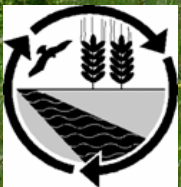


Long term study in the Dezydery Chłapowski Landscape Park in time of farming intensification:

are the small wooded patches sufficient for preservation of high bird diversity and abundance in a farmland?

(Puławy, 24 IV 2012)



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Birds as bioindicators:

- broad habitat spectrum
- are at top of food chains
- mobile $\Rightarrow$ quick response on changes
- relatively easy to identifying and monitoring, and ...
- mass participation of volunteers



Why the birds ?

Background - commonly known facts and processes :

- Strong (cummulated, synergistically enhanced) human pressure on wildlife in an agricultural area.
- Common Agriculture Policy = intensification of farming practices.
- Decline in population size of many bird species.
- Some attempts (agri-environmental schemes) have been undertaken to halt that negative trends.

Intensification and diversification

Expected impact on birds:

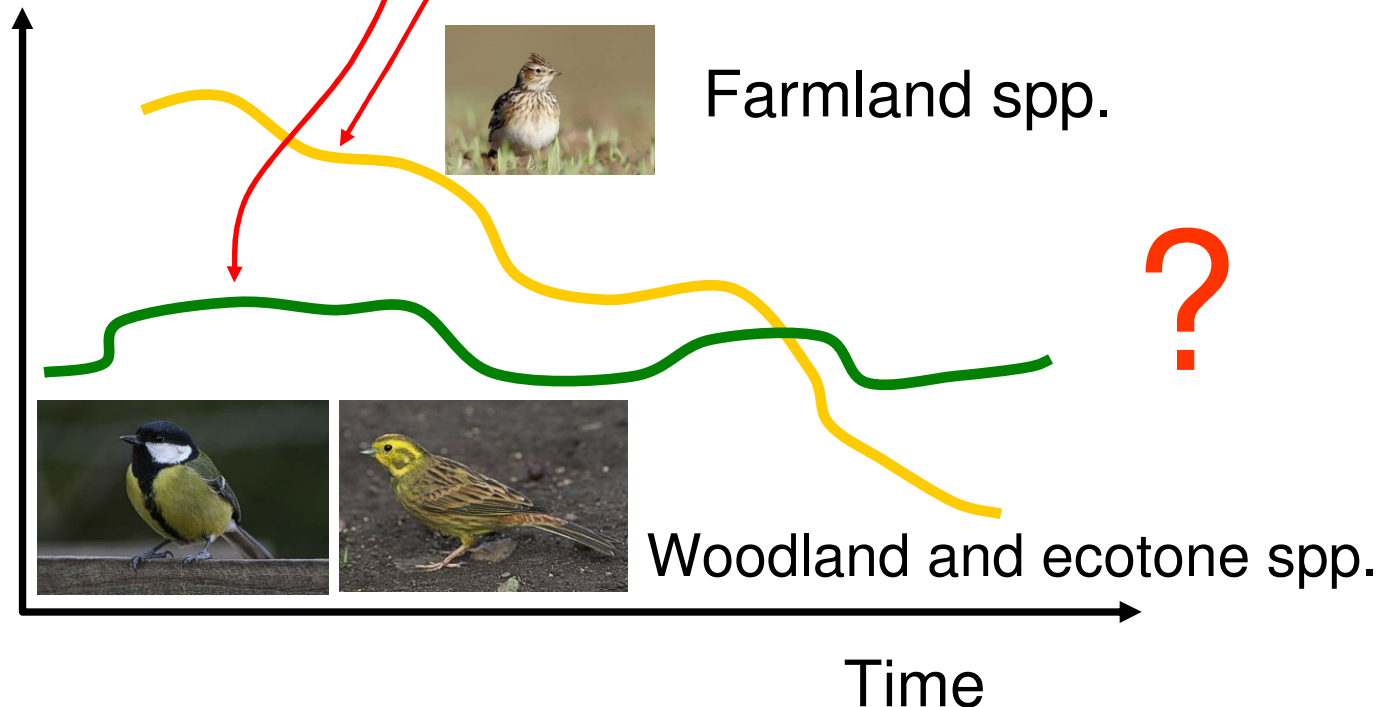
Farming intensification:

- more and more intensive farming practices (acceptation of current paradigm of free market, globalization, competition etc.).

Landscape diversification:

- enrichment of landscape structure with non-farmed, semi-natural habitats.

Abundance/
diversity of
birds



Recognition of the effect of landscape diversity on biodiversity...
is „region-biased” ?

Studies on impoverishment of biodiversity in farmland, carried out in West Europe, are excellent and numerous, but it seems that there is a serious methodological weakness:

- **farming intensification has been combined with landscape simplification (habitat loss)**

In consequence:

- **there is poor possibility for testing the effect of farming intensification in itself, controlling for effect of landscape structure, and *vice versa***

Dezydery Chłapowski Landscape Park - unique combination of features:

- mosaics of cultivated fields, diverse woody vegetation clumps, small water bodies and wetlands
- landscape arrangement stable for several tens years, protected by law
- more and more intensive agriculture
- 50 years of interdisciplinary investigations

Study area – the Dezydery Chłapowski Landscape Park



Stable structure of landscape for several tens of years:



