

BTV vector studies in Switzerland

What we know and what we need to know.



Christian Kaufmann, Francis Schaffner, and Alexander Mathis

Institute of Parasitology, Division of Vector Entomology
University of Zürich, Switzerland.

Monitoring of *Culicoides* in Switzerland: History

Before 2002:

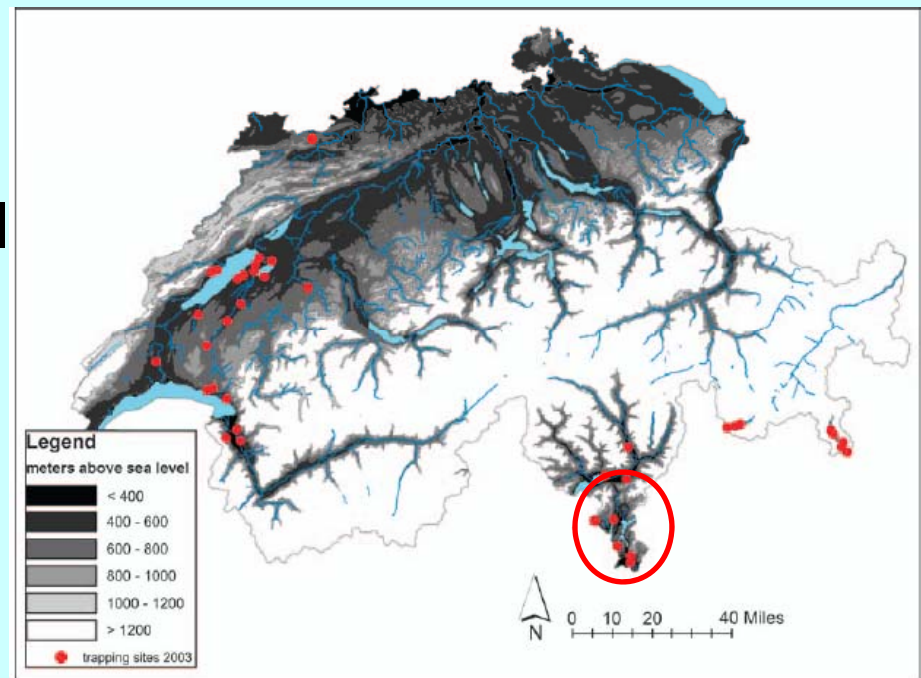
Culicoides imicola:

- Main BTV vector in Africa and Mediterranean region
- Is *C. imicola* extending its range more northwards?

As from 2003, Switzerland:
Culicoides monitoring along
southern border and at additional
sites expected to be suitable
for *C. imicola* (single night catches)

One single female *C. imicola*

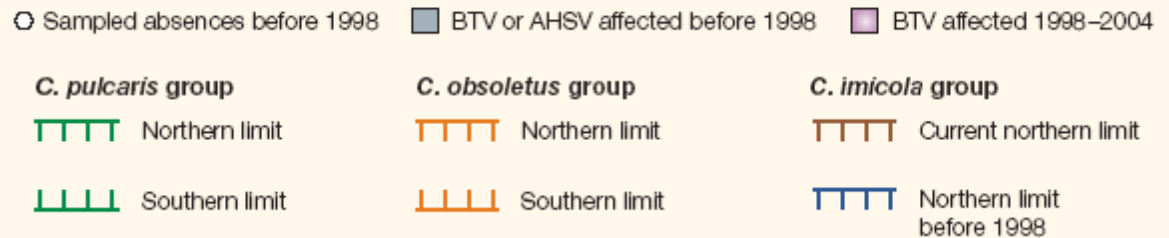
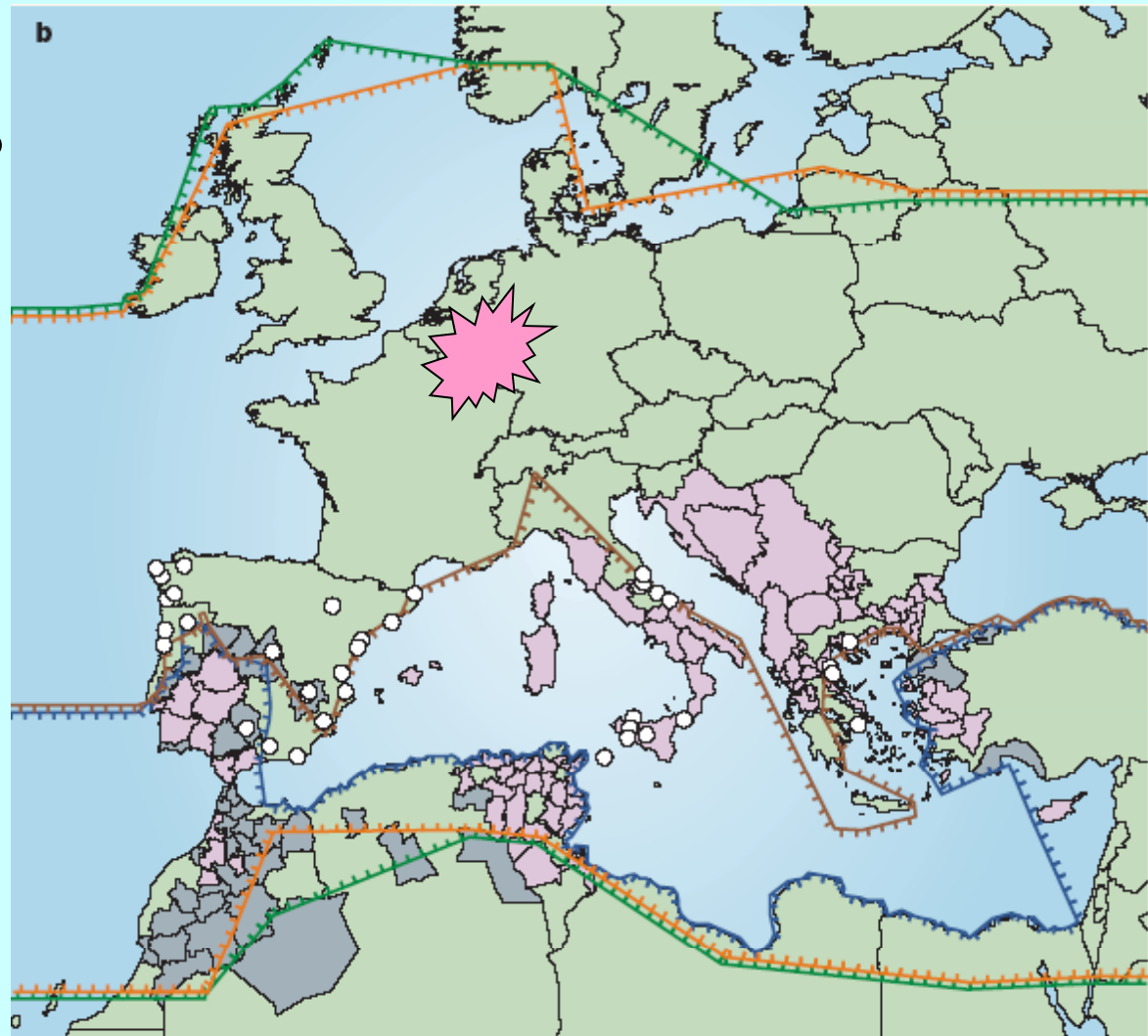
Racloz et al., 2007



