn, EIS 41 (Brinkmann 1976b).

Remarks on the localities:

Gulbergaunet is a camp site almost in the centre of the city of Steinkjer.

Distribution and ecology (Fig. 8B):

The northernmost record from Norway (Gulbergaunet, 64°01'N) roughly corresponds to the northern limit in Finland (64°N) (Nuorteva 1959a). In Sweden *L. caesar* is reported northwards to Uppland (about 60°N) (Ringdahl 1952). According to Nuorteva (1963) *L. caesar* is more synanthropic than *L. illustris* in the southern part of Finland, probably because of its greater proximity to the northern limit of its range. The record from Gulbergaunet fits well with the trend of increasing synanthropy towards the northern limit of their range shown also by other *Lucilia* species (Nuorteva 1963, Nuorteva & Laurikainen 1964).

Remarks on biology:

Acccording to Brinkmann (1976a, 1976b) only *L. caesar* acts as primary striker in sheep myiasis in Norway. In a series of ten breeding experiments giving rise to *Lucilia* species, this species was bred alone from larvae collected from sheep in four cases. In five cases it was bred together with *L. illustris*. Only in one case was *L. illustris* reared alone. Unfortunately Brinkmann does not state the number of emerged flies in each rearing experiment. His arguments for ruling out the latter case, which may indicate that also *L. illustris* acts as primary striker, is discussed below.

Blow-fly myiasis of sheep is mainly known from the western part of Norway (Rogaland, Hordaland, Sogn og Fjordane and Møre) (Brinkmann 1976a). As is evident from Fig. 8B, *L. caesar* is more widely distributed than the disease.

8. *Lucilia illustris* (Meigen, 1826)

Total material examined: 80 ♂ ♂ and 76 ♀ ♀.

Notes on taxonomy:

The female of *L. illustris* is defined in this paper according to the distribution of the marginal setae of the innermost segment of the postabdomen (sixth tergite) (Fig. 6H, and key) (cf. also Spence 1954). In the majority of cases the number of hairs on the underside of the arista cannot be used to distinguish females of this species from those of *L. caesar*. In the material examined it varies from 7 to 18 (mean 11). Spence (1954) and Emden (1954) give the range as 9—12 (mean 11), Nuorteva (1959a) as 9—13.

New and revised records:

AKERSHUS: AK: Frogn, Sønderstøa-Degerud, EIS 28, 1 ♂ 8 Aug., 2 ♂ ♂ 9 Aug. 1935, T. Soot-Ryen, TM (Ringdahl 1944b: 6, as *L. illustris* Meigen); Oslo, Sognsvatn, EIS 28, 1 ♂ 31 July 1935, T. Soot-Ryen, TM (Ringdahl 1944b: 6, as *L. illustris);* Tøyen EIS 28, 1 ♀ 22 July 1846, H. Siebke, ZMO no. 6149 (determined by Siebke as *L. sericata* Meigen according to Brinkmann 1976a: 327) (J.P. Dear det.); 1 ♂ 10 Aug. 1846, H. Siebke, TM (Ringdahl 1944b: 6, as *L. illustris);* 1 ♂ 10 Aug. 1846, H. Siebke, ZMO no. 6106 (positioned as *L. caesar* L.); 1 ♂ ?date, H. Siebke, TM (Ringdahl 1944b: 6, as *L. illustris);* ?loc., EIS 28, 1 ♂ ?date,

L.M. Esmark, ZMO no. 6117 (positioned as *L. ruficeps* Meigen); ? loc., EIS 28, 1 ♀ 14 July 1936, F.C. Bishopp No. 26 497, ZMO no. 6213 (determined as *L. sericata* by D.G. Hall, misidentification).

HEDMARK: HEs: Elverum, Grundset, EIS 55, 1 ♀ ?date, H. Siebke, ZMB (determined as *L. caesar,* by Siebke?); 1 ♀ ?date, H. Siebke, ZMO no. 6109 (positioned as *L. caesar).*

BUSKERUD: Bø: Røyken, Slemmestad, EIS 28, 1 ♂ 2 June 1935, T. Soot-Ryen, TM (Ringdahl 1944b: 6, as *L. illustris);* 1 ♀ 19 Aug. 1935, T. Soot-Ryen, TM; Modum, ?loc., EIS 28, 1 ♀ ?date, W.M. Schøyen, ZMO no. 6107 (positioned as *L. caesar);* Øvre Eiker, Burud, EIS 27, 1 ♀ 1 Aug. 1979; Kongsberg, Efteløt, EIS 27, 1 ♂ 6 Aug. 1979; Kongsberg, EIS 27, 2 ♂♂ 1 ♀ 27 July 1979; Meheia, EIS 27, 1 ♀ 26 July 1979.

TELEMARK: TEi: Bø, Bø, EIS 18, 1 ♂ 1 ♀ 25 July 1979; Øvrebø, EIS 18, 3 ♂♂ 1 ♀ 25 July 1979; Seljord, Ulvenes, EIS 17, 1 ♀ 25 July 1979.

