

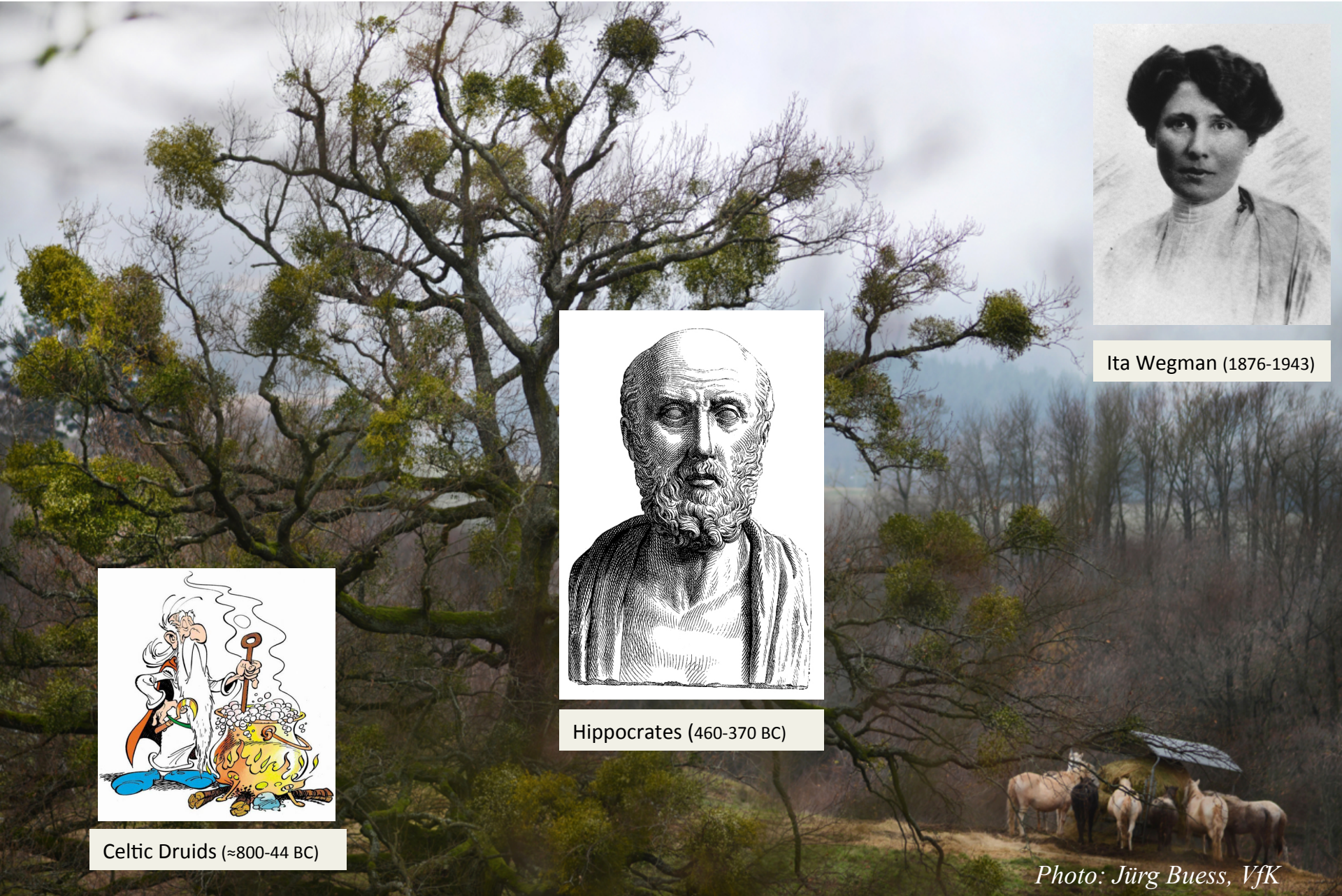
Between heaven and earth – mistletoes as precious commodity for cancer cures

Hartmut Ramm
HISCIA Institute, Arlesheim, Switzerland

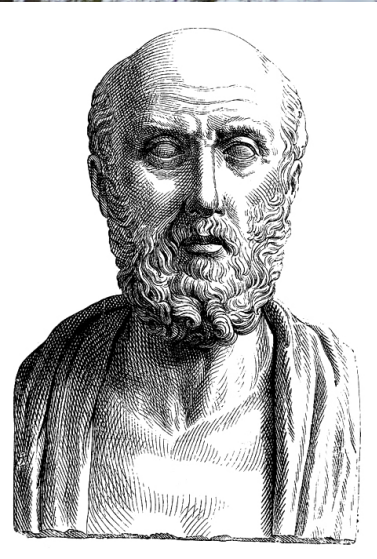
26th International Symposium of the Scientific
Centre for Fertilizers (CIEC)

Impact of Anticipating Research in the Past on
Research in the Future





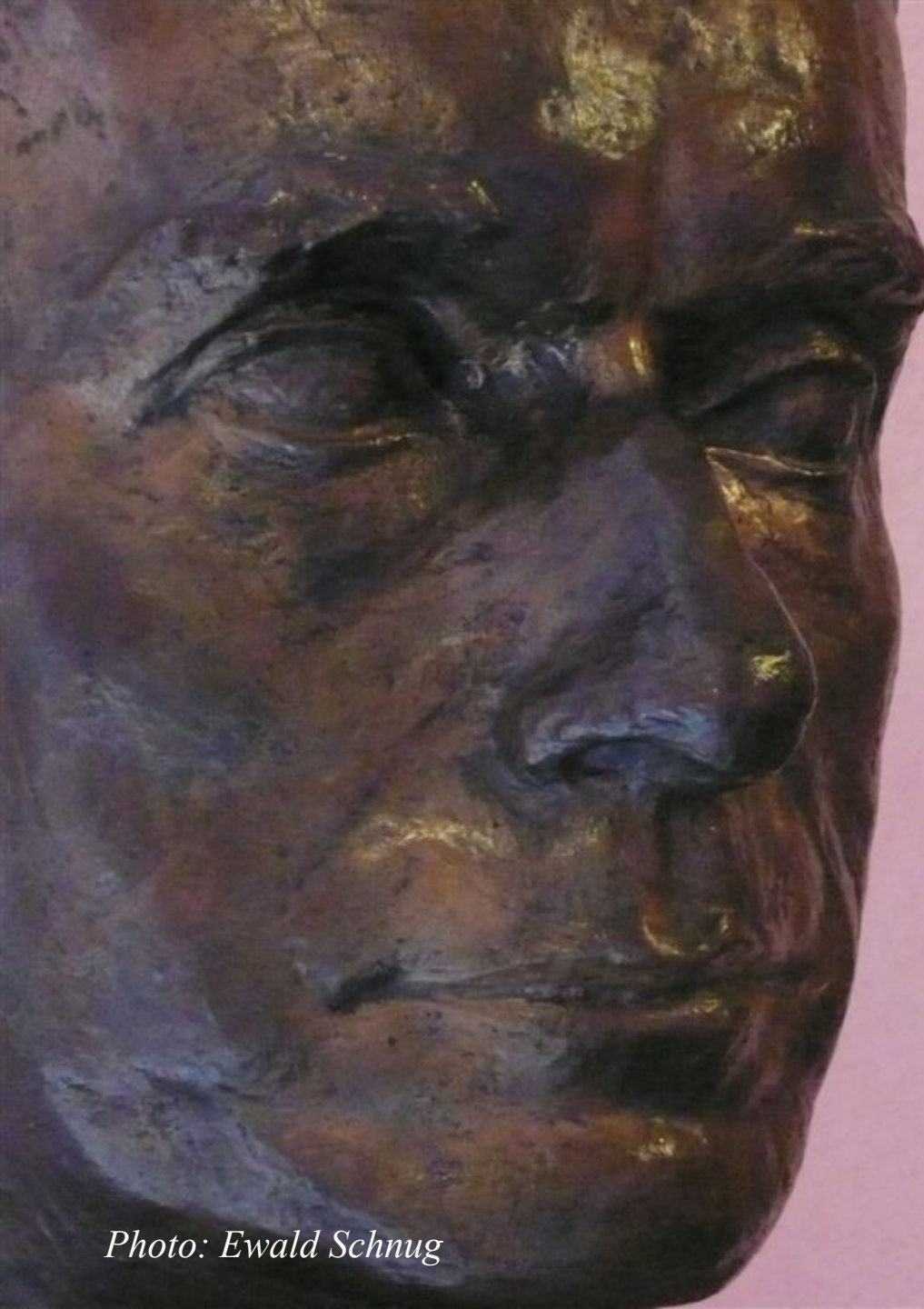
Ita Wegman (1876-1943)



Hippocrates (460-370 BC)



Celtic Druids (≈800-44 BC)



Rudolf Steiner

(1861-1925)

- ✓ **Biodynamic Farming**
(1924)
- ✓ **Anthroposophic Medicine**
(1920)
- ✓ **Waldorf Education**
(1919)

Photo: Ewald Schnug

The good sides of a parasite

FAL researcher uses legendary mistletoe as indicator for soil pollution – large-scale field-mapping

Von Elke Ebeling

BRAUNSCHWEIG. Ein Paar, das wie Pech und Schwefel zusammenhalten will, küsst sich an Weihnachten unter dem Mistelzweig. Warum? Schon die Römer wussten, dass Mistelbeeren „wie Hölle kleben und nutzten sie für weißen Leim“, berichtet der Braunschweiger Professor Ewald Schnug.