Small fields

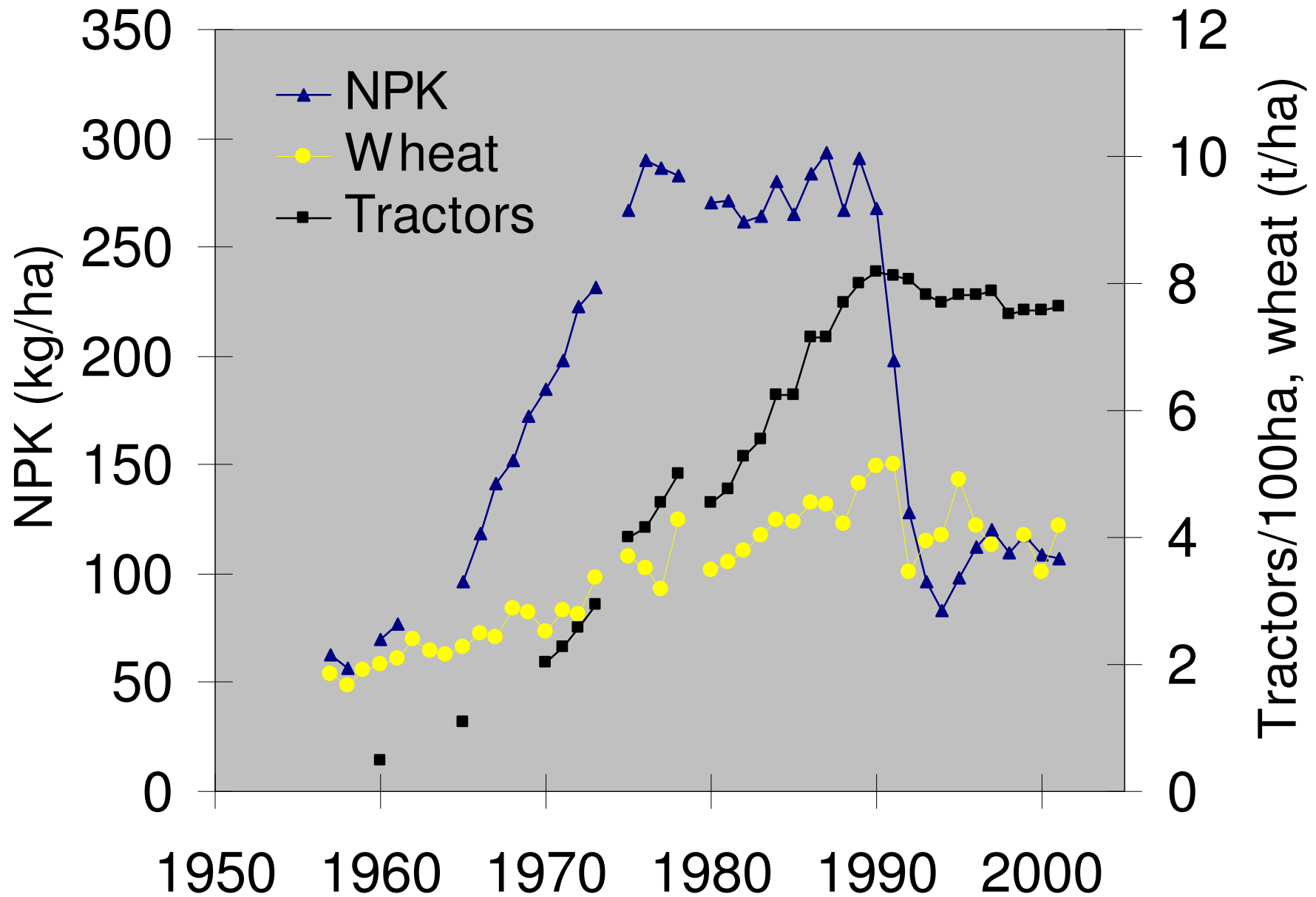


Wooded patches



Shelterbelts

Farming intensification

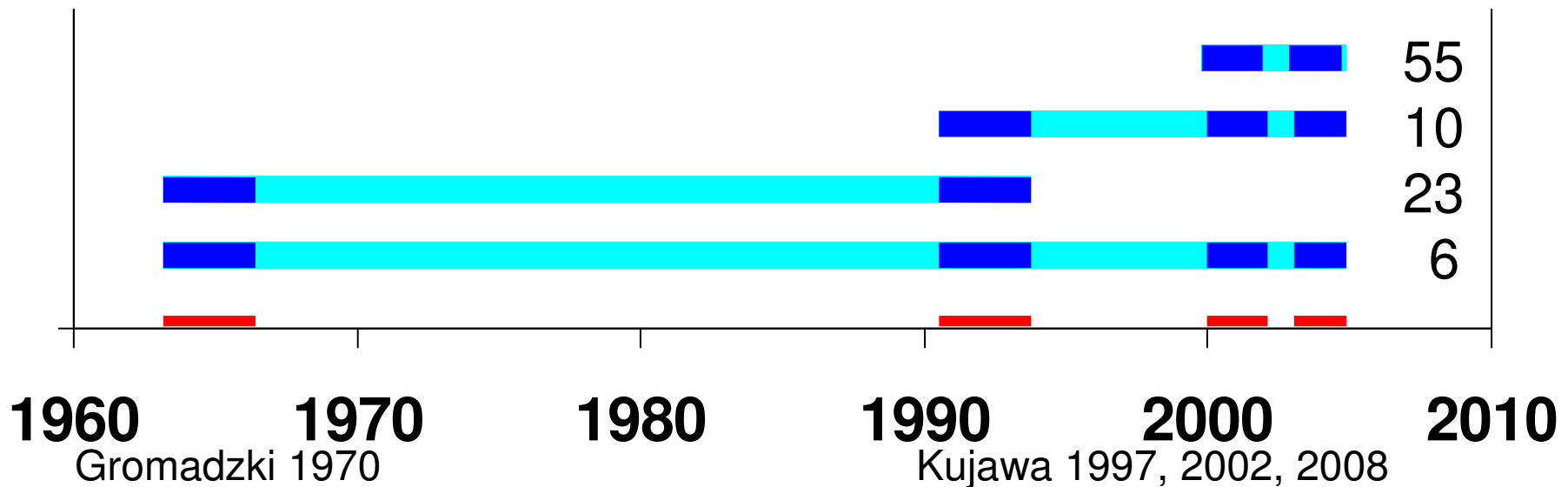


Number of species in the study area *(best known groups)*

Group	Number of species
Vascular plants	~850
Macrofungi	~700
Apoidea (bees)	~250
Diurnal butterflies	~50
Birds (total)	~200
Birds (breeding spp.)	120
Mammals	~30

