

**Breeding parameters of two northern Pied Flycatcher  
*Ficedula hypoleuca* populations**



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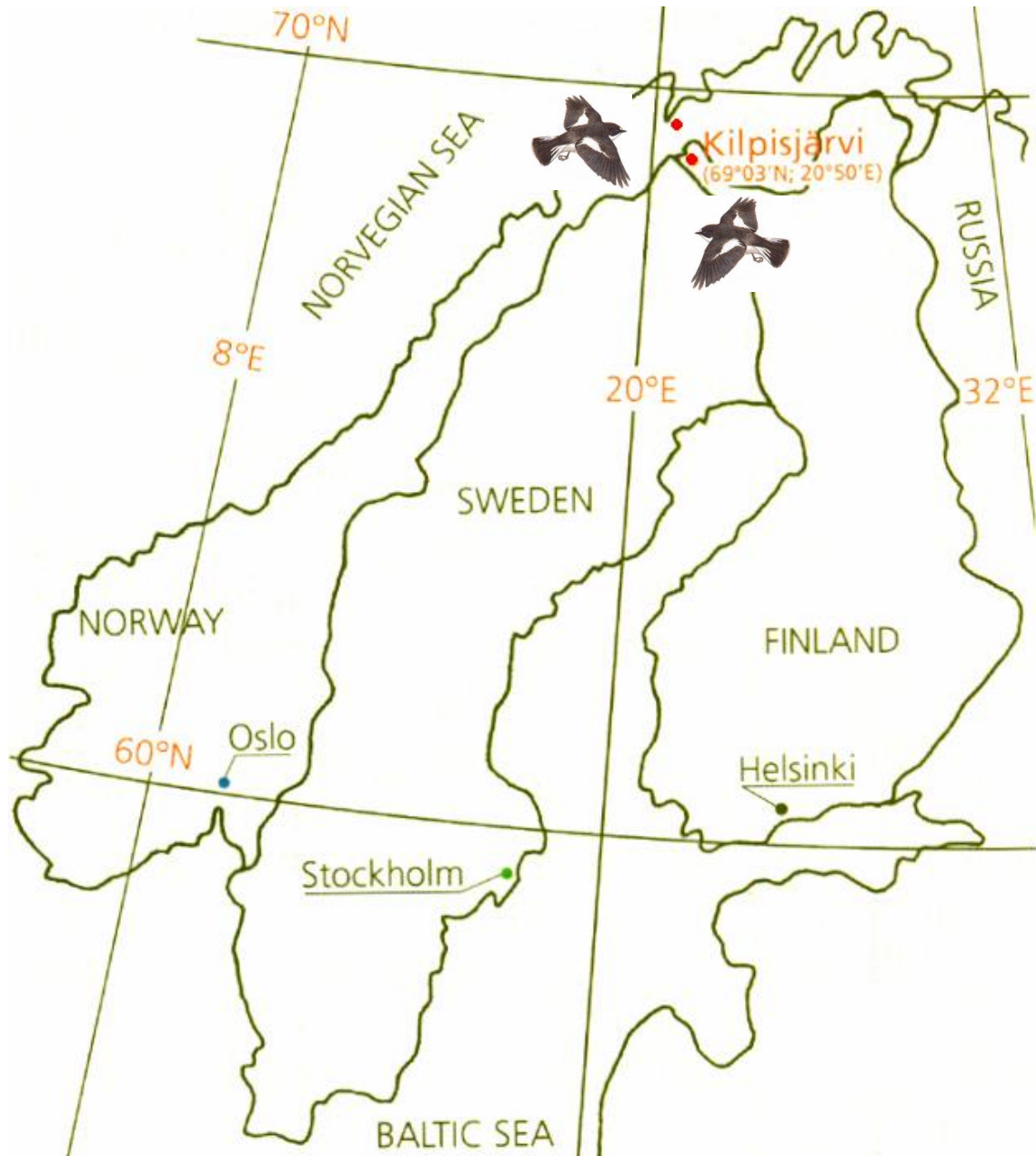
**Motto:**  
Theories may come and go,  
but facts go on forever.

- Science needs theories, but they cannot be tested without high quality data
- There are, for instance, hot theories of the effects of global warming and climate change on ecosystems, but too few cold facts

**Structure of the presentation:**

- Facts about two northern Pied Flycatcher populations
- Possible long-term trends in breeding parameters
- Scale problems: neighbouring populations may behave differently
- Global warming & northern bird populations