Diese Klebkraft bringt die Mistel auf die Bäume: Vor allem Drosseln naschen gern von den Beeren und werden sie nicht wieder los. Sie wetzen deshalb ihre Schnäbel oder ihre Vögelhinter an den Ästen, schildert

mistletoe: highly effective commodity for anti-cancer drugs

den Gründen. Ihm dient der Teilschmarotzer, der besonders gern die Leitungsbahnen von Obstbäumen und Weichhölzern wie Pappeln an-

Cd and Zn polluted soils favour expansion of mistletoe

der Mistel, meint Schnug. Die kugelig wachsenden Schmarotzer werden in den Baumkronen bis zu 15 Kilo schwer. Die Birne wehre sich vehement gegen die Mistel, so Schnug. Das gehe so weit,



FAL-Forscher Professor Ewald Schnug schleppt eine Mistel. Die weißen Beeren kleben wie Hölle.

it absterbe. Boden gas vielerlei ste Bäume mme noch anten Bäu-

me sogar absterben, teilt ergänzend die Biologische Bundesanstalt in Braunschweig mit.

So sehr sich Förster und Gärtner über den Schädling ärgern – nur Ausschneiden hilft – so günstig kann

er sich auf schrieben t wirken. Den ein Verfahren denkartierung

phenomen since 15 years

bis 15 Jahre.“ Für Schnug ein Indiz,

dass die Böden belastet sind. Sobald im Herbst die Blätter von den Bäumen gefallen sind, kann sich die Mistel nicht mehr in den Kronen der Laubbäume verstecken. In Nadelge-

colour-infrared photography – detect green mistletoe on leafless tree canopies

schiedenen Daten über Böden und Standortbedingungen mit dem Verbreitungsmuster der Misteln verarbeitet werden. Dazu setzt Schnug Kleinflugzeuge und unbemannte

„Aerosol“ mit Infrarot Kameras beitet da Deutsch Raumfahrt für das cro-Airls rekt zur

large-scale field-mapping with unmanned aerial

Heavy metals in soil can be found in mistletoe - that is important information for pharmaceutical companies!

von Bodenproben. Bei der Suche mit Schwermetallen belastet, fänden sich die Schadstoffe in der Mistel wieder. Ein für die Arzneimittelherstellung wichtiges Nebenergebnis der Mistel-Forschung der FAL.

Cultivation of oak mistletoe

- since 1976: based on genetic disposition of mistletoe-bearing French oaks

- 1987: dying oaks & weak mistletoe growth
 - soil analysis: alkaline soil (pH 7.8)
 - leaf analysis: Mn deficiency
 - **lime-induced chlorosis!**

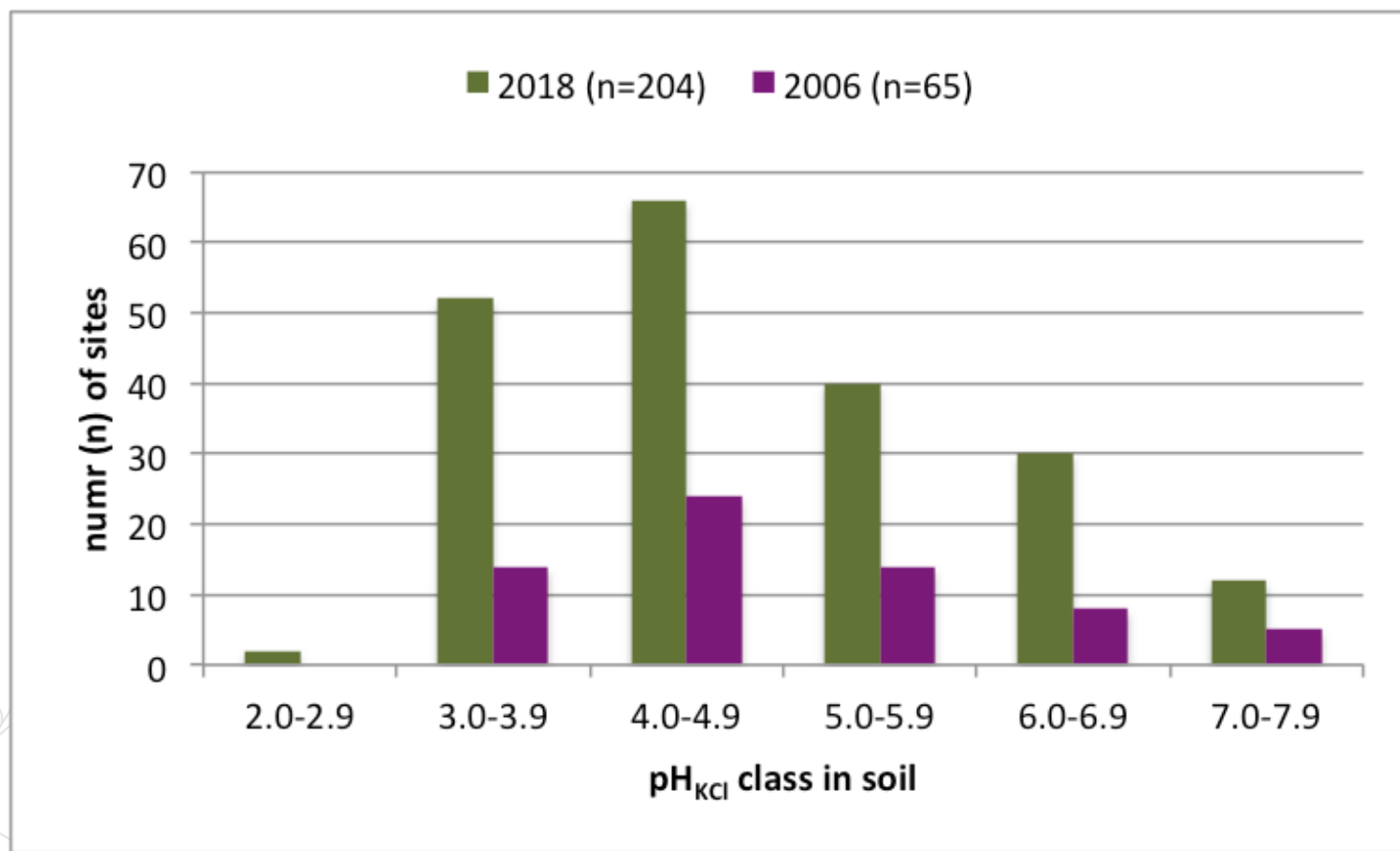


Soil & leaf analysis

- I 1988 – 2006
- II 2010 - 2018
 - soil samples on natural oak mistletoe sites in France
 - ~ 400 oaks (*Q. robur/petraea*) archived since 1949
 - A-horizon (0-25cm)