Distribution of bluetongue and its *Culicoides* vectors in Europe

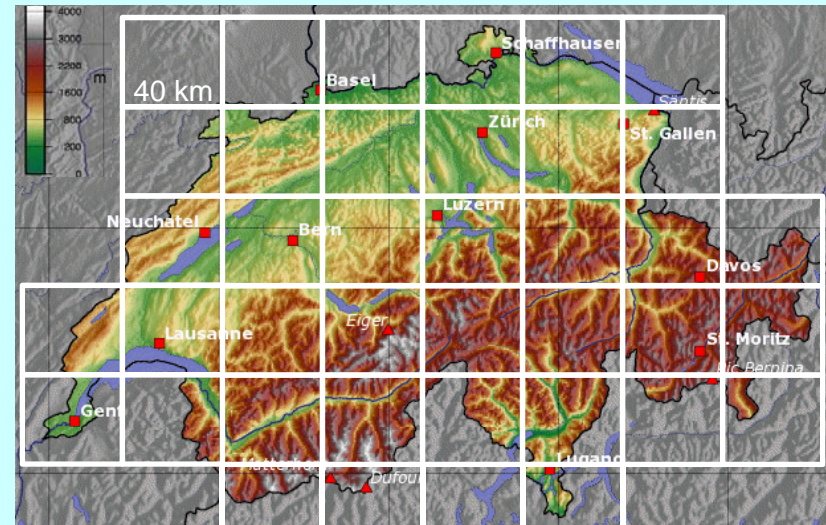


Bluetongue 2006



Monitoring of midges in Switzerland: choice of trapping sites

EU grid (40 x 40 km)



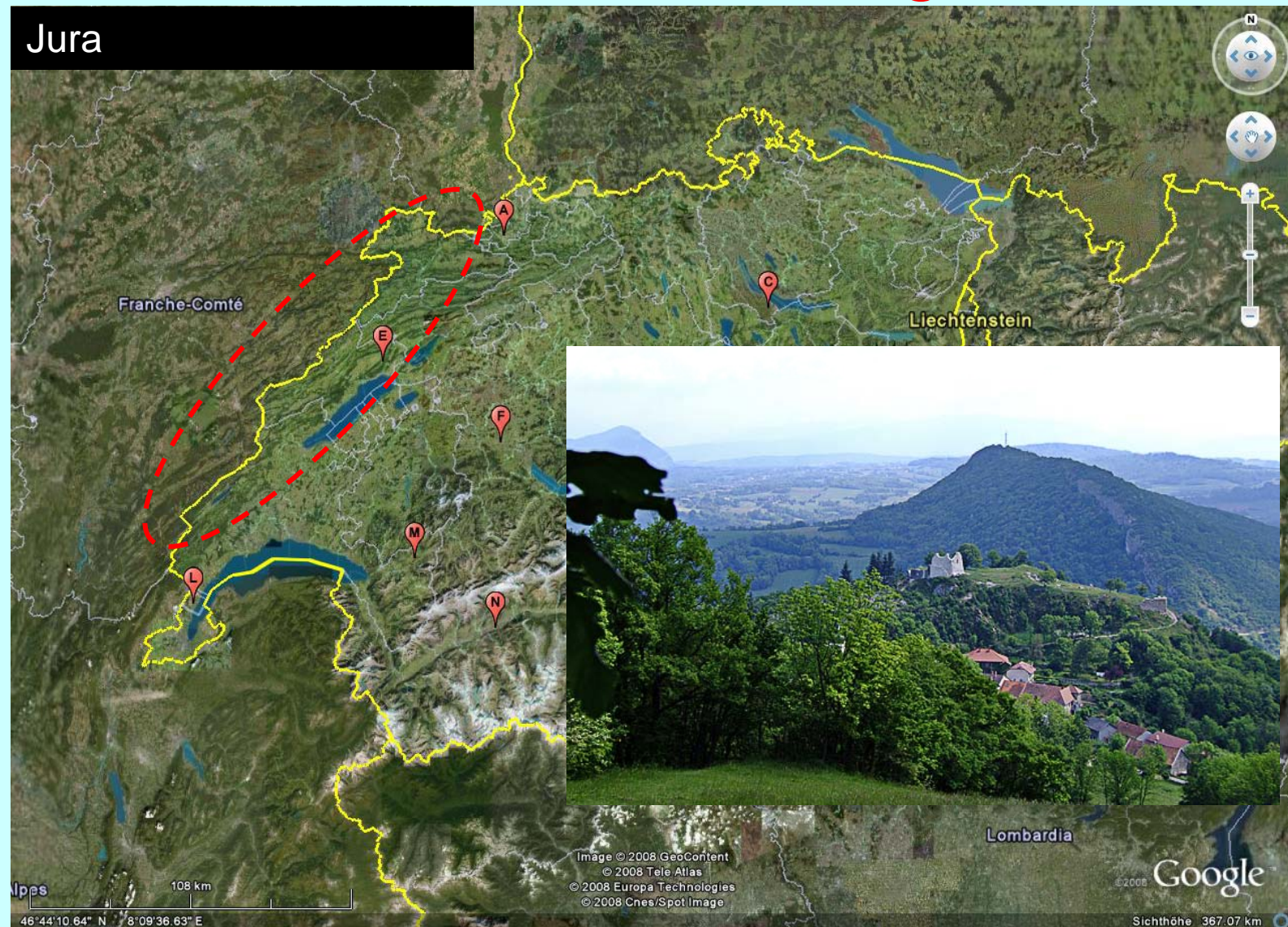
Swiss Federalism
(26 cantons)