AUST-AGDER: AAy: Hisøy, Ramsø, EIS 6, 1 ♂ 19 July 1935, T. Soot-Ryen, TM (Ringdahl 1944b: 6, as *L. illustris);* 1 ♀ 19 July 1935, T. Soot-Ryen, TM.

VEST-AGDER: VAy: Mandal, Kvisla-Mandal, EIS 2, 1 ♂ 12 July 1935, T. Soot-Ryen, TM (Ringdahl 1944b: 6, as *L. caesar,* misidentification); 1 ♂ 2 ♀♀ 12 July 1935, T. Soot-Ryen, TM; Rona-Mandal, EIS 2, 1 ♂ 9 July 1935, T. Soot-Ryen, TM (Ringdahl 1944b: 6, as *L. illustris);* Farsund, Lista, EIS 1, 1 ♂ 28 June 1978, J. Nystrøm.

ROGALAND: Ry: Hå, Ogna, EIS 3, 1 ♂ 29 July 1962, T. Nielsen; Klepp, Gjeishaug, EIS 7, 1 ♀ 4 Aug. 1963, A. Løken, ZMB; Vik, EIS 7, 1 ♂ 4 Aug. 1963, T. Nielsen, ZMB; Øksnevad, EIS 7, 1 ♂ 1 ♀ 23 July 1965, T. Nielsen, ZMB; 2 ♂♂ 5 ♀♀ 1 Aug. 1979, T. Nielsen; ?loc., EIS 7, 2 ♀♀ 21 July 1962, T, Nielsen, ZMB; Gjesdal, Kydland, EIS 7, 1 ♀ 10 July 1977; Sandnes, Lura, EIS 7, 3 ♂♂ 1 ♀ 19 July 1979; Sola, Gimra, EIS 7, 1 ♀ 29 Aug. 1963, T. Nielsen, ZMB; 3 ♂♂ 19 July 1979; Ølberg, EIS 7, 1 ♂ 16 July 1961, A. Løken, ZMB; Stavanger, Byhaugen, EIS 7, 1 ♂ 9 June 1979; Krossberg, EIS 7, 1 ♂ 11 July 1977; 1 ♀ 9 Aug. 1978; 2 ♀♀ 4 July 1979, Ø. & K. Rognes; Sunde, EIS 7, 1 ♂ 25 June, 1 ♀ 30 June, 1 ♀ 2 July, 1 ♂ 7 July 1977; 1 ♀ 29 May, 1 ♀ 9 Aug. 1978; 2 ♂♂ 1—15 Aug., 3 ♂♂ 24 Aug. 1979; Tjensvoll, EIS 7, 3 ♂♂ 2 ♀♀ 5 July, 1 ♀ 13 July, 1 ♂ 1 ♀ 11 Aug. 1977; Ullandhaug, EIS 7, 1 ♀ 29 May 1977; 2 ♂♂ 4 ♀♀ 10 Aug. 1978; 1 ♀ 10 June, 2 ♀♀ 4 July 1979.

HORDALAND: HOy: Fana, Milde, EIS 30, 1 ♀ 28 July 1966, L. Greve, ZMB; Askøy, Herdla, EIS 39, 1 ♂ 29 July 1935, N. Knaben, ZMB; 1 ♂ 17 June 1936, N. Knaben, ZMB; 1 ♂ 2 ♀♀ July 1936, A. Brinkmann, ZMB; 1 ♀ 10 July, 1 ♂ 15 July 1937, N. Knaben, ZMB; 1 ♂ 23 July 1937, A. Brinkmann, ZMB; Lindås, Fosse EIS 39, 1 ♂ 6 June 1965, A. Løken, ZMB. HOi: Kvinnherad, Berget, EIS 31, 1 ♀ 3 Sept. 1966, Museum of Zoology, Bergen, Excursion, ZMB; Ljosmyr, EIS 31, 1 ♀ 3 Sept. 1965, Museum of Zoology, Bergen, Excursion, ZMB.

SOGN OG FJORDANE: SFy: Gloppen, Sandane, EIS 68, 2 ♂♂ 2 ♀♀ 31 July 1978. SFi: Luster, Sande, EIS 60, 1 ♀ 31 July 1945, N. Knaben, ZMB.

MØRE OG ROMSDAL: MRi: Rauma, ?loc., EIS 77, 1 ♀ ?date, H. Siebke, ZMO no. 6111 (positioned as *L. caesar).*

SØR-TRØNDELAG: STi?: ?loc., EIS 92?, 12 ♂♂ 6 ♀♀, V. Storm, DKNVS (Ringdahl 1944a: 80, as *L. illustris).*

NORD-TRØNDELAG: NTy: Namsos, Namsos, EIS 106, 1 ♀ 16 July 1946, T. Soot-Ryen, TM. NTi: Levanger, Hammer, EIS 98, 1 ♀ 3 July 1978; Steinkjer, Gulbergaunet, EIS 101, 1 ♂ 1 ♀ 26 July 1978.