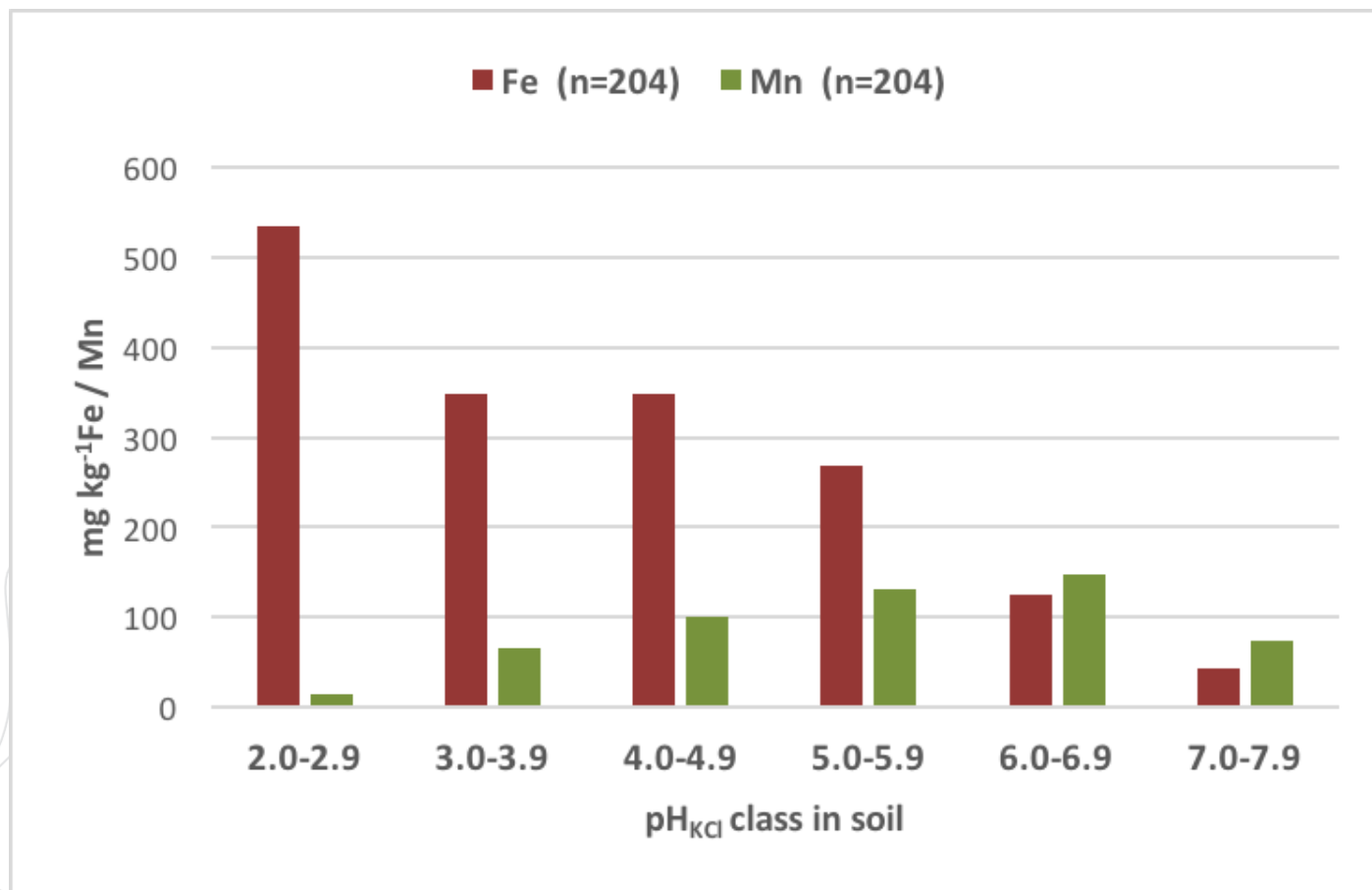


Soil analysis on natural oak mistletoe sites



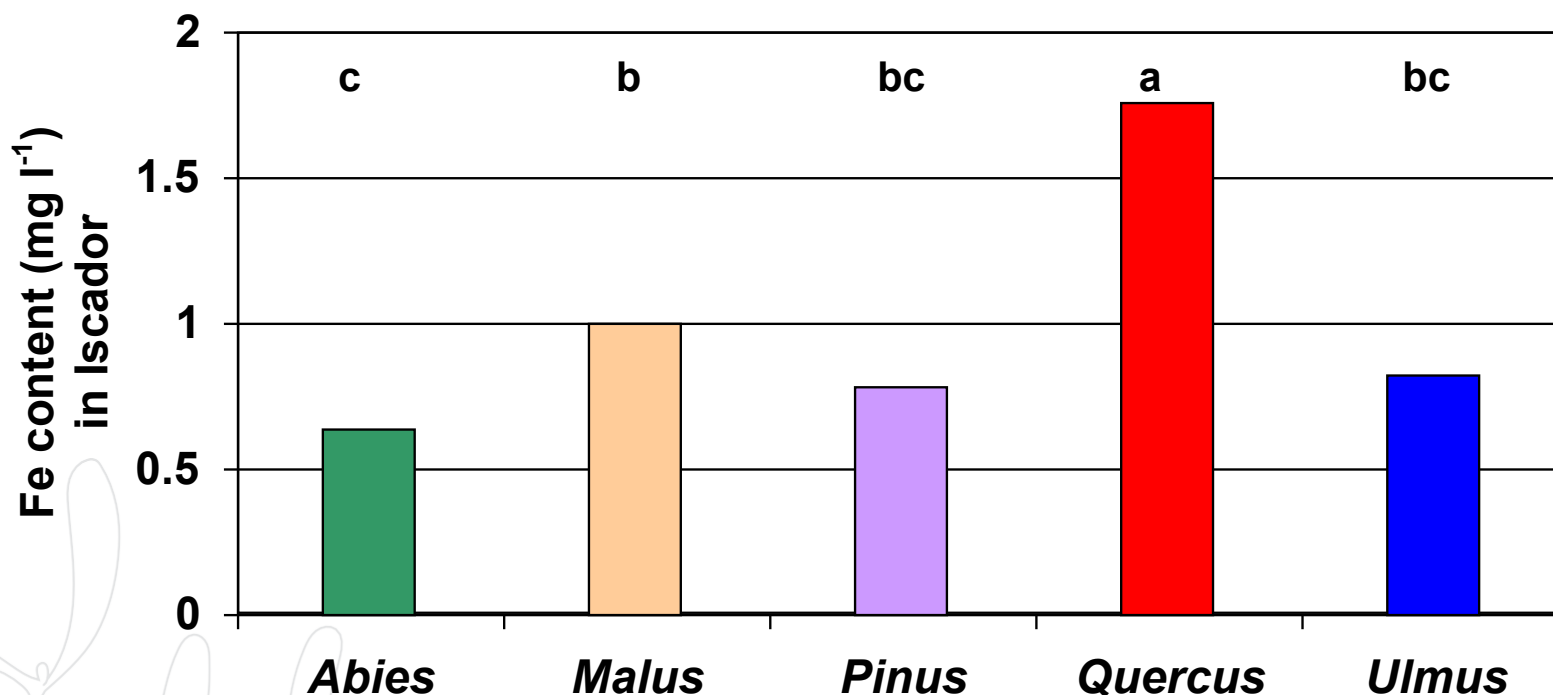
Distribution of natural oak mistletoe sites on soil pH_{KCl} classes

Soil analysis on natural oak mistletoe sites



Medium Fe and Mn content in soil pH_{KCl} classes of natural oak mistletoe sites

Fe content in extracts from *Viscum album* (Iscador®) grown on *Abies*, *Malus*, *Pinus*, *Quercus* and *Ulmus* (n = 5).



Different letters indicate significant ($p < 0.05$) differences between hosts specific extracts.