Trapping sites in the 12 Swiss climatic regions



Trapping sites in the 12 Swiss climatic regions



Trapping sites in the 12 Swiss climatic regions



Trapping 12 Swiss cli

Pre-, High-, Inner-Alps

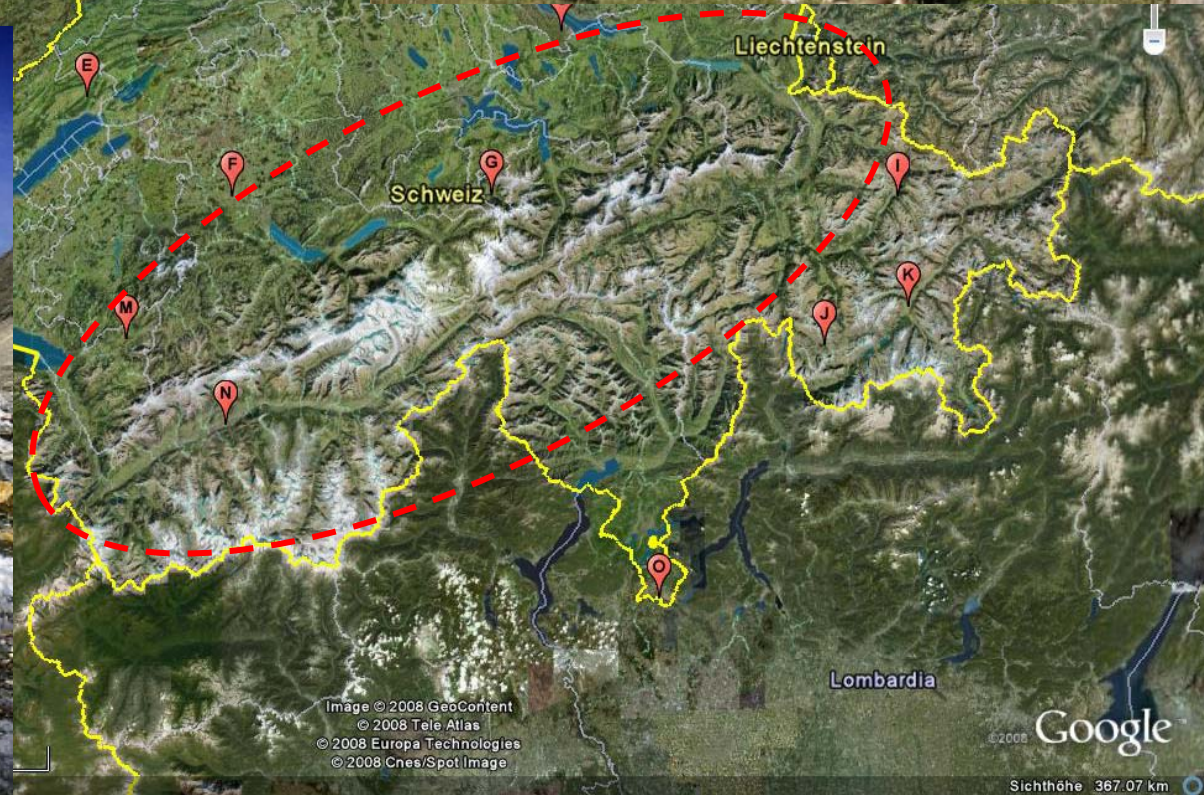
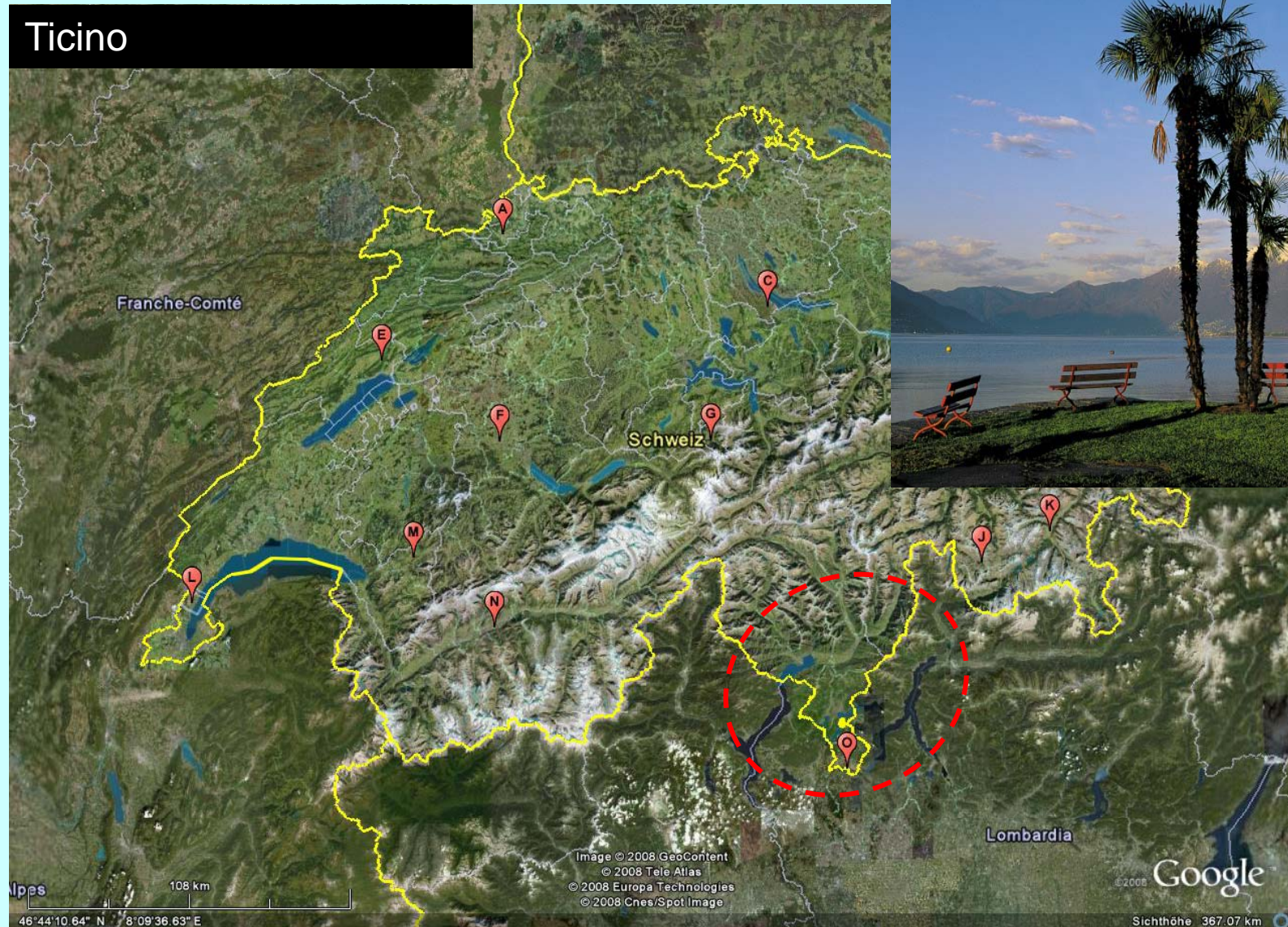