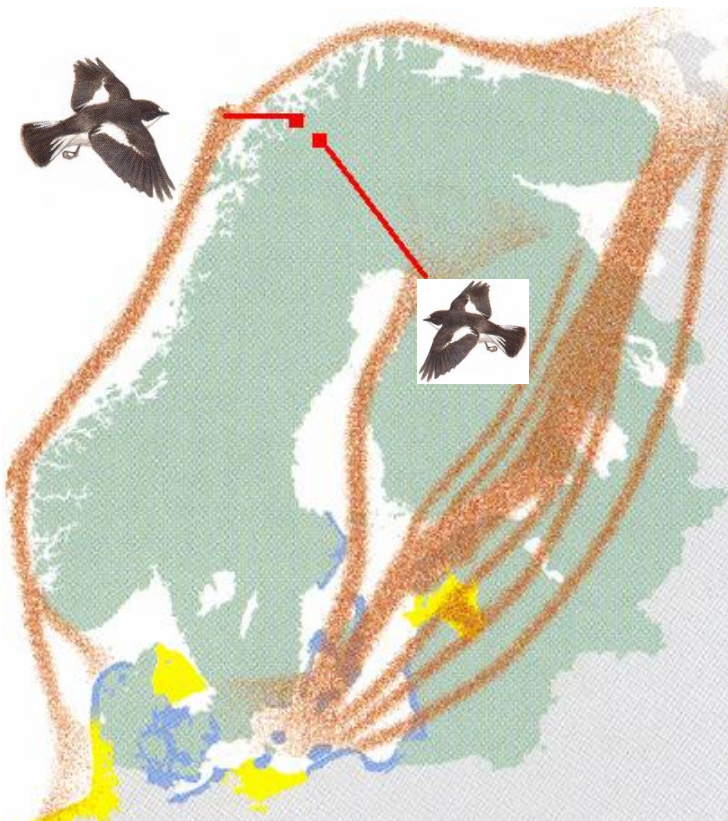
# Study areas (●) in Northern Europe



# Different migration routes?

## Skibotn along the Norwegian coast, Kilpis along the Gulf of Bothnia?

- Exchange rate between the populations is **zero** (most females ringed in 1987 – 1990; no exchange of birds even in 1991 – 2008 when almost all females were ringed in Kilpis and many irregularly in Skibotn)
- Site-tenacity of breeding females is **low** in both areas; in Skibotn varied significantly annually



Site-tenacity of Pied Flycatcher females at Skibotn and Kilpisjärvi in 1988–1990.

| A. Järvinen, 1993 |       | Females trapped | Females retrapped | Site-tenacity % |
|-------------------|-------|-----------------|-------------------|-----------------|
| ■ Skibotn         | 1987  | 25              | –                 | –               |
|                   | 1988  | 39              | 0                 | 0.0             |
|                   | 1989  | 40              | 1                 | 2.5             |
|                   | 1990  | 36              | 5                 | 13.9            |
|                   | Total | 115             | 6                 | 5.2             |
| ■ Kilpisjärvi     | 1987  | 47              | –                 | –               |
|                   | 1988  | 24              | 2                 | 8.3             |
|                   | 1989  | 31              | 5                 | 16.1            |
|                   | 1990  | 34              | 3                 | 8.8             |
|                   | Total | 89              | 10                | 11.2            |

Annual variation in site-tenacity: Skibotn  $\chi^2 = 8.22$ ,  $df = 2$ ,  $P = 0.016$ ; Kilpisjärvi  $\chi^2 = 1.15$ ,  $df = 2$ ,  $P = 0.56$ .

# Global warming?!

- In Central Europe, for instance, significant trends in breeding parameters of the Pied Flycatcher have occurred during the past few decades (e.g. Both et al. 2004)
- Such trends were hardly evidenced in Northern Lapland in **1987-2008**

## Northern Lapland, Spearman's correlations, YEAR versus:

|                   |         |        |                  |
|-------------------|---------|--------|------------------|
| MAY TEMPERATURE   | Kilpis  | 0.408  | ns               |
| MAY TEMPERATURE   | Skibotn | 0.249  | ns               |
| JUNE TEMPERATURE  | Kilpis  | 0.147  | ns               |
| JUNE TEMPERATURE  | Skibotn | -0.126 | ns               |
| JULY TEMPERATURE  | Kilpis  | 0.416  | <b>P = 0.055</b> |
| JULY TEMPERATURE  | Skibotn | 0.278  | ns               |
| BIRCH LEAFING     | Kilpis  | 0.348  | ns               |
| BIRCH LEAFING     | Skibotn | -0.419 | <b>P = 0.053</b> |
| NO. OF PAIRS      | Kilpis  | -0.336 | ns               |
| NO. OF PAIRS      | Skibotn | 0.120  | ns               |
| DATE OF FIRST EGG | Kilpis  | -0.097 | ns               |
| DATE OF FIRST EGG | Skibotn | -0.425 | <b>P = 0.050</b> |
| CLUTCH SIZE       | Kilpis  | 0.023  | ns               |
| CLUTCH SIZE       | Skibotn | 0.394  | ns               |
| NO. OF FLEDGLINGS | Kilpis  | 0.046  | ns               |
| NO. OF FLEDGLINGS | Skibotn | 0.201  | ns               |

# Lessons to Learn

- In peripheral areas the struggle for existence against the physical world is the chief concern of organisms.
- In peripheral areas birds are generally sensitive to the slightest fluctuations of climate and weather. Because they are on such a narrow margin, even a slight warming/cooling could be beneficial/harmful. Thus, global warming may cause great changes in the factors which limit peripheral populations. When the effects of physical factors diminish, the effects of biotic factors (intra- and interspecific competition and predation) may increase and play a greater role in the periphery than today.
- A clear message is borne out of the Pied Flycatcher study: The parameters of neighboring populations may differ from each other more than expected and it is difficult to make generalization of these parameters based on only one or few populations (and one or few years).
- In contrast to most climate change models, only slight temperature changes and accompanying breeding parameter changes have occurred in northern Lapland so far.