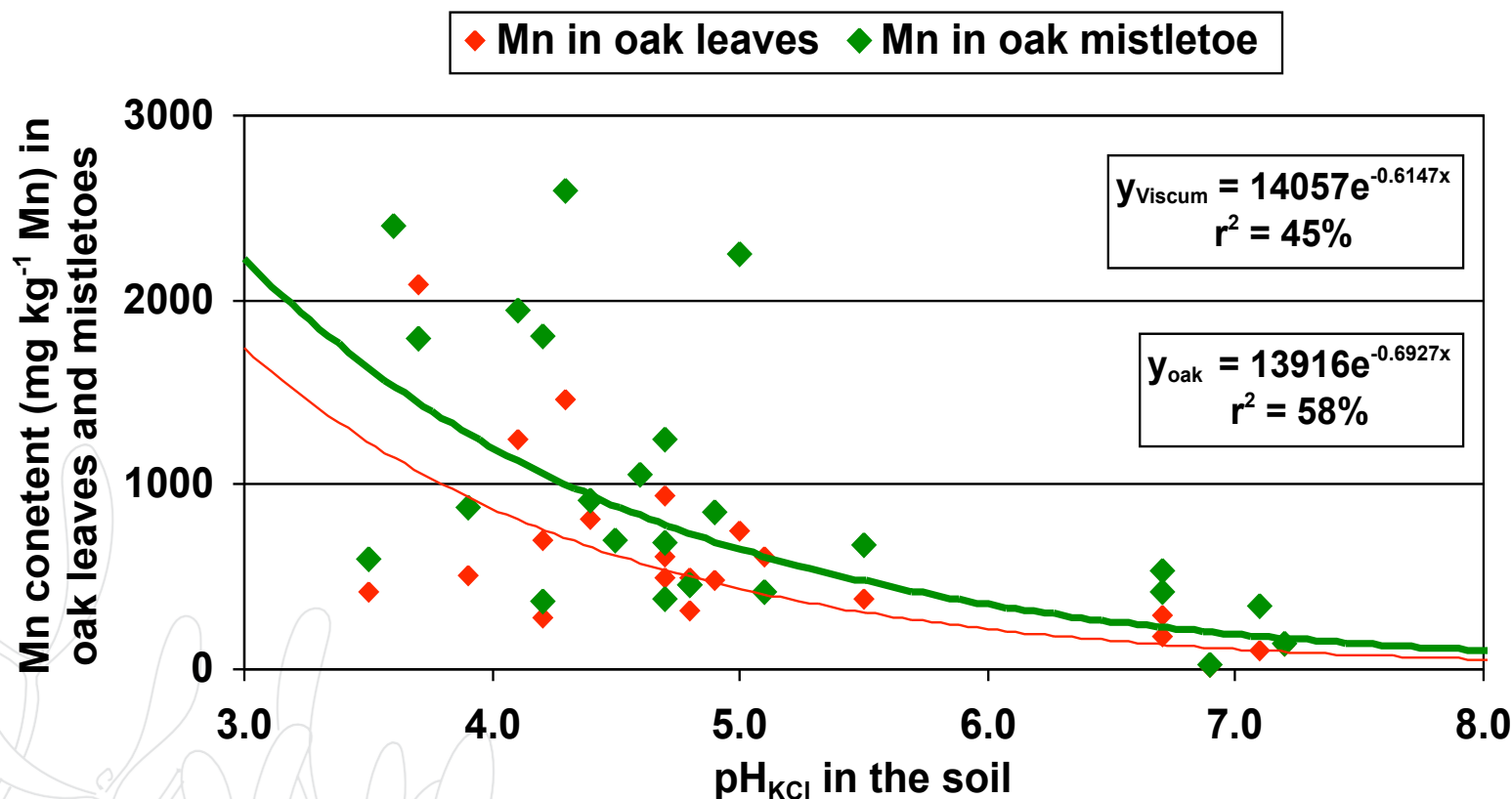
Leaf analysis



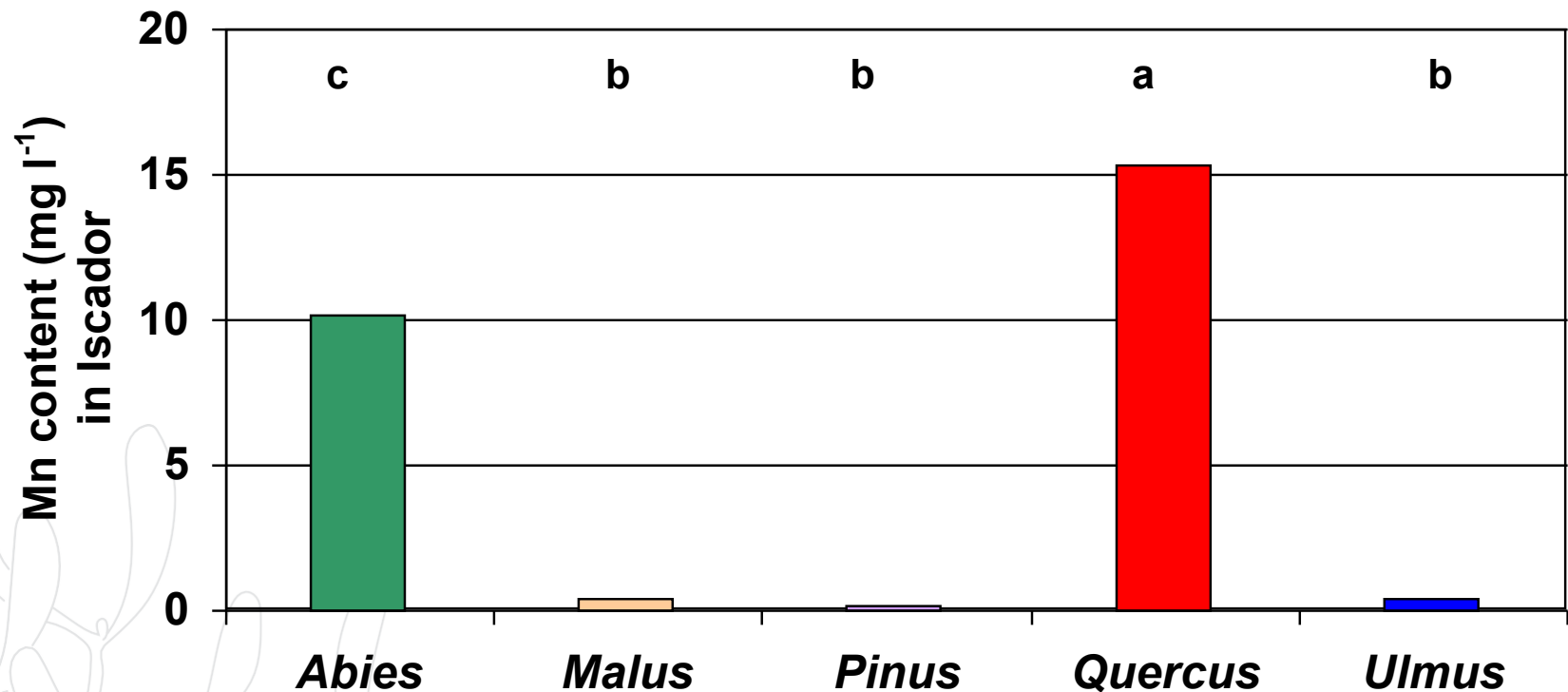
Samples of leaves and mistletoe branches (2-y-old) were taken from natural oak mistletoe sites in France.

Photo: Jürg Buess, VfK

Relationship between the pH_{KCl} in the soil and the Mn content of oak leaves and oak mistletoe twigs on natural oak mistletoe sites

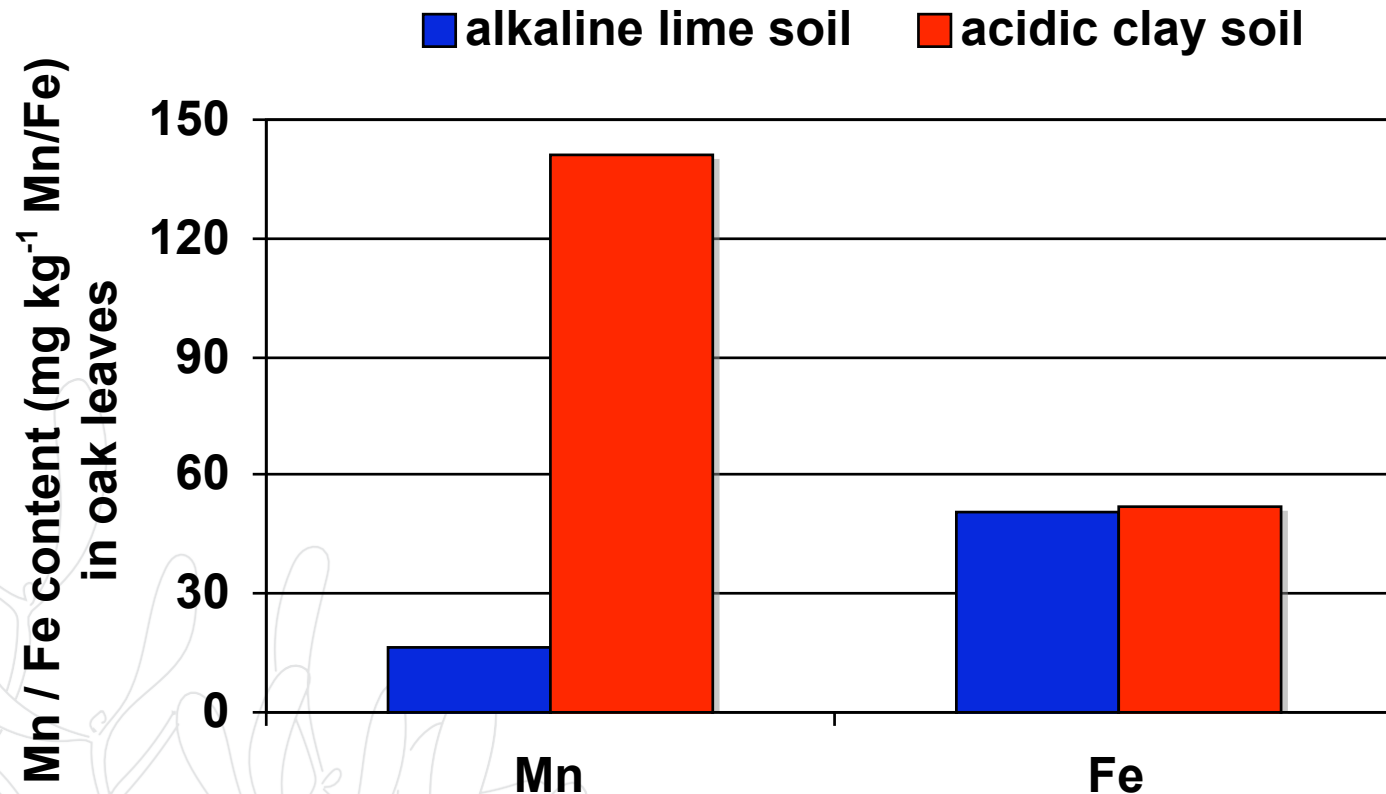


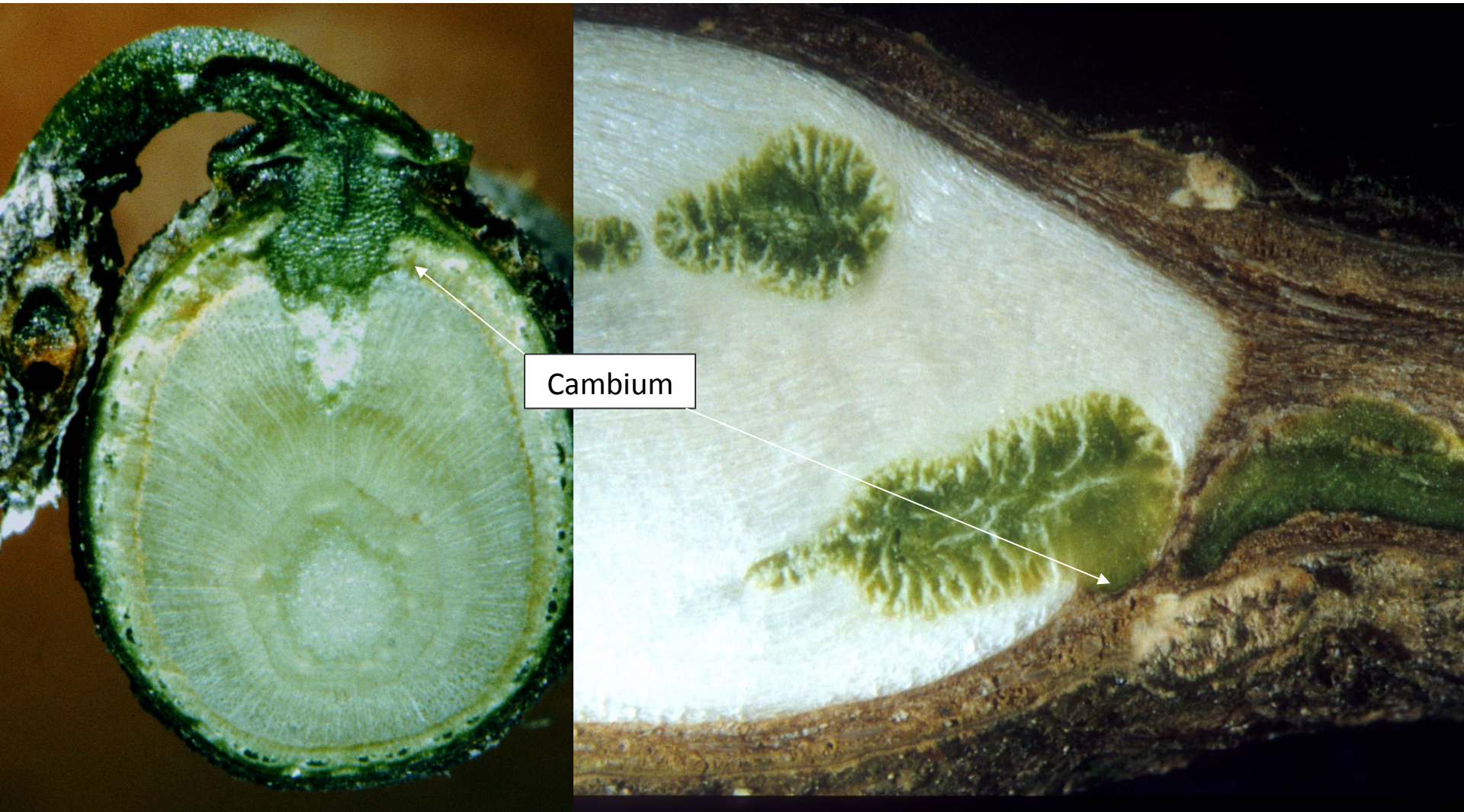
Mn content in extracts from *Viscum album* (Iscador®) grown on *Abies*, *Malus*, *Pinus*, *Quercus* and *Ulmus* (n = 5).