Image © 2008 GeoContent
© 2008 Tele Atlas
© 2008 Europa Technologies
© 2008 Cnes/Spot Image

© 2008 Google

Sichthöhe 367.07 km

Trapping sites in the 12 Swiss climatic re



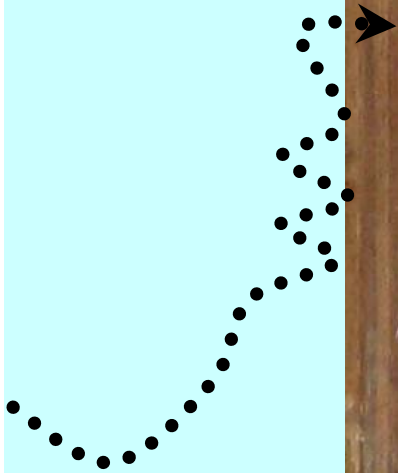
Trapping sites in the 12 Swiss climatic regions

- 12 farms with livestock
- Trapping weekly
 - Overnight
- All year round
- 3 years



Trapping of *Culicoides* spp.

- Onderstepoort blacklight traps



Morphological identification of *Culicoides* spp.

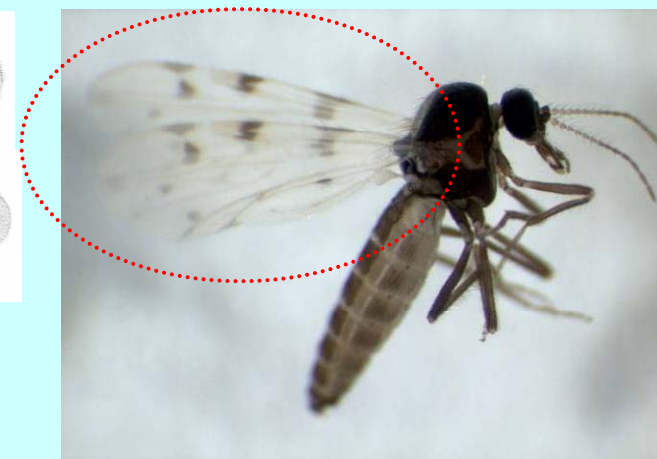
- Obsoletus group

- *C. obsoletus*
- *C. scoticus*
- *C. dewulfi*
- *C. chiopterus*



- Pulicaris group

- *C. pulicaris*
- *C. impunctatus*
- *C. punctatus*
- *C. grisescens*
- *C. newstaedi*
- ...more

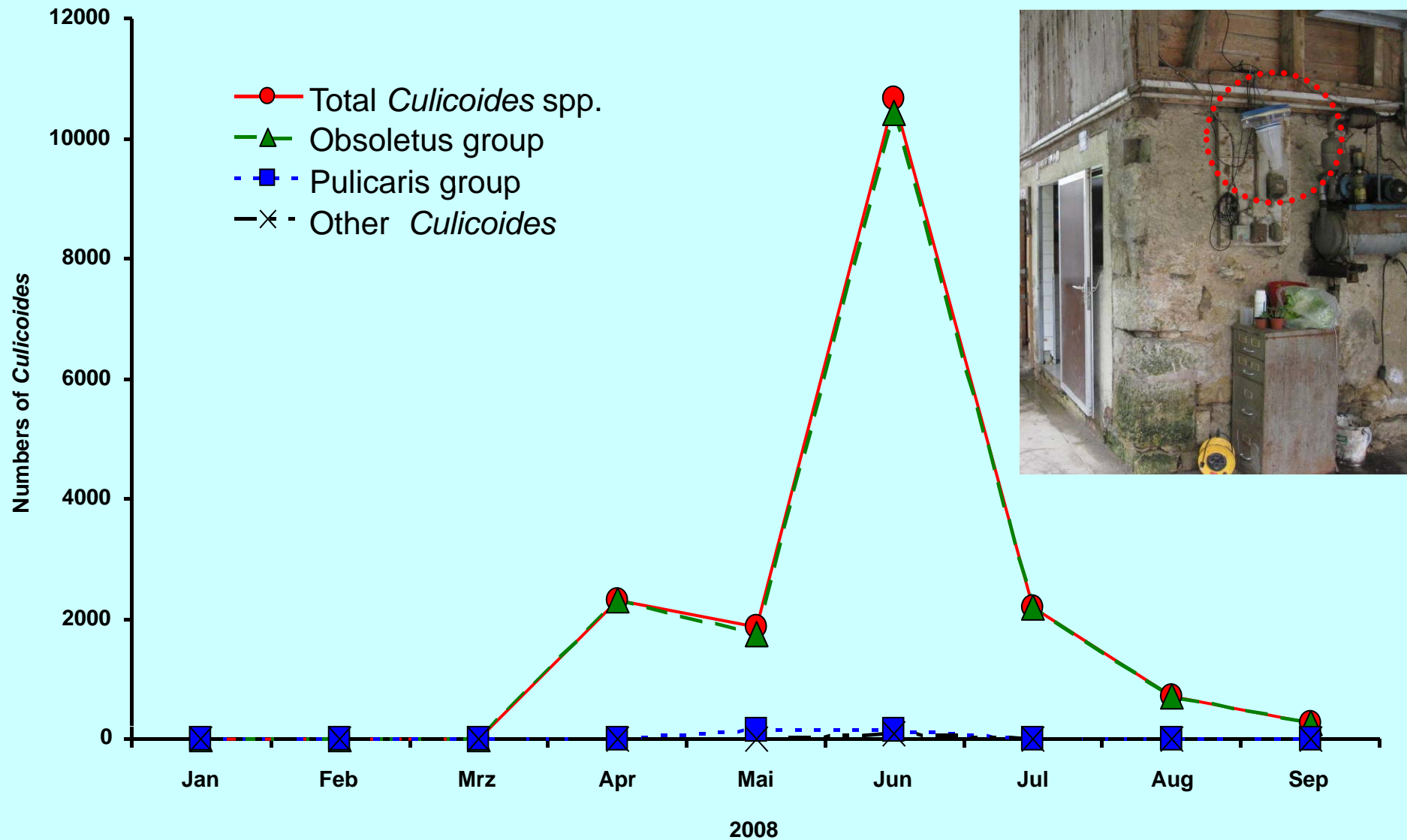


- Other *Culicoides* spp.