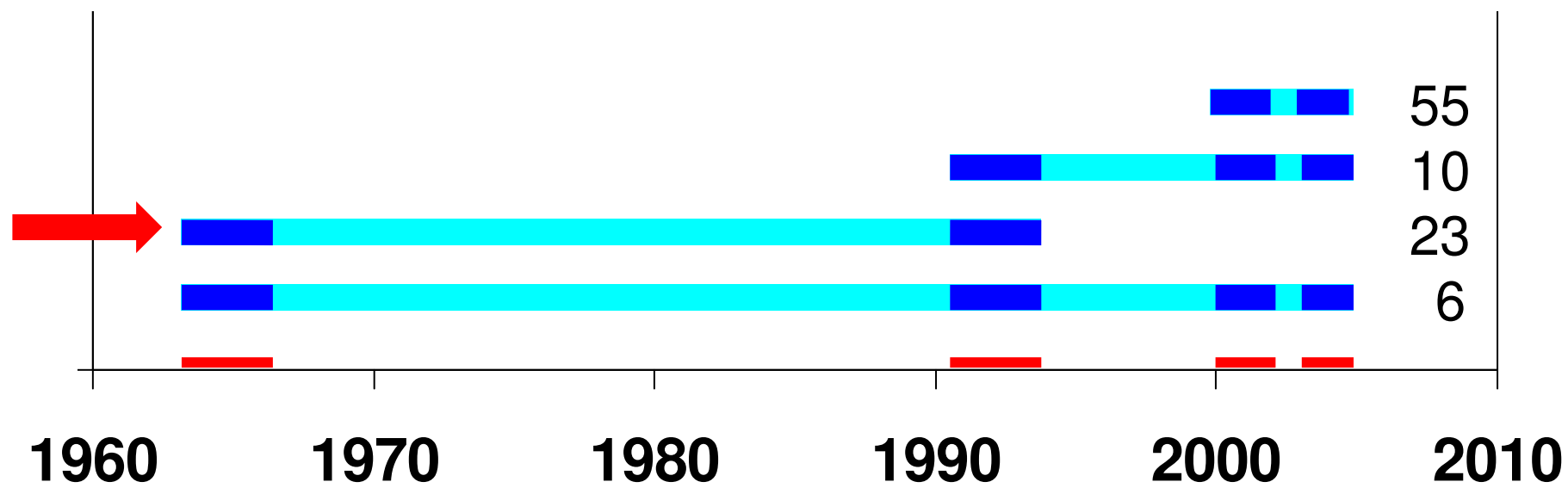
Methods in bird study:

- Various woody vegetation clumps (tree alleys, shelterbelts, wooded patches etc.)
- Cartographic methods (9-10 visits per breeding period)
- Two ecological guilds distinguished:
 - woodland species and farmland species
- Four periods: 1960s, 1990s, 2000-2002, 2005-2006

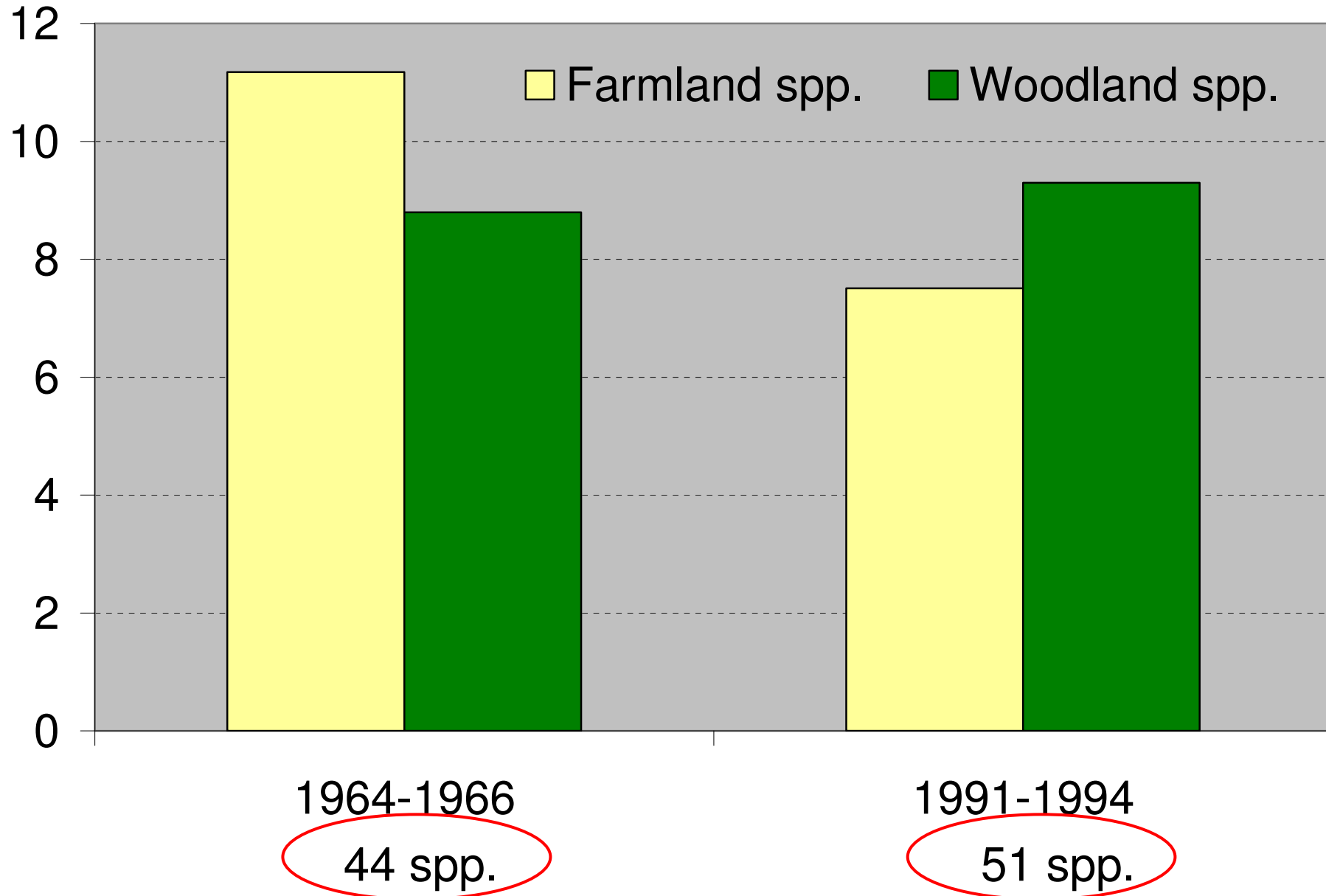


Species pool of breeding bird community:

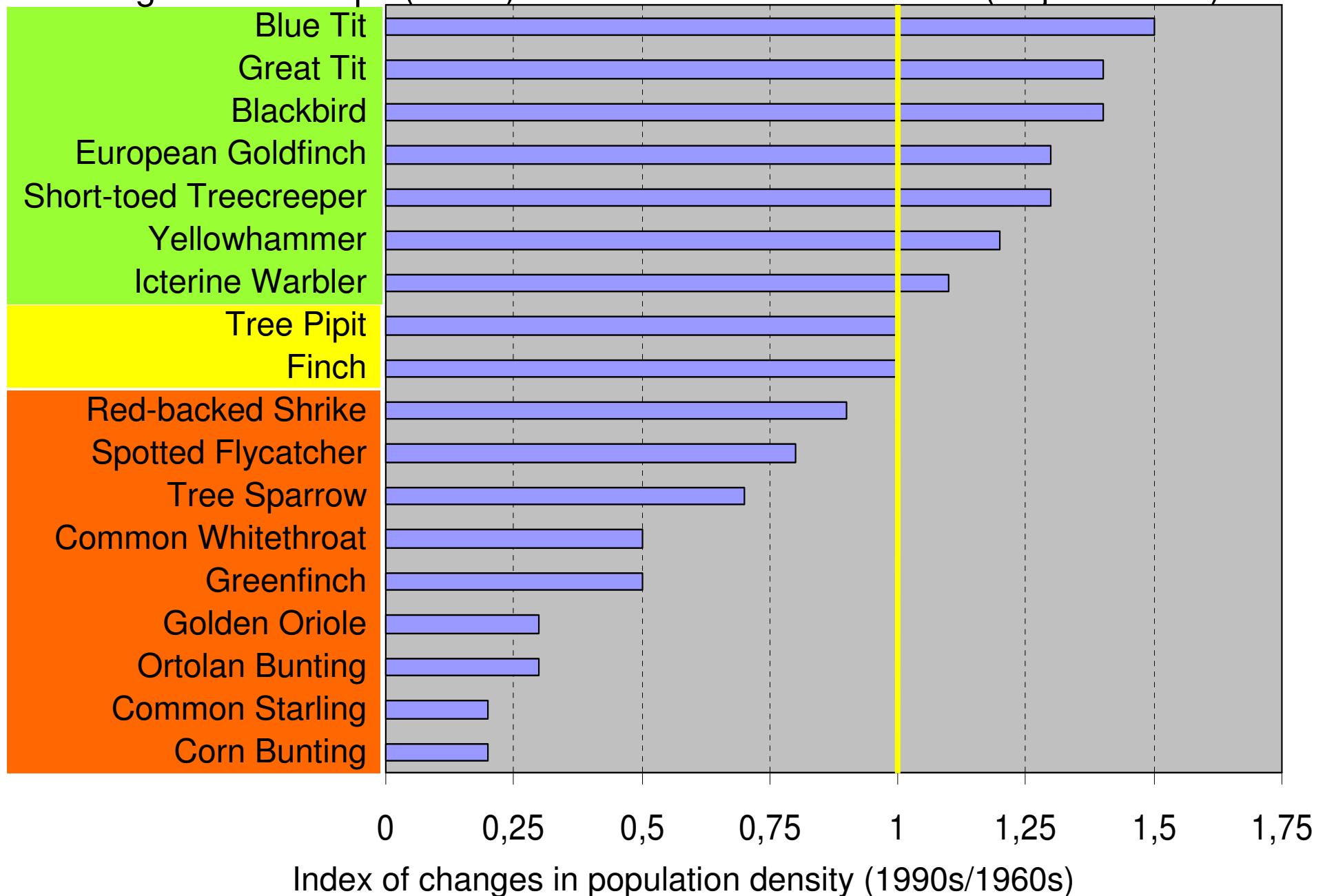
- Total of 72 species in all the years
- Dominants: Finch, Yellowhammer, Blackcap, Icterine Warbler, Blackbird, Great Tit, Starling
- Ephemeral: e.g. Kingfisher, Black Woodpecker
- Mean population density – from 10 to 18 pairs/ha



Population density (p/ha) of breeding birds in various woody vegetation clumps (N=23) in 1960s. and 1990s. (Kujawa 2002)



Changes in population density of most abundant species in various woody vegetation clumps (N=23) between 1964-66 i 1991-94 (Kujawa 2002)



Conclusions from first long-term comparisons:

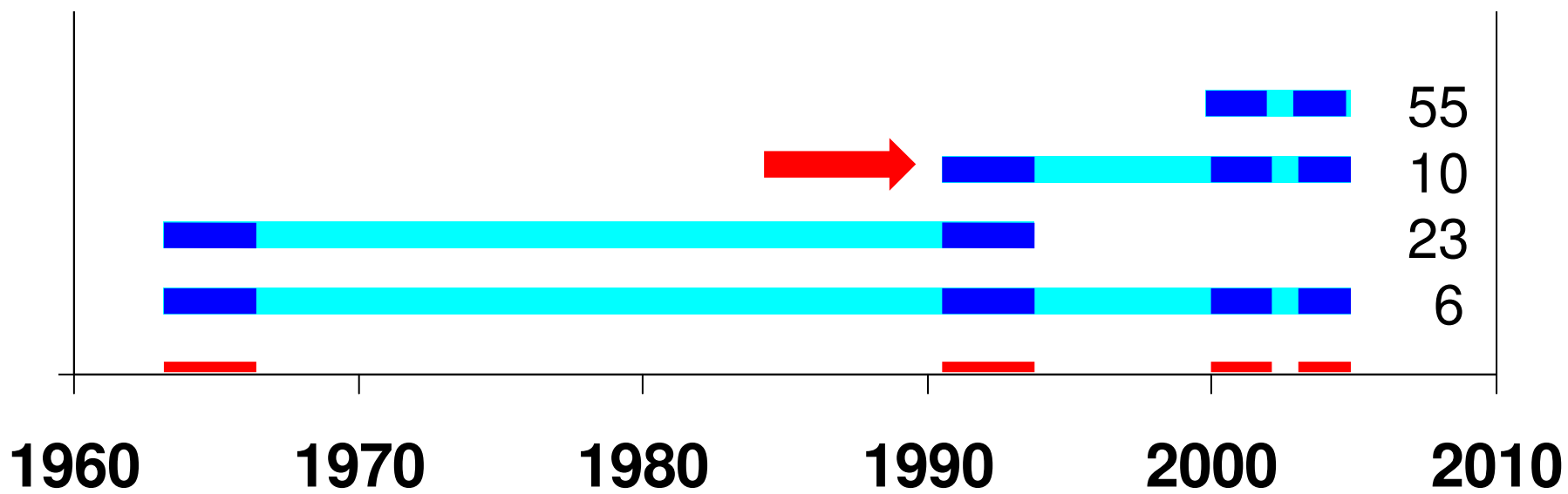
(Kujawa 2002, Agric., Ecos & Envir.)