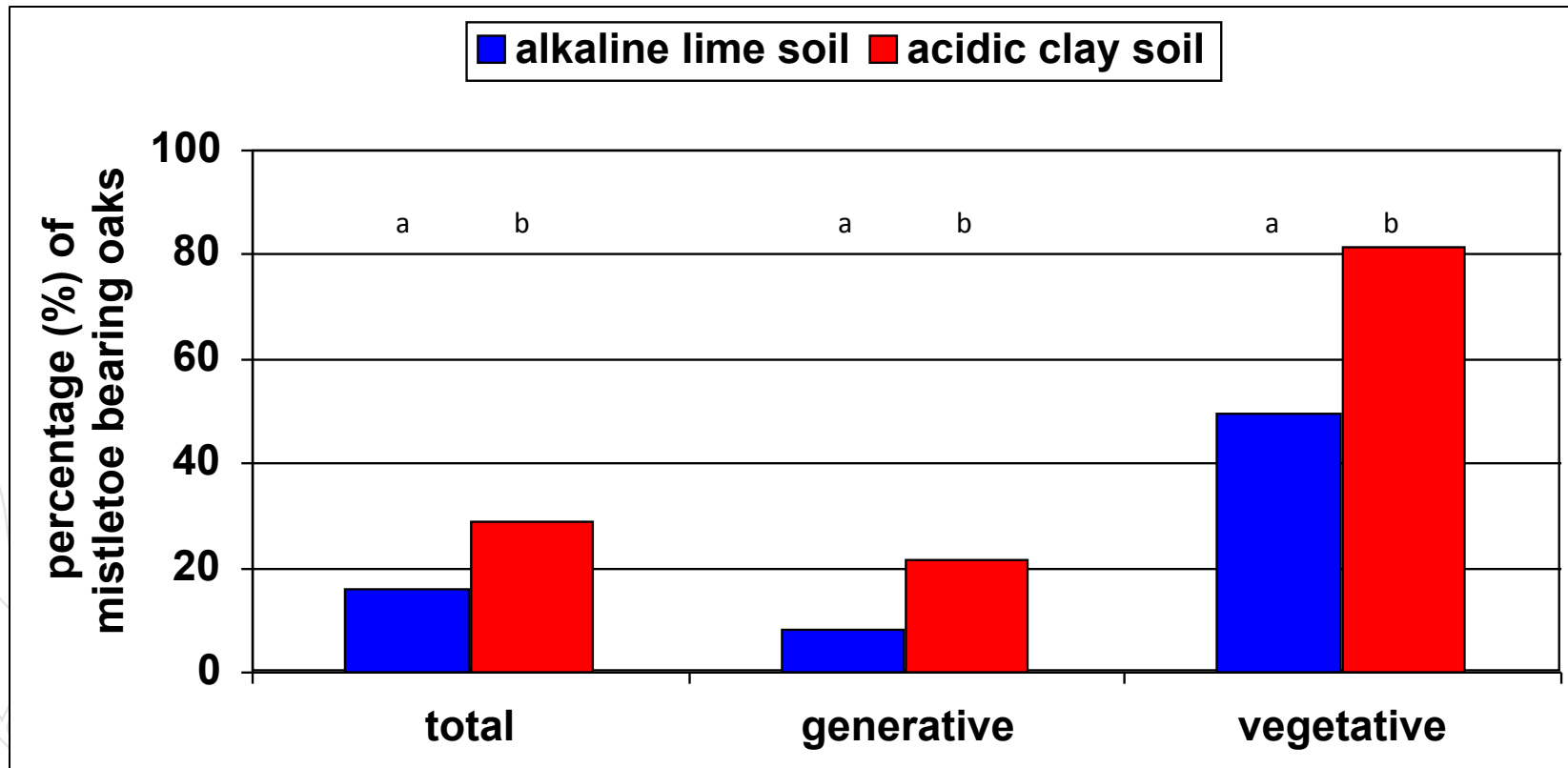
Different letters indicate significant ($p < 0.05$) differences between host-specific extracts.

Mn and Fe content in leaves from oak (*Q. robur/petraea*) grown on an alkaline lime soil and an acidic clay soil on cultivated oak mistletoe sites in Switzerland (n = 5 / 5)





Mistletoe bearing oaks from generative & vegetative reproduction on cultivated oak mistletoe sites with alkaline and acidic soils



Different letters indicate significant ($p < 0.05$) differences between alkaline and acidic soils.

Sowing of mistletoe on oak



Cultivated mistletoe-bearing oak



Harvest of oak mistletoe



Clinical Study

Oak mistletoe & Pancreatic Cancer

European Journal of Cancer (2013) 49, 3788–3797



Available at www.sciencedirect.com

SciVerse ScienceDirect

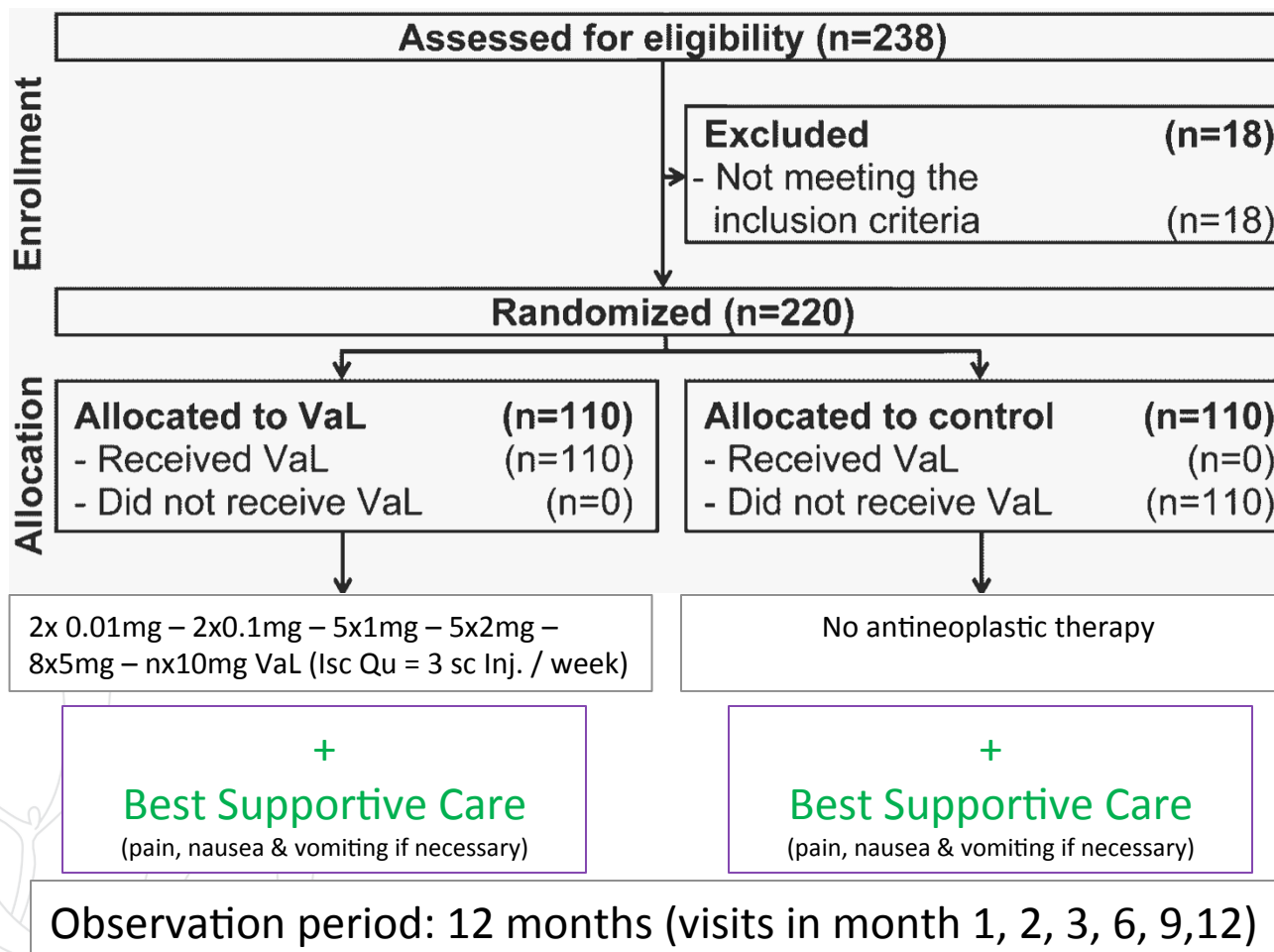
journal homepage: www.ejcancer.com



Viscum album [L.] extract therapy in patients with locally advanced or metastatic pancreatic cancer: A randomised clinical trial on overall survival ☆