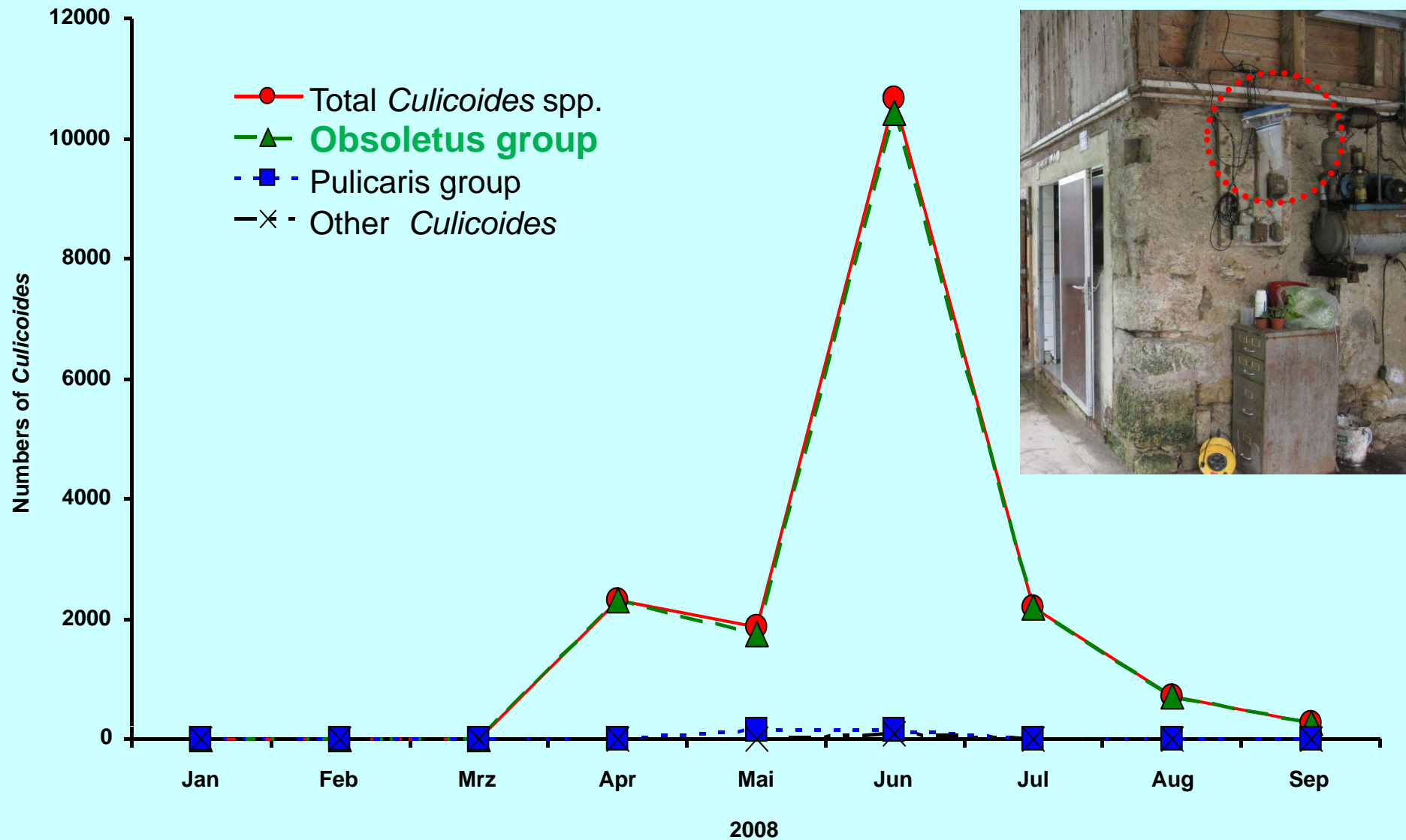
First Result

- There is no vector free zone

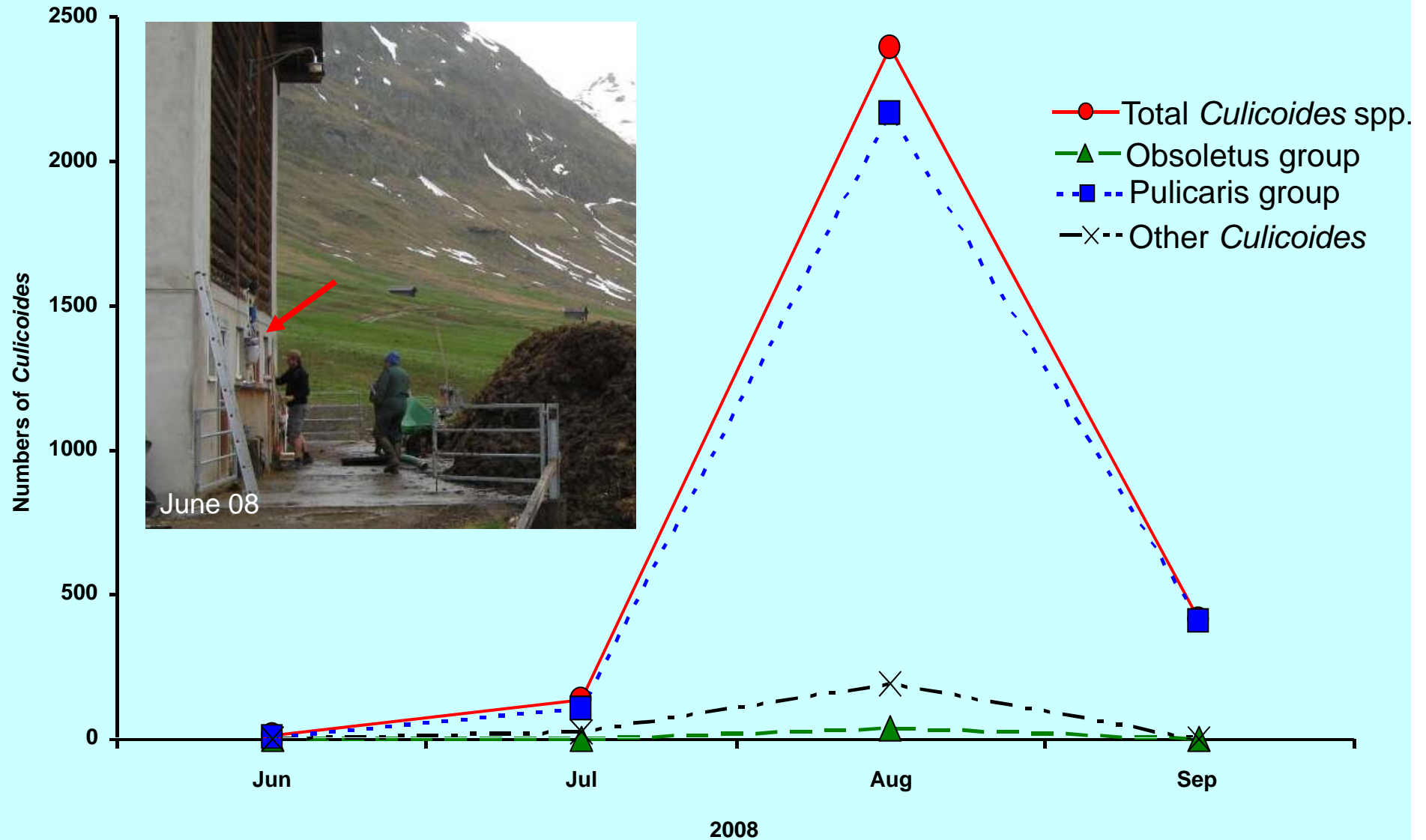
Monthly average of trapped *Culicoides* spp. in Dittingen (364 metres asl.)