Positive:

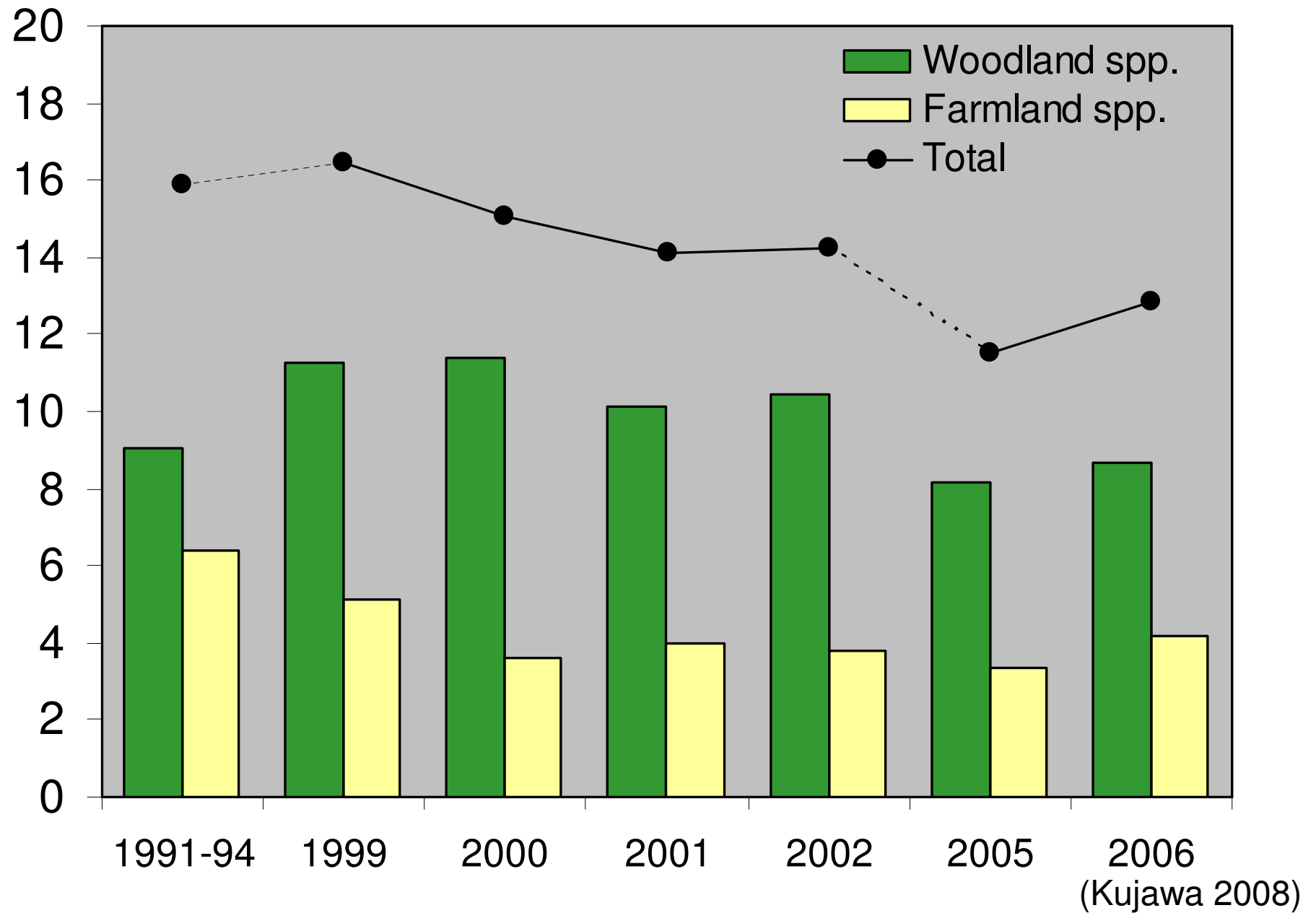
- stable species composition and number
- population decline only in sites where tree stand was re-juvenated

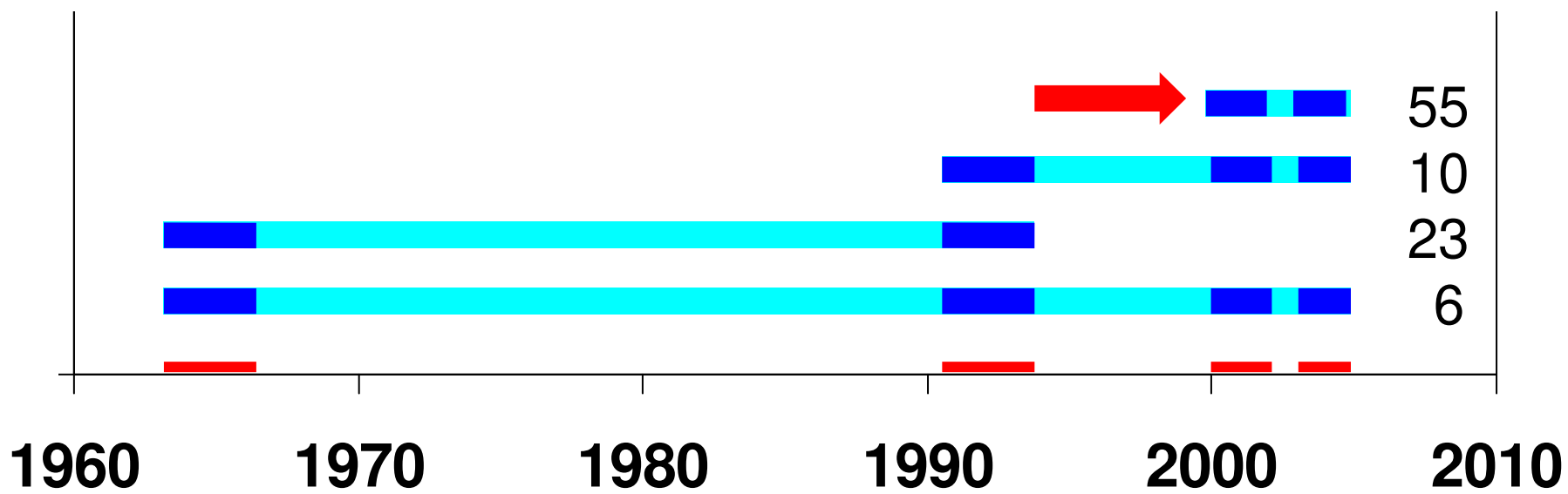
Negative:

- decrease in population density in farmland species guild

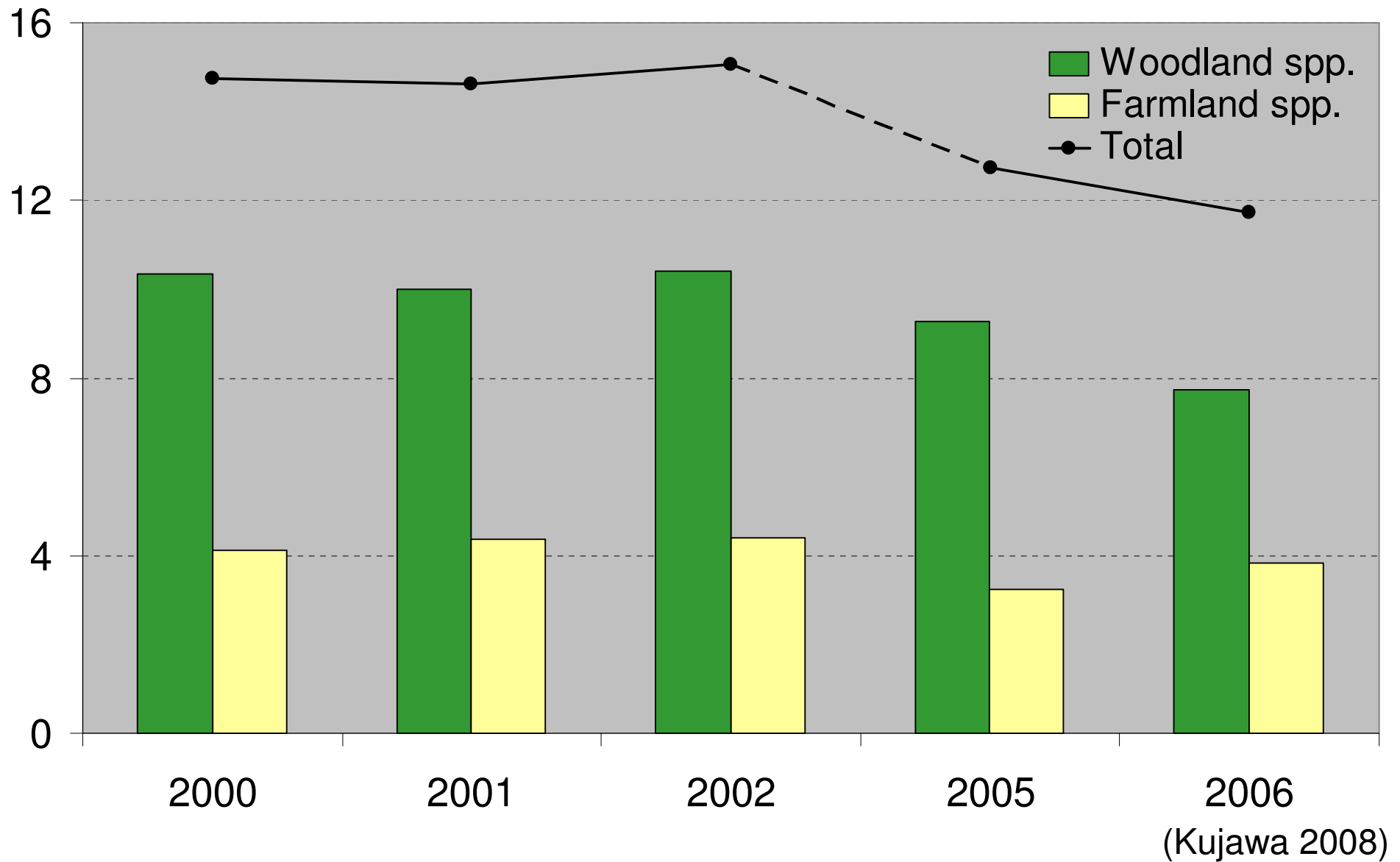


Bird density in small wooded patches (N=10) in 1991-2006



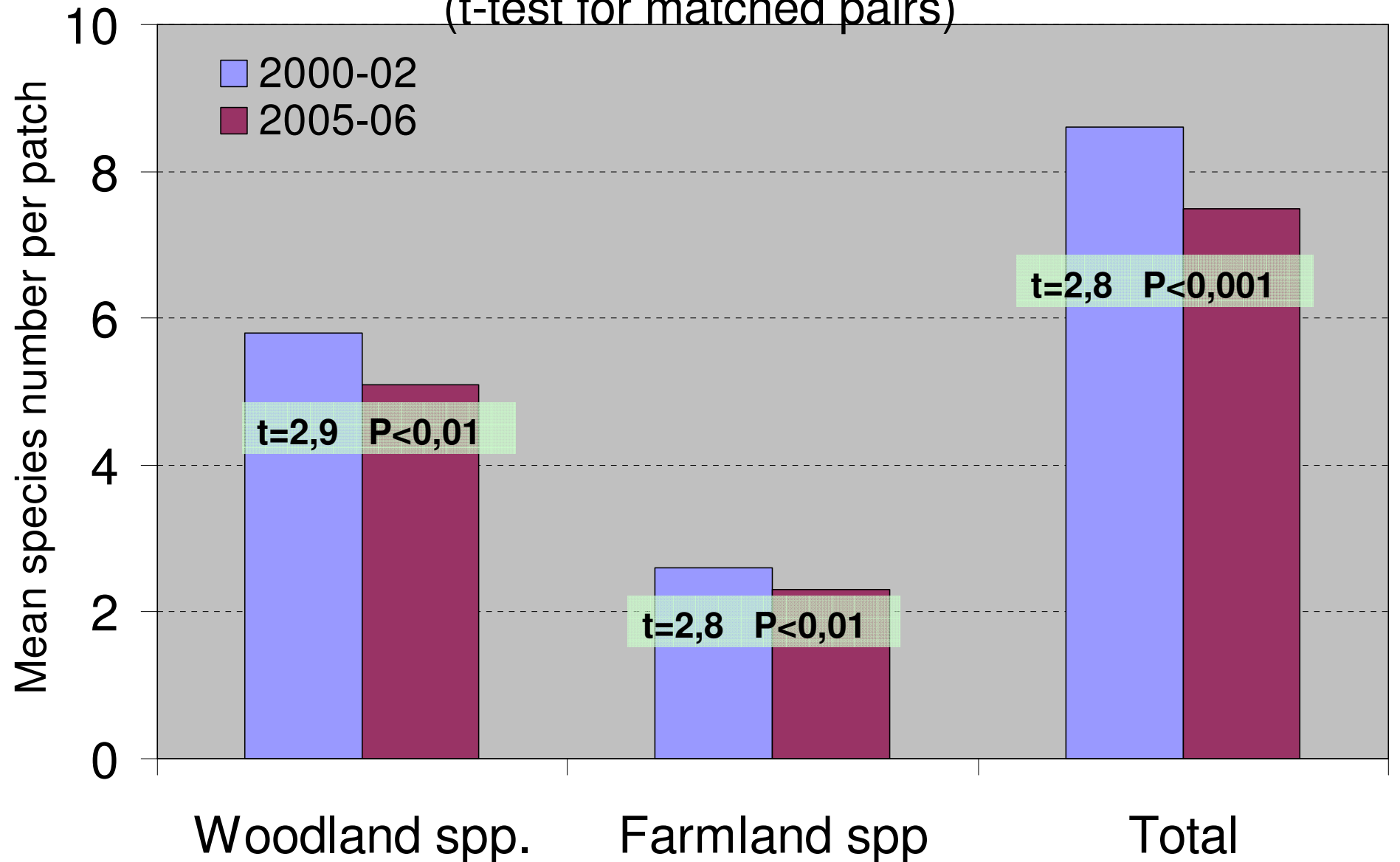


Bird density (pairs/ha) in small wooded patches
(N=55) in 2000-02 and 2005-06



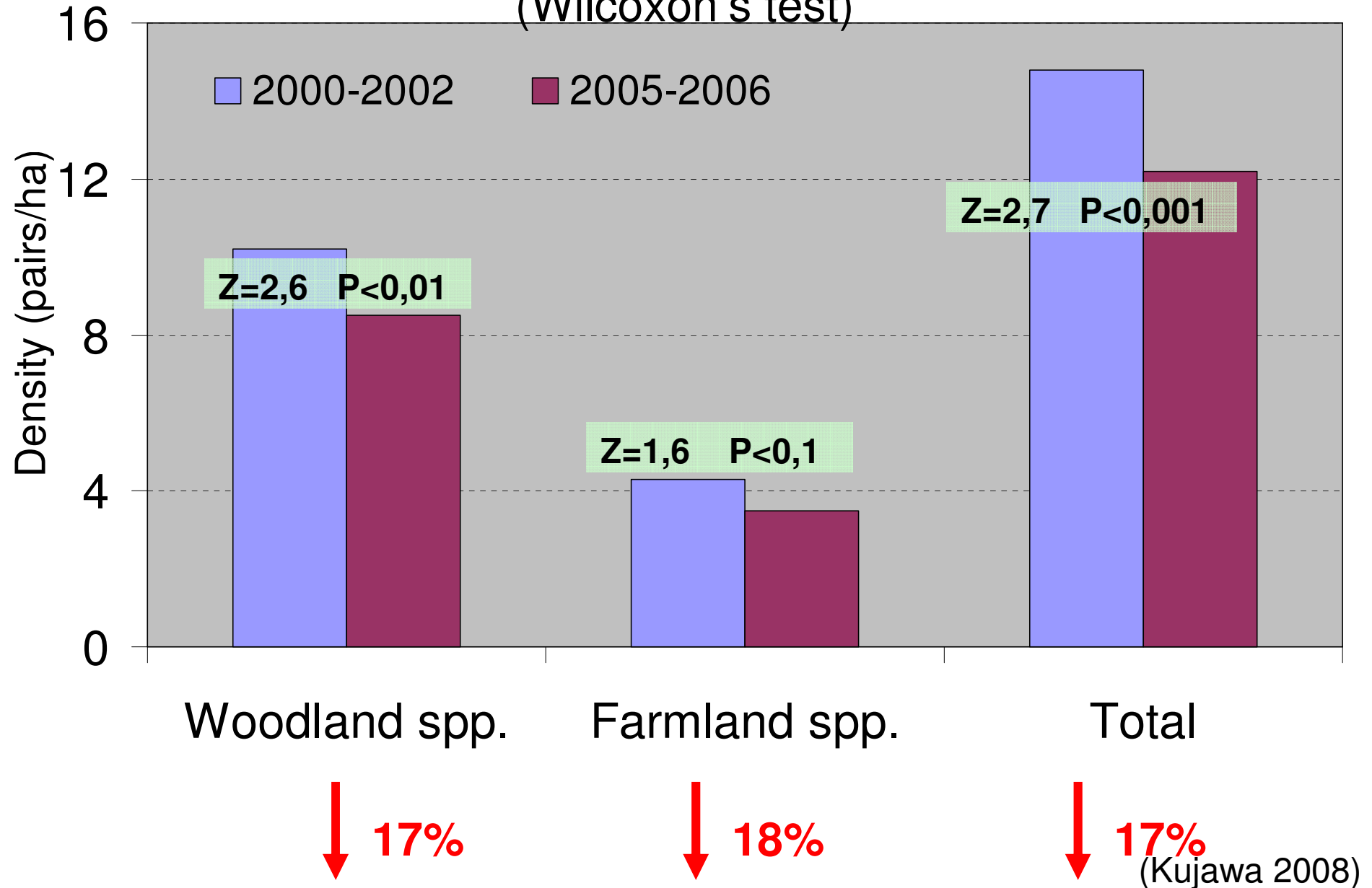
Comparison of species number in small wooded patches (N=55) between 2000-02 and 2005-06

(t-test for matched pairs)



(Kujawa 2008)

Comparison of bird density in small wooded patches (N=55) between 2000-02 and 2005-06
(Wilcoxon's test)



Changes in population density (p/ha) of common **woodland** spp.
in small wooded patches (N=55) between 2000-02 and 2005-06