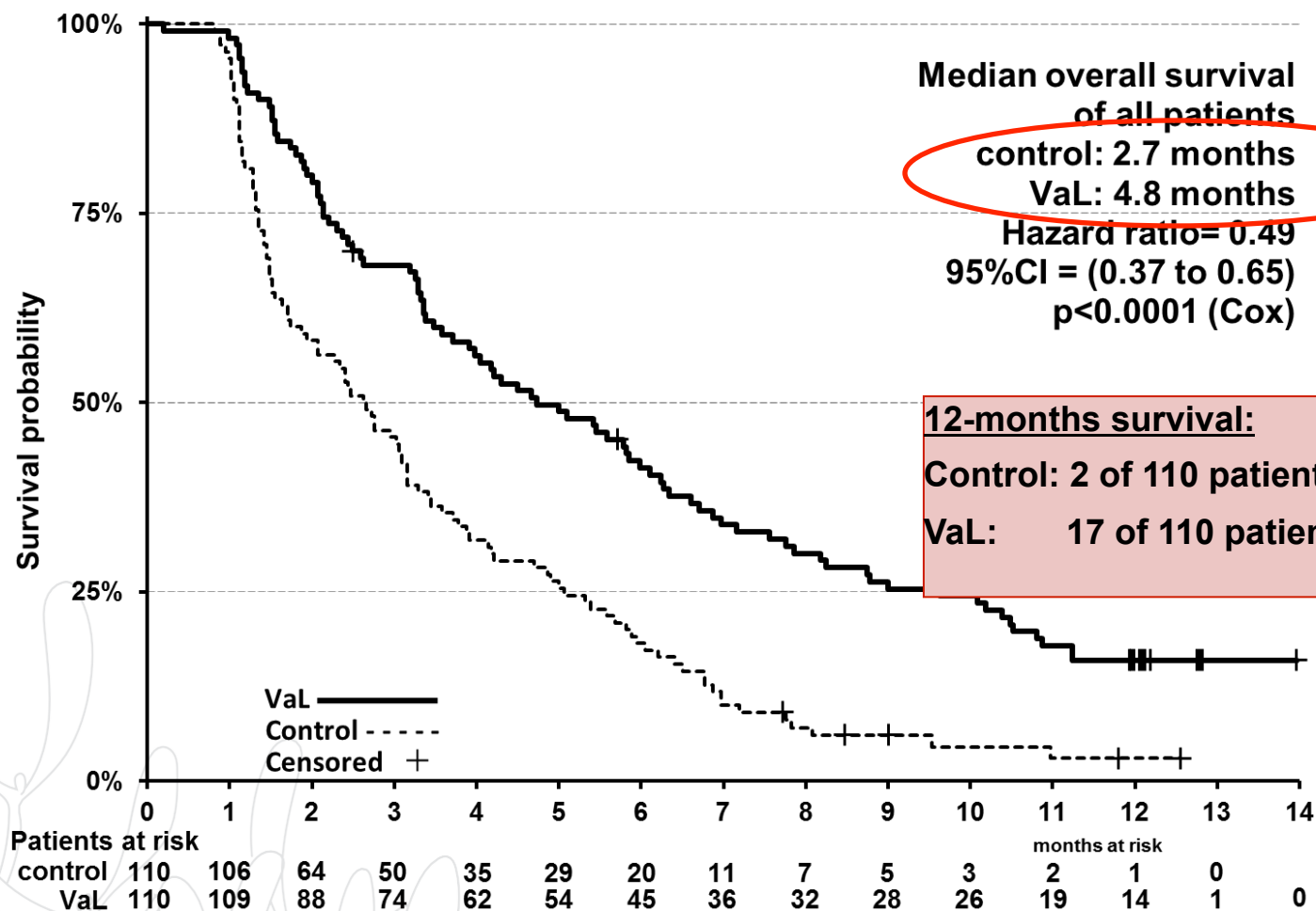
W. Tröger^{a,*}, D. Galun^b, M. Reif^c, A. Schumann^c, N. Stanković^d, M. Milićević^{b,e}

Randomisation and Application of VaL*

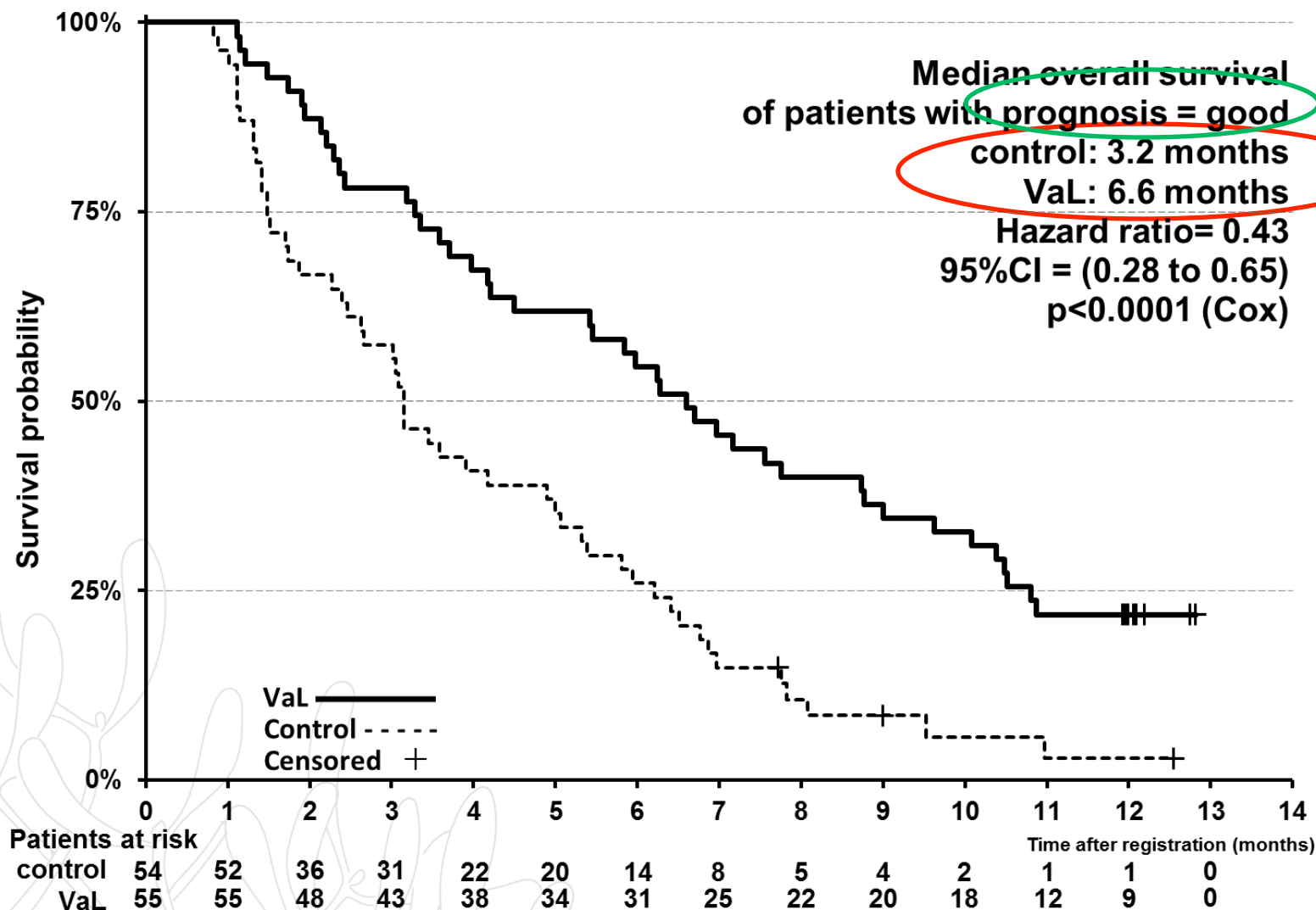


* *Viscum album* L extract

Median overall survival (all patients)



Median overall survival (good prognosis)



Quality of Life & Clinical data (EORTC* QLQ-C30Q)

Dtsch Arztebl Int. 2014 Jul 21;111(29-30):493-502, 33 p following 502. doi: 10.3238/arztebl.2014.0493.

Quality of life of patients with advanced pancreatic cancer during treatment with mistletoe: a randomized controlled trial.