NORDLAND: Nsy: Brønnøy, Brønnøysund, EIS 114, 1 ♂ 2 ♀♀ 25 June 1946, T. Soot-Ryen, TM; Hommelstø, EIS 114, 1 ♀ 28 June 1946, T. Soot-Ryen, TM. Nsi: Grane, Trofors, EIS 115, 1 ♀ 25 July 1946, T. Soot-Ryen, TM. Nnv: Røst Skomvær, EIS 129, 1 ♂ 8 July 1936, T. Soot-Ryen, TM (Ringdahl 1944b: 6, as *L. illustris);* Andøy, Andenes, EIS 152, 1 ♂ 23 July 1941, T. Soot-Ryen, TM (Ringdahl 1944b: 6, as *L. illustris).*

TROMS: TRy: Karlsøy, Torsvåg, EIS 171, 1 ♀ 16 July 1925, T. Soot-Ryen, TM. TRi: Balsfjord, Skjåvikør, EIS 162, 1 ♂ 19 June 1943, T. Soot-Ryen, TM; Storfjord, Oteren, EIS 155, 1 ♂ 10 July 1979, I. & T. Nielsen; Nordreisa, Andsjøen-Storslett, EIS 164, 4 ♂♂ 3 ♀♀ 8 July 1979, I. & T. Nielsen; Storslett, EIS 164, 1 ♀ 9 July 1979, T. Nielsen.

FINNMARK: Fv: Nordkapp, Repvåg, EIS 182, 1 ♂ 3 Aug. 1924, T. Soot-Ryen, TM (Ringdahl 1944b: 6, as *L. illustris).* Fi: Alta, Jotkajavre, EIS 165, 1 ♀ 25 July 1924, T. Soot-Ryen, TM (Ringdahl 1944b: 6, as *L. illustris);* Kautokeino, Kautokeino, EIS 157, 1 ♂ 3—4 July 1979, I. & T. Nielsen. Fn: Porsanger, Russenes, EIS 181, 1 ♀ 28 June 1979, T. Nielsen.

Unverified records:

Zetterstedt (1845: 1317) reports *L. illustris* from Oslo (Dahlbom). According to Ringdahl (1952: 185) Zetterstedt was not able to segregate the species of the genus *Lucilia,* and the record is consequently unreliable. Siebke's only record («In horto botanico ad Christianiam 26 Juli 1850 a me reperta.» Siebke 1877: 97) belongs to *L. bufonivora* (the locality is obviously wrong, see ZMO no. 6148 above). Ringdahl (1944b: 6) reports *L. illustris* from Ry: Sandnes, Hana, EIS 7 (F. Jensen leg.). Brinkmann (1976b) has bred *L. illustris* from larvae collected from sheep from the following localities: HOy: Fusa, Eikelandsosen (Koldal), EIS 31; Holdhus (Bjørndal), EIS 31; HOi: Kvinnherad, Rosendal, EIS 31; Voss, Høyland n. of Lønavatn, EIS 41. S. Andersen, Copenhagen,

(in litt.) reports to have caught 4 specimens of this species at «Breivegen Bru, Hundorp» (On: Fron, EIS 63).

Distribution and ecology (Fig. 8C):

L. illustris is distributed all over the country, the northernmost record being from Repvåg (70°45'N). The species also occurs all over Finland and Sweden (Ringdahl 1952, Nuorteva 1959a, 1963, 1964, Nuorteva & Vesikari 1966). In the northern parts of Finland it is strongly synanthropic whereas it is almost independent of conditions created by man in the south (Nuorteva 1963).

Remarks on biology:

In the breeding experiments cited above, *L. illustris* emerged together with *L. caesar* in five of ten cases. In one case it was reared alone (Brinkmann 1976a, 1976b). This may indicate that *L. illustris,* in addition to *L. caesar* (see above), may act as primary striker in sheep myiasis in Norway. MacLeod (1943a: 78) also reports a few cases of *L. illustris* acting alone from Great Britain. Brinkmann (1976a, 1976b), however, rules out this case completely, for two reasons. Firstly, because it was an isolated case. Secondly because the species «is abundant all over the country, i.e. also in eastern and northern Norway from which parts sheep strike is unknown.» (Brinkmann 1976a: 326). The strength of the first argument cannot be evaluated as Brinkmann does not give the number of adult flies which emerged in the breeding experiments. The second argument has no force since, following the logic behind it, one would have to rule out even *L. caesar,* which also is abundant in areas where sheep strike has not been recorded, e.g. Finland (Brinkmann 1976a: 327). *L. sericata* would have to be rejected as primary cause of sheep myiasis in Europe, for the same reason (Cragg 1950). None of the above mentioned *Lucilia* species are obligatory parasites of sheep. The fact that each of them has an area of distribution exceeding the area of occurrence of the disease does not in itself constitute an argument against any species being its primary cause.

Note

6 females in TM, 3 in ZMB and 5 in ZMO (nos. 6112, 6113, 6114, 6116, 6192) remain unidentified. They belong to *L. caesar* or *L. illustris.*

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