(Wilcoxon's test)

Species	2000-02	2005-06	Trend	Z	P
Finch	2.9	2.5	↓	2.6	*
Icterine Warbler	0.9	0.5	↓	3.5	***
Nightingale	0.5	0.5	→	1.1	n.s.
Spotted Flycatcher	0.3	0.3	→	1.1	n.s.
Blue Tit	0.5	0.1	↓	4.8	***
Great Tit	0.7	0.4	↓	3.6	***
Chiffchaff	0.4	0.6	↑	2.1	*
Blackcap	1.7	0.8	↓	5.3	***
Blackbird	0.8	1.1	↑	2.3	*
Song Thrush	0.3	0.1	↓	3.3	***

Changes in population density (p/ha) of common **farmland** spp.
in small wooded patches (N=55) between 2000-02 and 2005-06
(Wilcoxon's test)

Gatunek	2000-02	2005-06	Trend	Z	P
Goldfinch	0.5	0.1	↓	4.5	***
Greenfinch	0.2	0.1	↓	2.4	*
Yellowhammer	1.6	1.5	→	0.9	n.s.
Ortolan Bunting	0.2	0.3	→	0.8	n.s.
Tree Sparrow	0.4	0.4	→	0.8	n.s.
Starling	0.6	0.4	→	1.3	n.s.