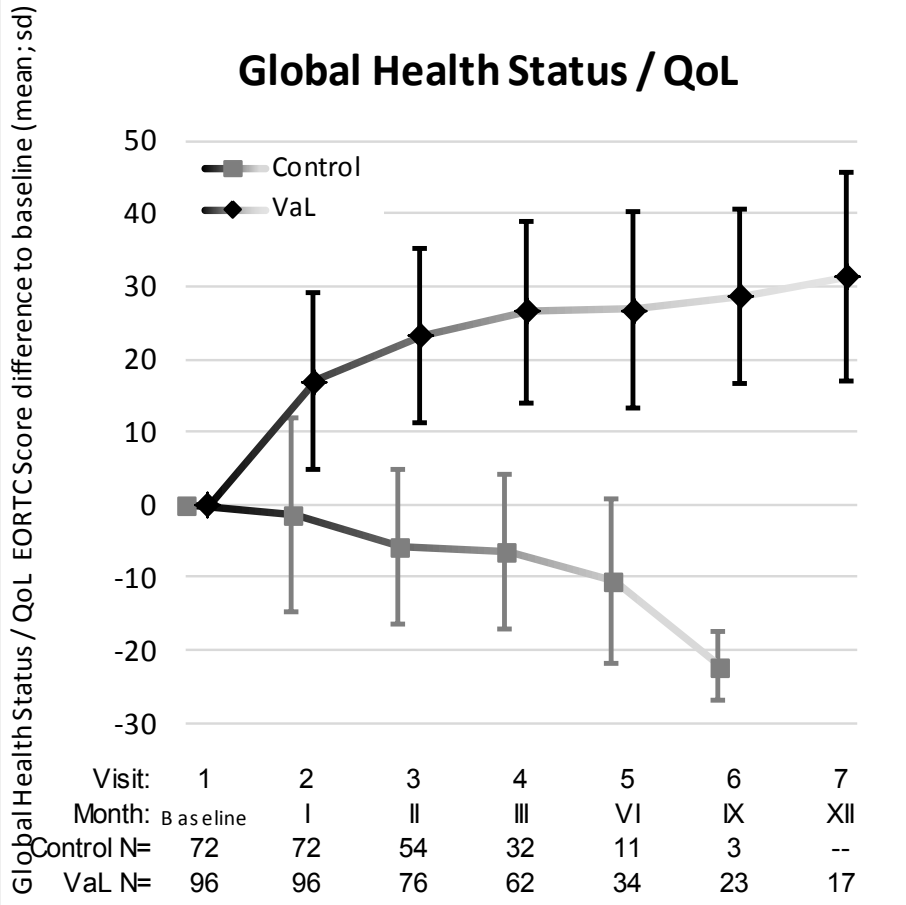
Tröger W¹, Galun D², Reif M³, Schumann A³, Stanković N⁴, Miličević M⁵.



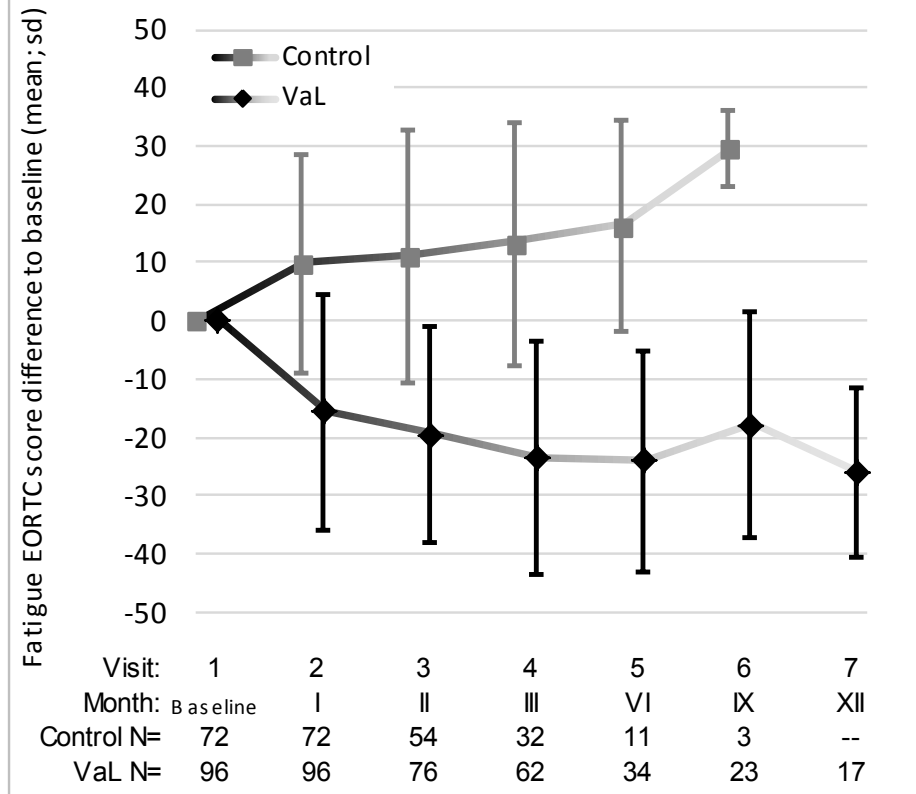
*EORTC = European Organisation for Research and Treatment of Cancer

Quality of Life & Clinical data

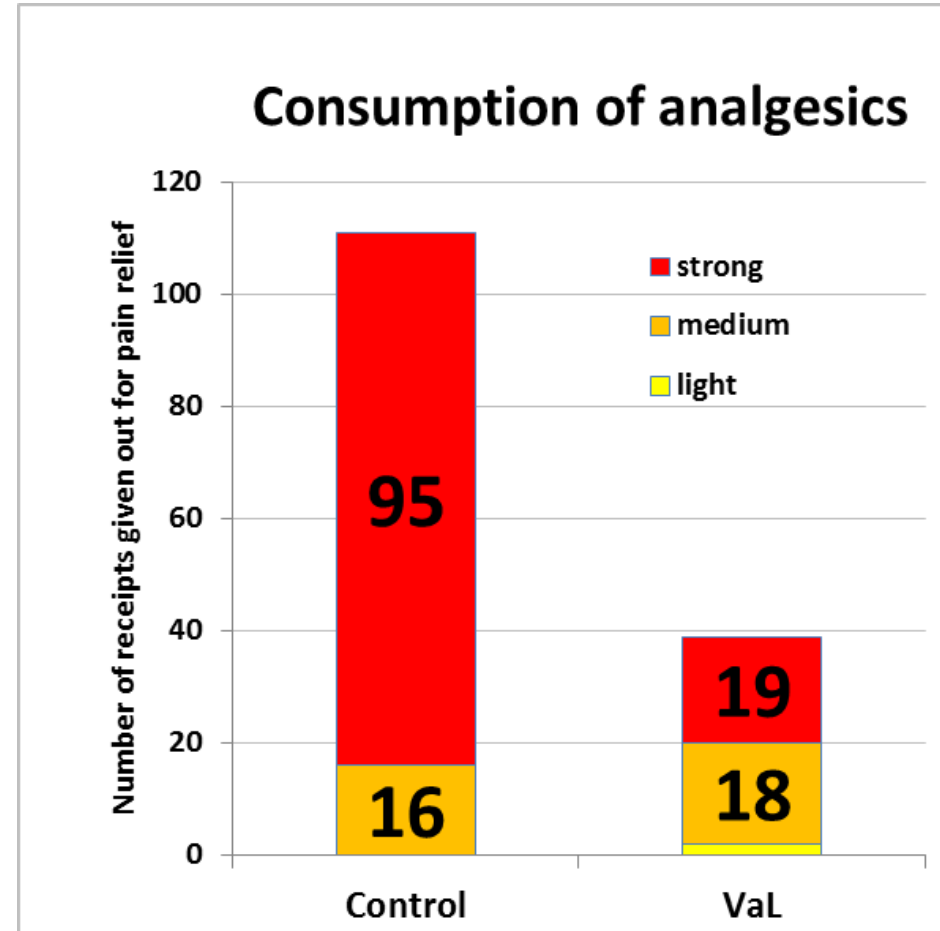
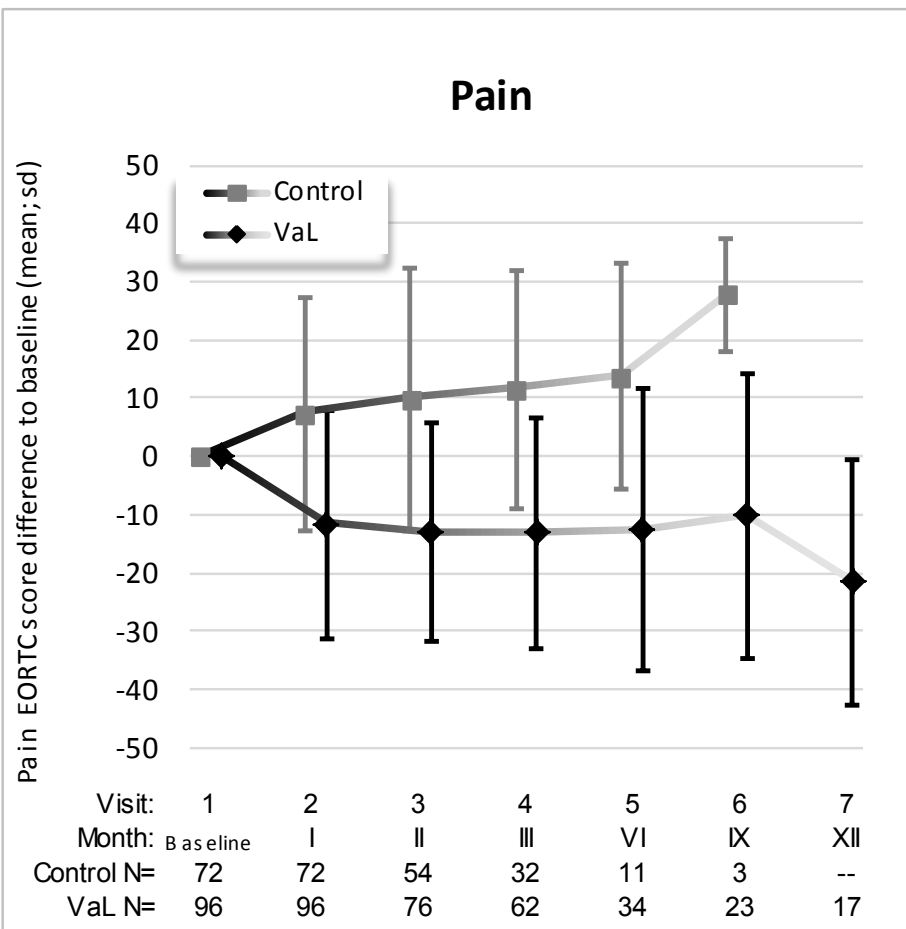
Global Health Status / QoL



