

Winter-Harvest: Organic Vegetable Production in Unheated Greenhouses in Central Europe

Wolfgang Palme*, Elfriede Stopper**

* Horticultural College and Research Institute, Schoenbrunn, Gruenbergstr. 24, A-1130 Vienna, Austria; w.palme@gartenbau.at

** BioAustria. (Austrian Organic Farmers Association), Theresianumgasse 11 A-1040 Vienna, Austria

Introduction:

During winter time many greenhouses and polytunnels in Central Europe stay unused. Alternatively they are heated with fossil fuels which means high input of unsustainable energy. Imports from southern countries meet demand of fresh vegetables during that time.

In this project a new cultivation system for harvesting leafy vegetables during winter without additional heating was developed by organic growers together with researchers and advisers in Austria.

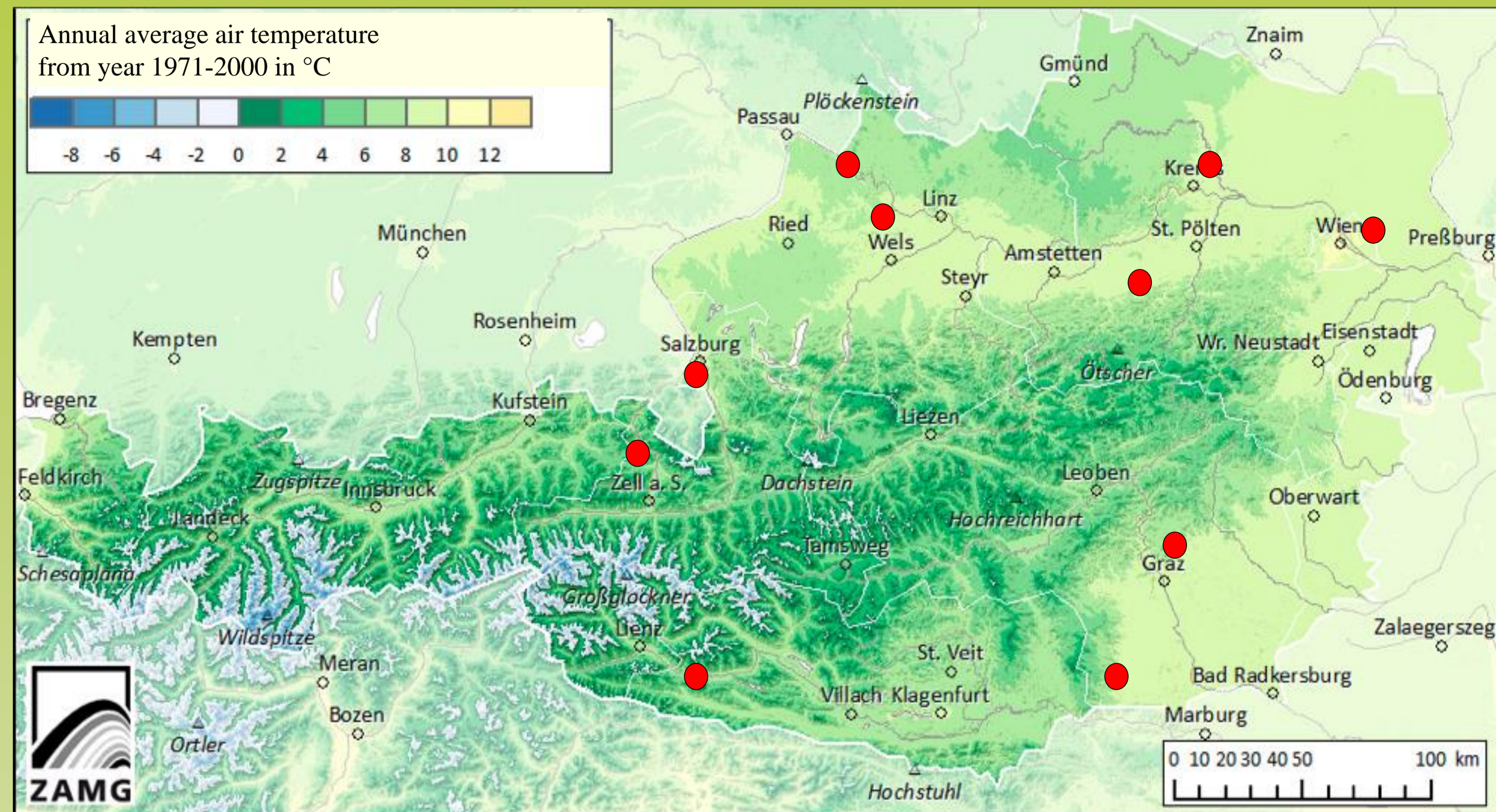


Figure 1: Growing sites all over Austria from alpine to pannonic climate during the Winter Harvest Project in 2014/15 (Zentralanstalt für Meteorologie und Geodynamik:ZAMG)

Material and methods:

Winter is defined as the time between November and end of March. More than 100 different vegetable species and cultivars were tested on their frosthardeness. Sowing-planting-harvesting tables were compiled using these data from practical experiments on-farm and in research stations.

Extensive nitrate analyses were done on 260 samples of different vegetable groups.