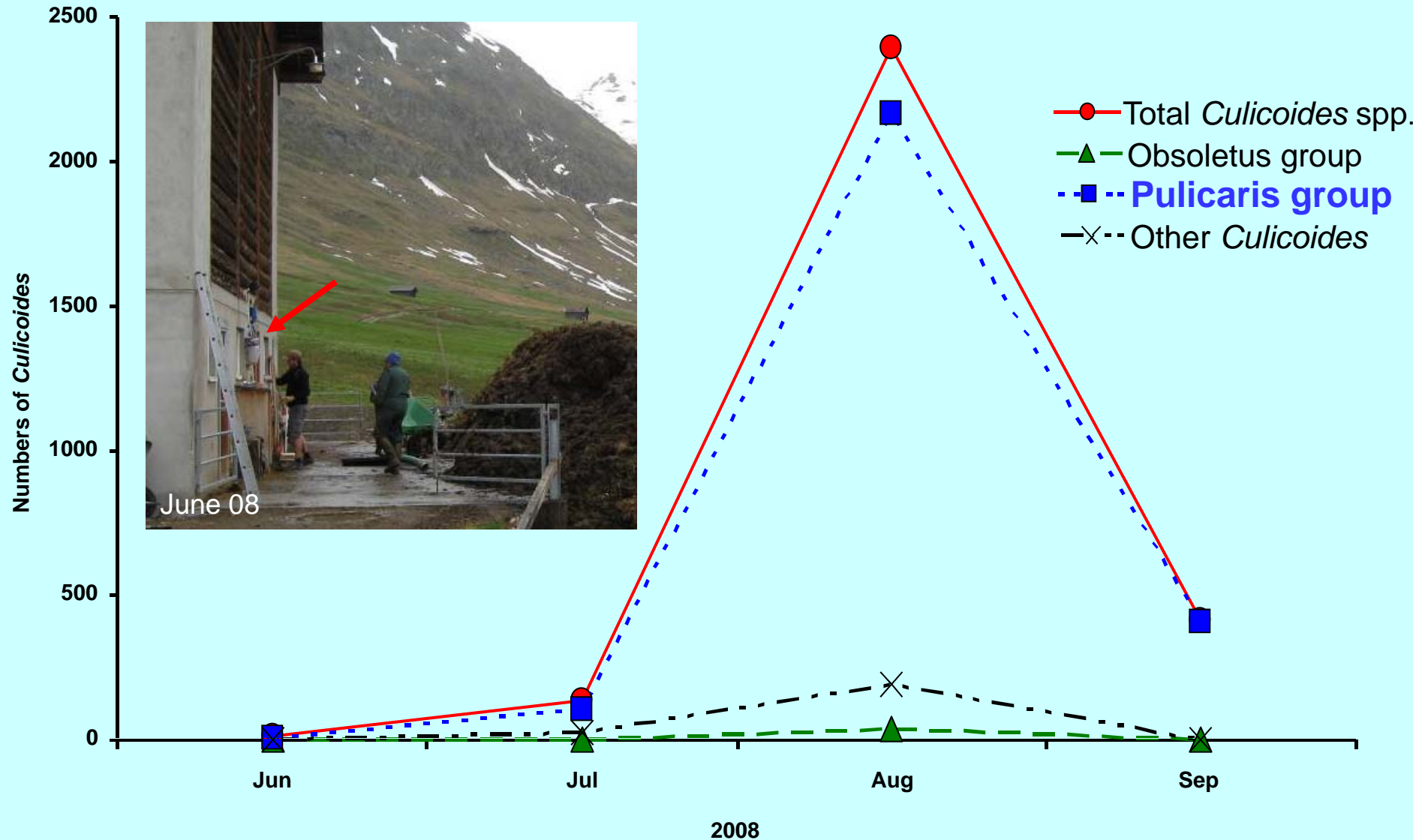
Monthly average of trapped *Culicoides* spp. in Dittingen (364 metres asl.)