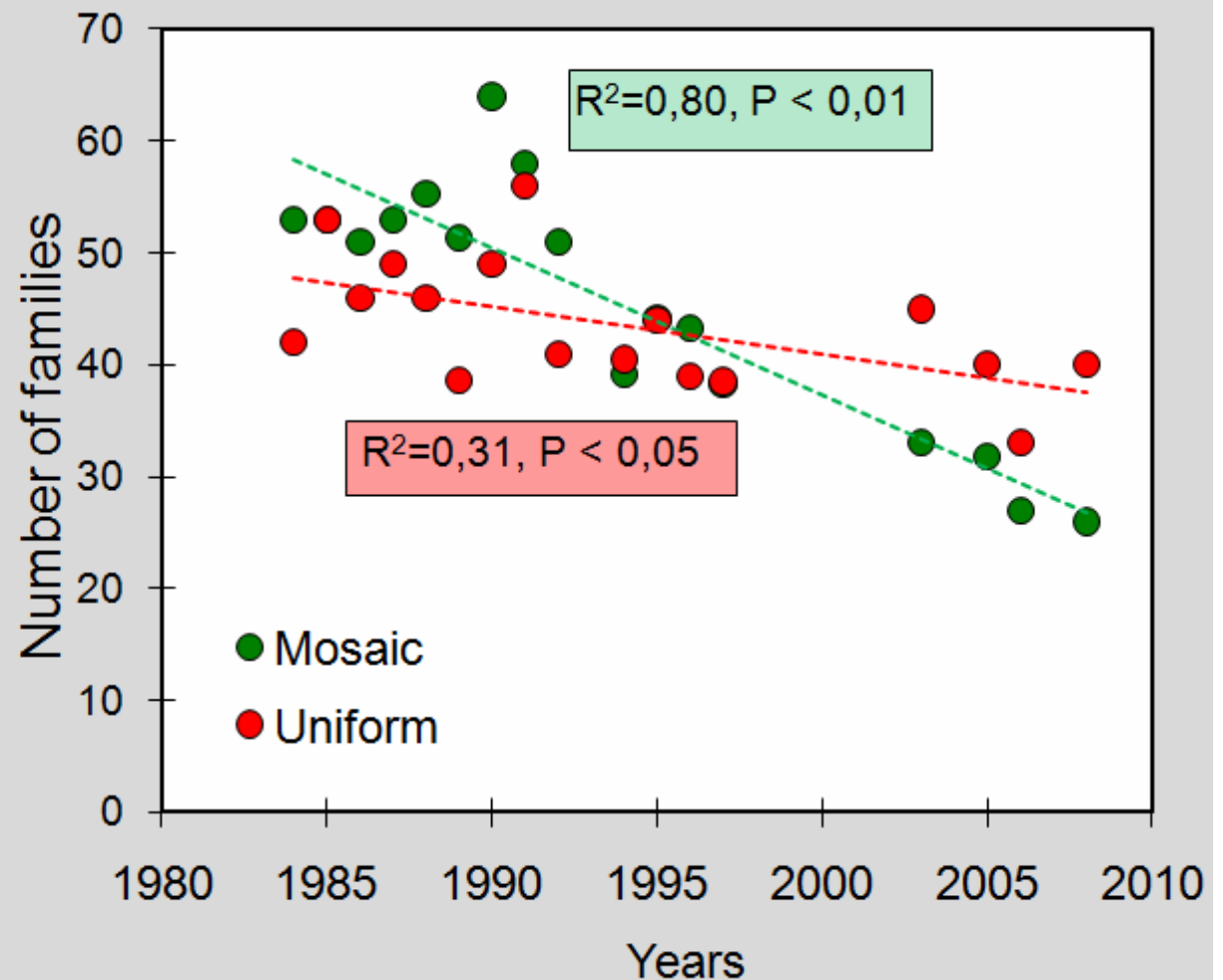
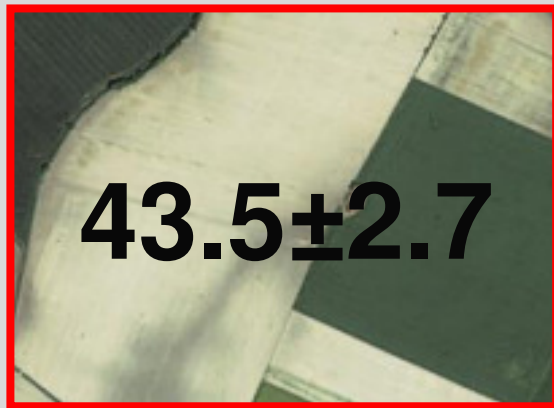
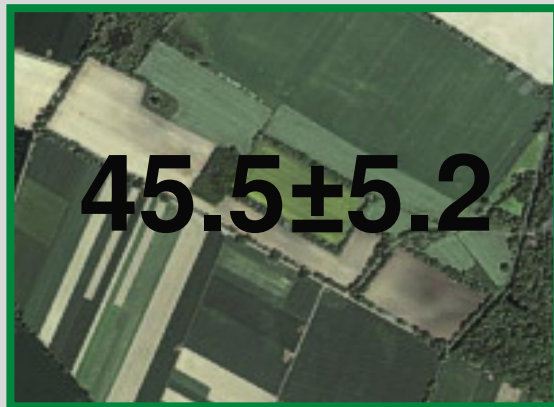
Not only birds ...



Phot. J. Karg



Long term trends in diversity (number of families) of epigeic insects in cereals in relation to landscape structure



SUMMARY:

In 1964 – 2006 the total number of bird species declined by 20-25% (the decline has begun in XX/XXI).

There is a different pattern of changes in population density:
permanent decline of typical farmland birds and fluctuations of woodland birds.

CONCLUSIONS:

The long-term study in the Dezydery Chłapowski Landscape Park strongly suggests, that stable, mosaic-like structure of an agricultural landscape is not enough for successful preservation of bird diversity, when agriculture is becoming more and more intensive.

Thus, landscape diversification should be combined with extensification of farming practices.

A landscape photograph showing a long, straight row of trees with green foliage stretching across a grassy field. The sky is blue with scattered white clouds. The sun is low on the horizon to the left, creating a warm glow. The text "Thank you for attention" is overlaid in the upper left area.

Thank you for attention

Many thanks for colleagues from Field Station in Turew for assistance, without which conducting the research in such a large extent would be impossible

Relationship between bird diversity and landscape heterogeneity is well known and broadly accepted, but ... what about an effect of long-term farming intensification?