Category	Frost hardy Vegetable Crops
Lettuces	Butterhead, Iceberg, Romaine, Babyleaf, Multileaf, Stem type, Crisp type
Endives & Chicories	Escarole, Curly endive, Sugarloaf, Radicchio, Witloof, Catalogna, Leafy Types
Salads	Oriental leaves, Corn Salad, Arugula, Claytonia, Winter Cress, Garden Cress, Water Cress, Sorrel, Minutina, Garland Chrysanthemum
Herbs	Parsley, Cutting Celery, Chervil, Coriander, Chives, Thyme, Oregano
Kales & Cabbages	White/Red Cabbage, Savoy Cabbage, Cone Cabbage, Curly Kale, Tuscan Kale, Collards, Ornamental Kales, Brussels Sprouts, Cauliflower, Broccoli, Kohlrabi, Chinese Cabbage, Bok Choy
Spinaches	Spinach, Swiss Chard
Roots & Tubers	Carrot, Celeriac, Beetroot, Parsnip, Root Parsley, Radish, Turnip, Rutabaga, Jerusalem artichoke, chufa sedge, Chinese artichoke, skirret
Leek & Onions	Onion, Shallot, Scallions, Welsh Onion, Leek, Green Garlic, Chinese chives
Wild Herbs	Chickweed, Wild Garlic, Dandelion, Salad Burnet
Others	Stridolo, Pea Shots

Table 1: Categories and species of frost hardy winter vegetables

In the nitrate analyses none of the samples exceeded critical legal limits.



Resumee and Outlook:

A big diversity of leafy vegetables are well suitable for winter harvest without heating in Central Europe.

This new low-energy-production system can be recommended to organic vegetable farmers who want to market climate neutral produce with a low ecological footprint.

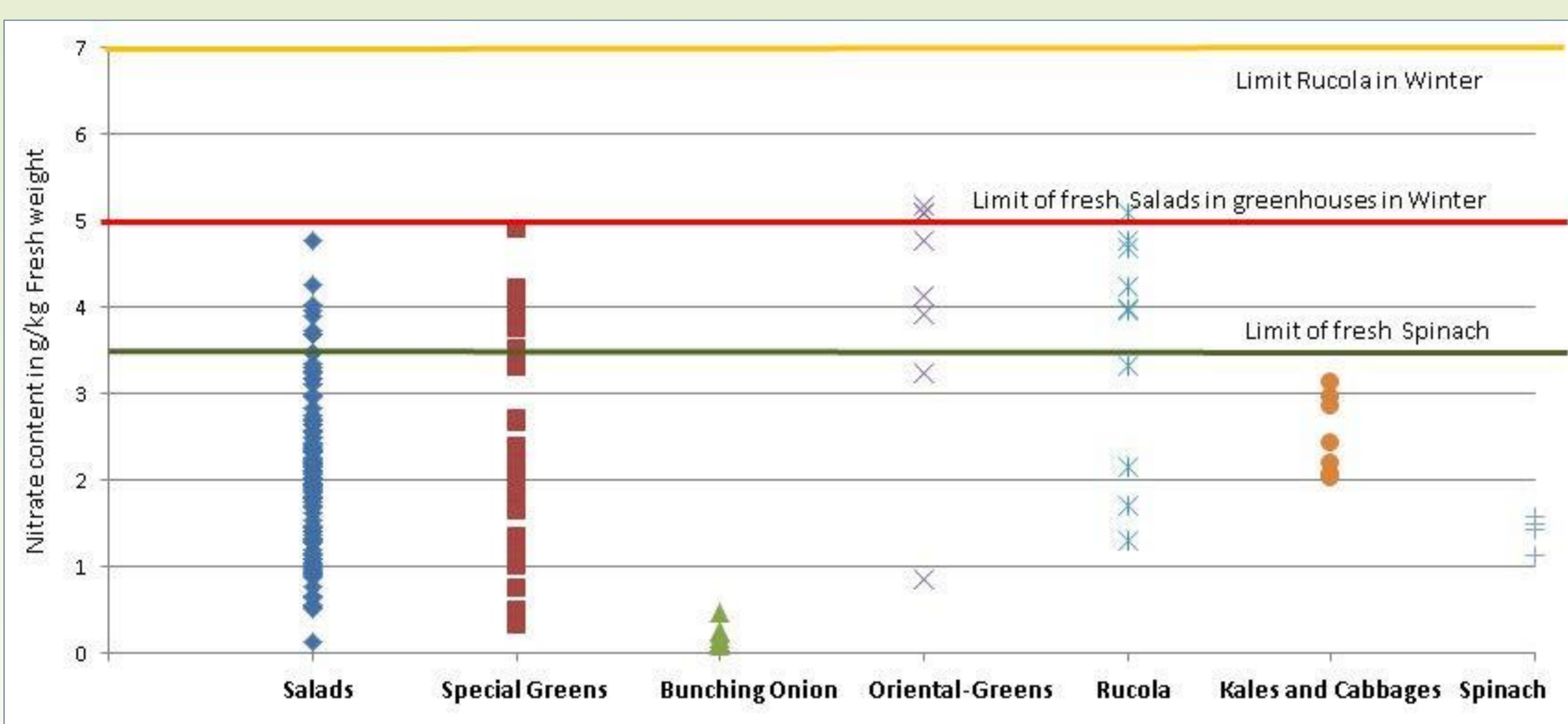


Figure 2: Nitrate content in g/kg fresh weight in different winter vegetables (n= 260)

Results:

Lettuces, salad herbs and many other leafy vegetables were much more frost hardy than supposed. New data of frost hardiness could be collected about these important vegetables.



MINISTERIUM
FÜR EIN
LEBENSWEERTES
ÖSTERREICH

HBLFA GARTENBAU
SCHÖNBRUNN