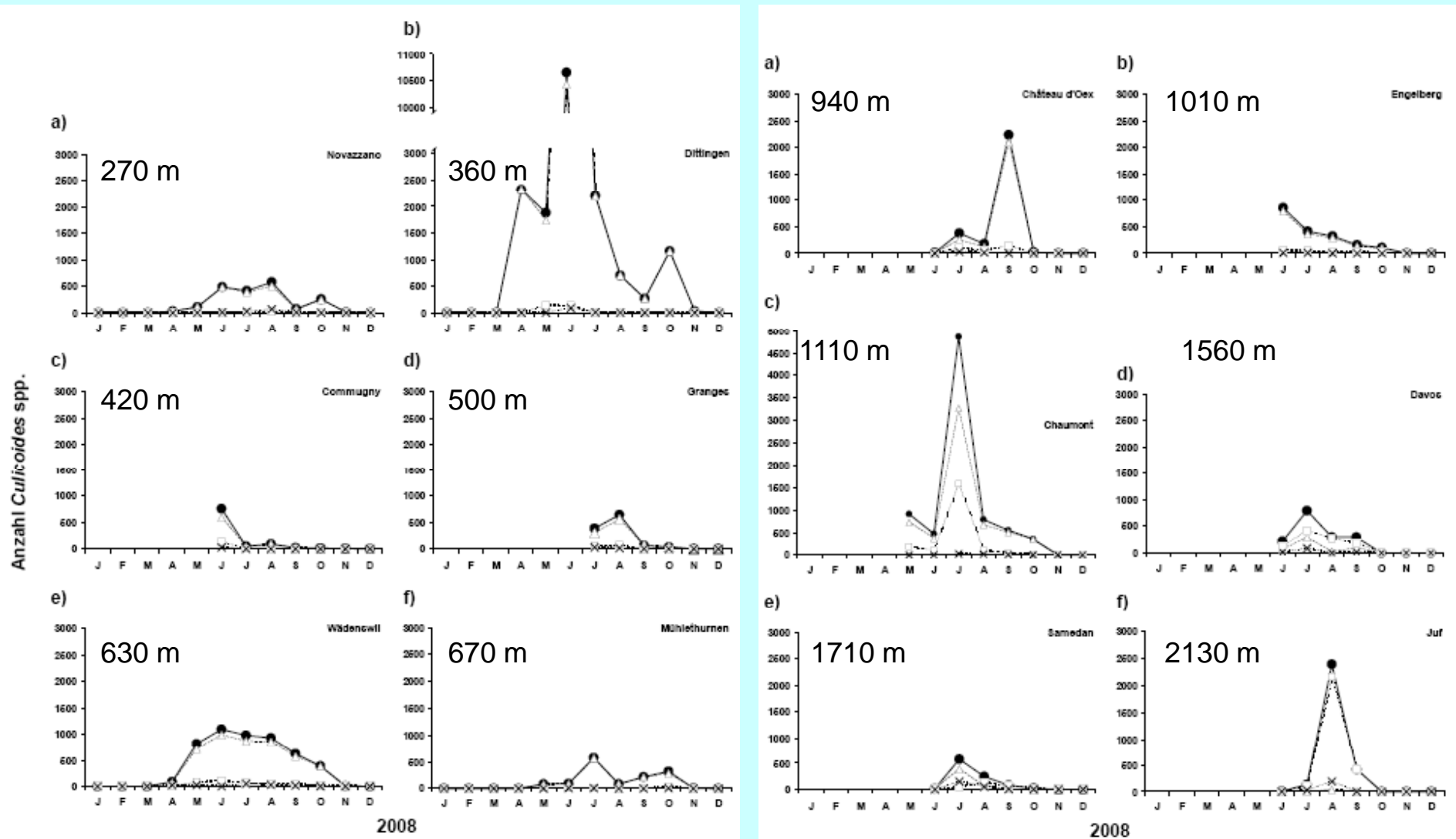
Monthly average of trapped *Culicoides* spp. in Juf (2126 metres asl.)



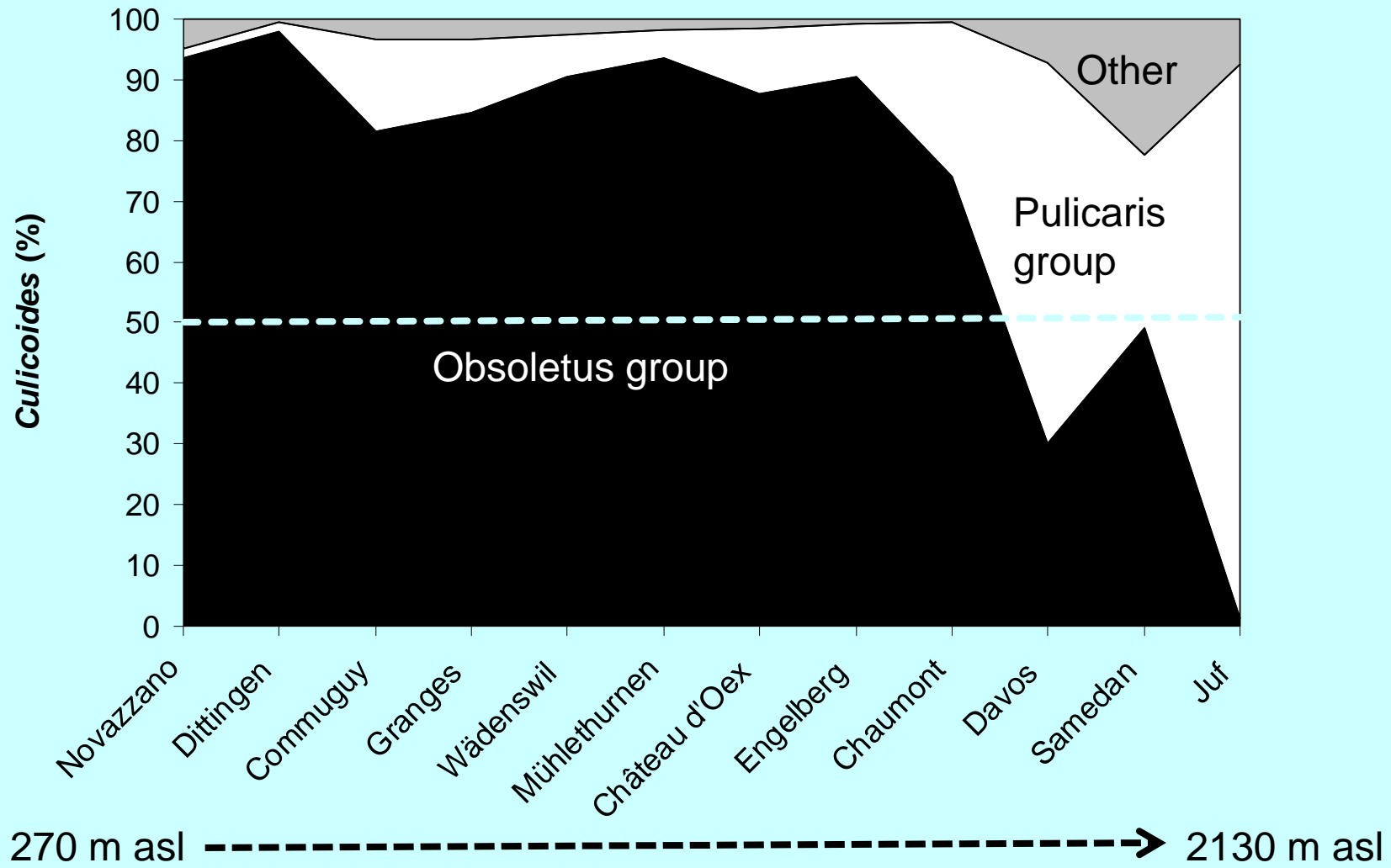
Monthly average of trapped *Culicoides* spp. in Juf (2126 metres asl.)