Fatigue

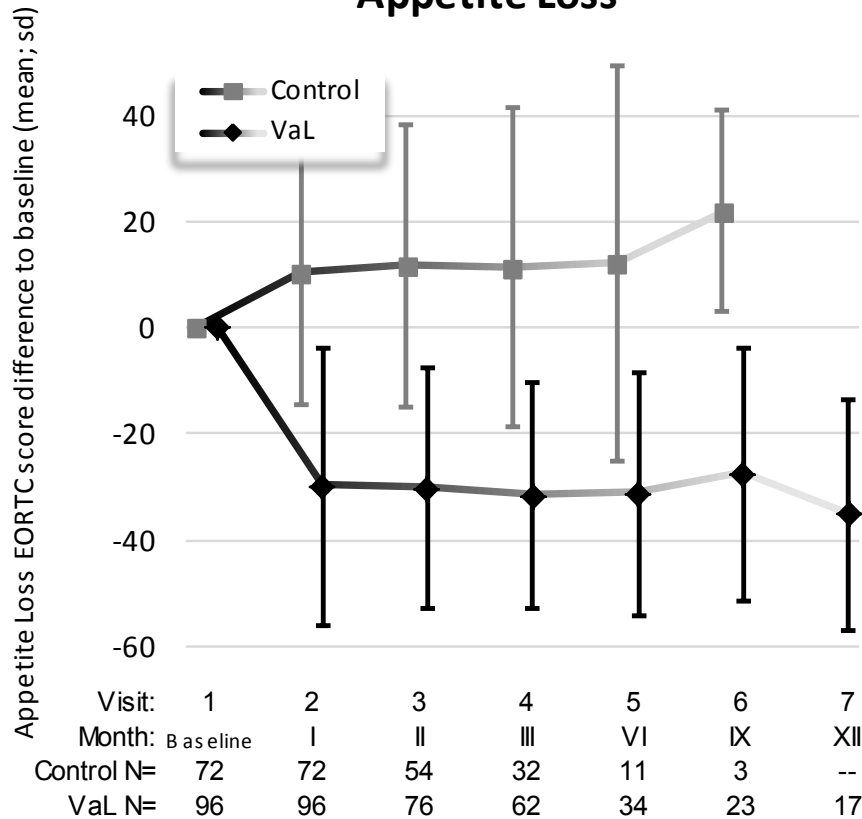


Quality of Life & Clinical data

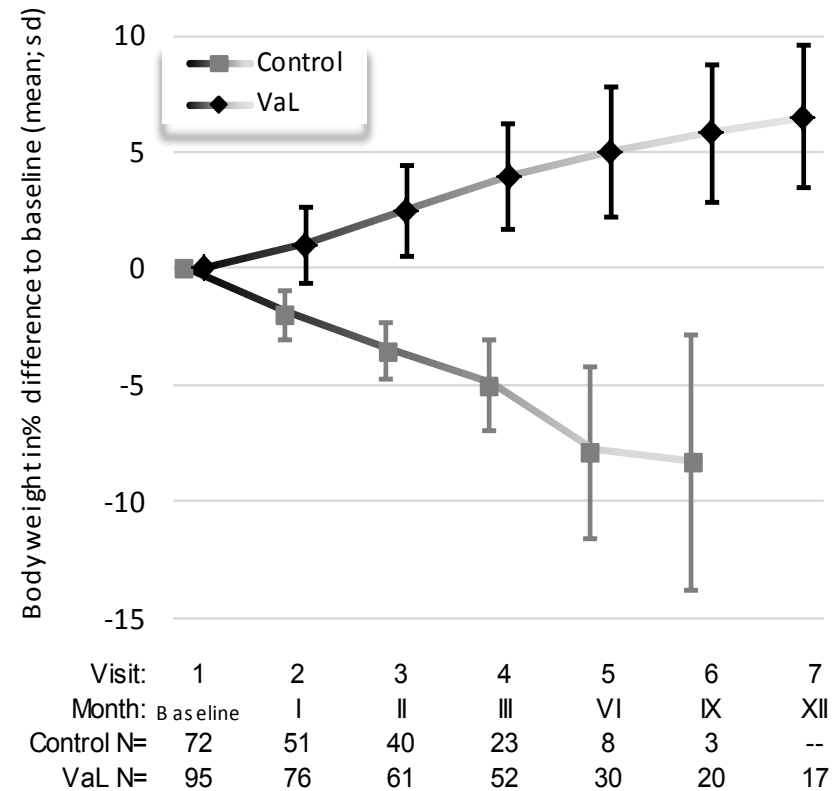


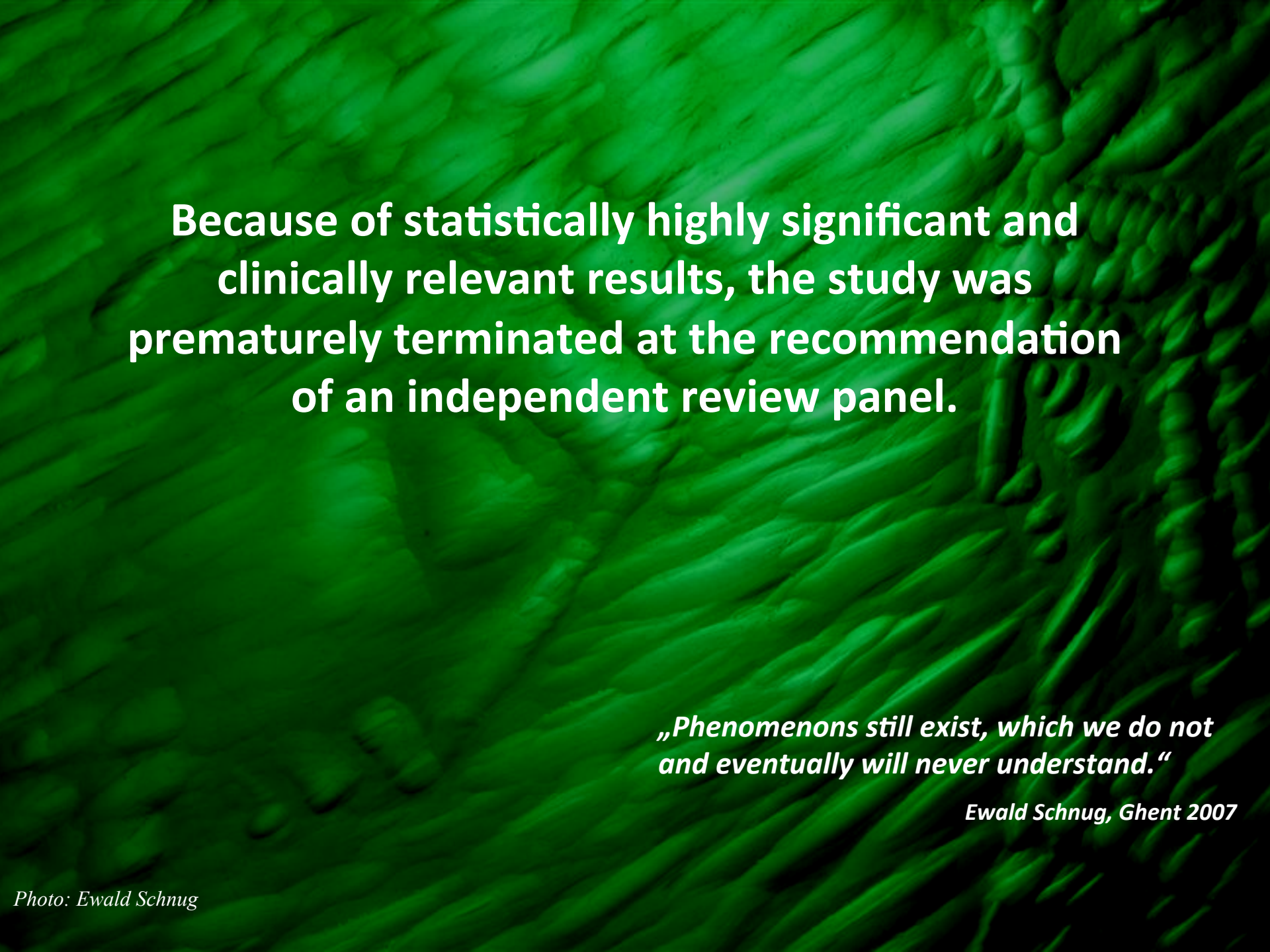
Quality of Life & Clinical data

Appetite Loss



Body weight





Because of statistically highly significant and clinically relevant results, the study was prematurely terminated at the recommendation of an independent review panel.

„Phenomenons still exist, which we do not and eventually will never understand.“

Ewald Schnug, Ghent 2007

Thank you,



Ewald!

Photo: Ewald Schnug