Monthly average of trapped *Culicoides* spp. in Switzerland, 2008



Percentage of *Culicoides* groups with increasing altitude



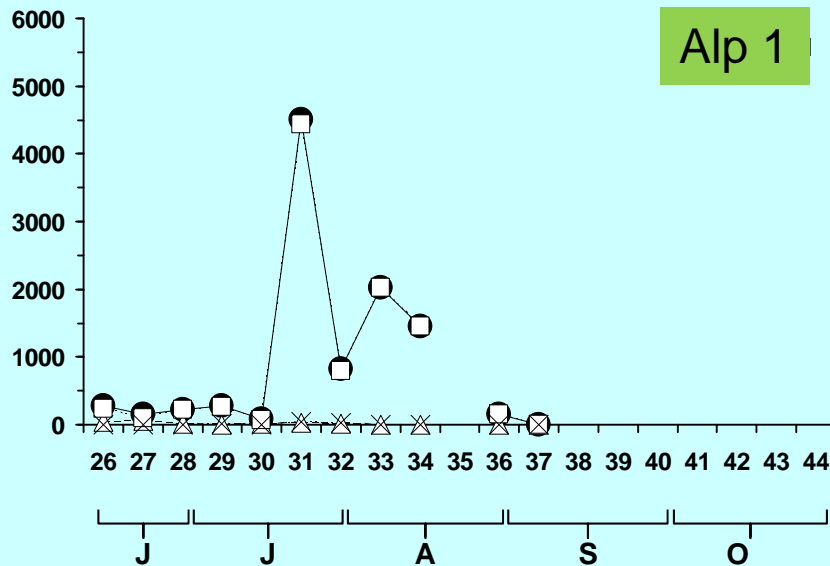
Morphological identification of *Culicoides* spp. (n=200)

| | Obsoletus | Pulicaris | Other |
|------------------------|---|---|--|
| Ticino: (270 m asl) | <i>C. obsoletus/scoticus</i> (161) <i>C. chiopterus</i> (2) | <i>C. pulicaris</i> (14) <i>C. punctatus</i> (1) | <i>C. circumscriptus</i> (8) <i>C. festivipennis</i> (6) <i>C. pallidicornis</i> (6) <i>C. kibunensis</i> (1) |
| Basel: (360 m asl) | <i>C. obsoletus/scoticus</i> (191) <i>C. dewulfi</i> (5) <i>C. chiopterus</i> (1) | <i>C. lupicaris</i> (2) | <i>C. festivipennis</i> (1) |
| Davos: (1560 m asl) | <i>C. obsoletus/scoticus</i> (59) <i>C. chiopterus</i> (1) | <i>C. lupicaris</i> (65) <i>C. deltus</i> (43) <i>C. grisescens</i> (13) <i>C. pulicaris</i> (1) | <i>C. spp.</i> (9) <i>C. comosioculatus</i> (2) <i>C. jurensis</i> (2) <i>C. achrayi</i> (1) <i>C. brunnicans</i> (1) <i>C. stigma</i> (1) <i>C. fascipennis</i> (1) |

Preliminary Conclusions

- *Culicoides* of the *Obsoletus* and *Pulicaris* group are present all over Switzerland
- Present >1500 metre asl.

Weekly *Culicoides* catches on two neighboring (4 km) alps (2000 m)

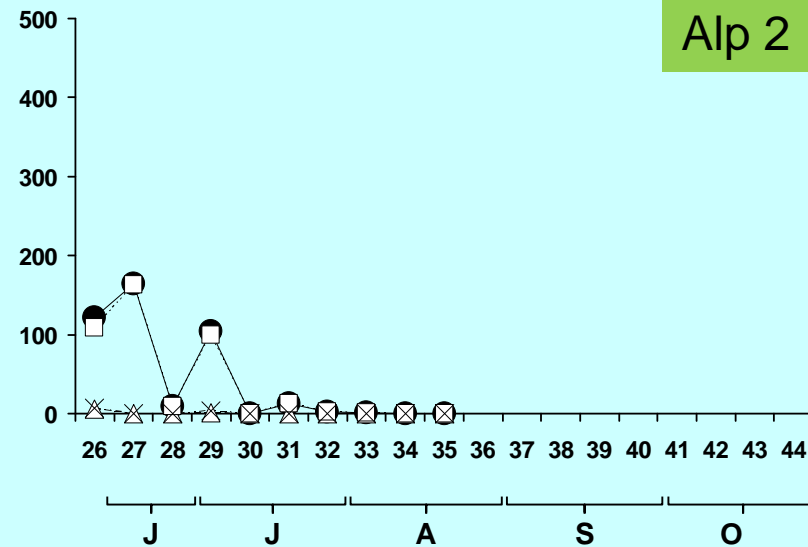


Dairy cows (118)

Sedimentary

Animals

Rock classification



Dairy cows (62)
Sows (12)

Loose

What we need to know

1. Onderstepoort UV-trap
2. Backpack aspirator

Resting places...



What we need to know

1. Onderstepoort UV-trap
2. Backpack aspirator
3. Breeding sites



Emergence traps



Soil samples

What we need to know

1. Onderstepoort UV-trap
2. Backpack aspirator
3. Breeding sites



Culicoides rearing

- *C. nubeculosus* colony (IAH, Pirbright)
- Special Thanks to:
 - Dr. Simon Carpenter
 - Eric Dension
- *Further projects:*
 - Establish colonies of indigenous *C. spp.*
 - Vector biology
 - Vector physiology
 - Vector competence



Many thanks to...

- Mr. Frau Binggeli
- Mr. and Mrs. Tschumi-Fuchs
- Mr. and Mrs. Ehrensperger
- Mr. Steiner
- Mr. Luzi
- Mr. and Mrs. Hess
- Mr. Junod
- Mrs. Gabaglio
- Mr. and Mrs. Faillétaz
- Mrs. Henchoz
- Pénitencier de Crêtelongue
- **Mr. and Mrs. Baumann**



Grant Nr. 1.08.10

... and to you for your attention