



# Variation in the number of stomata in potato cultivars versus drought resistance

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## Introduction

Under global climate change, drought tolerance is supposed to become more important for gaining stable yields in all crop in the future. Since potato plants are not tolerant to drought at present, the enhancement of drought tolerance is an urgent task for potato researchers in the 21st century. Drought-resistant plants developed various strategies that allow them either to escape from drought or avoid. Drought avoidance strategies allow plants to maintain water status by reduced water loss due to lowered transpiration, limited vegetative growth, or increased root growth and water efficiency (WUE) mediated by stomatal and nonstomatal factors in the leaf (Blum, 2011).

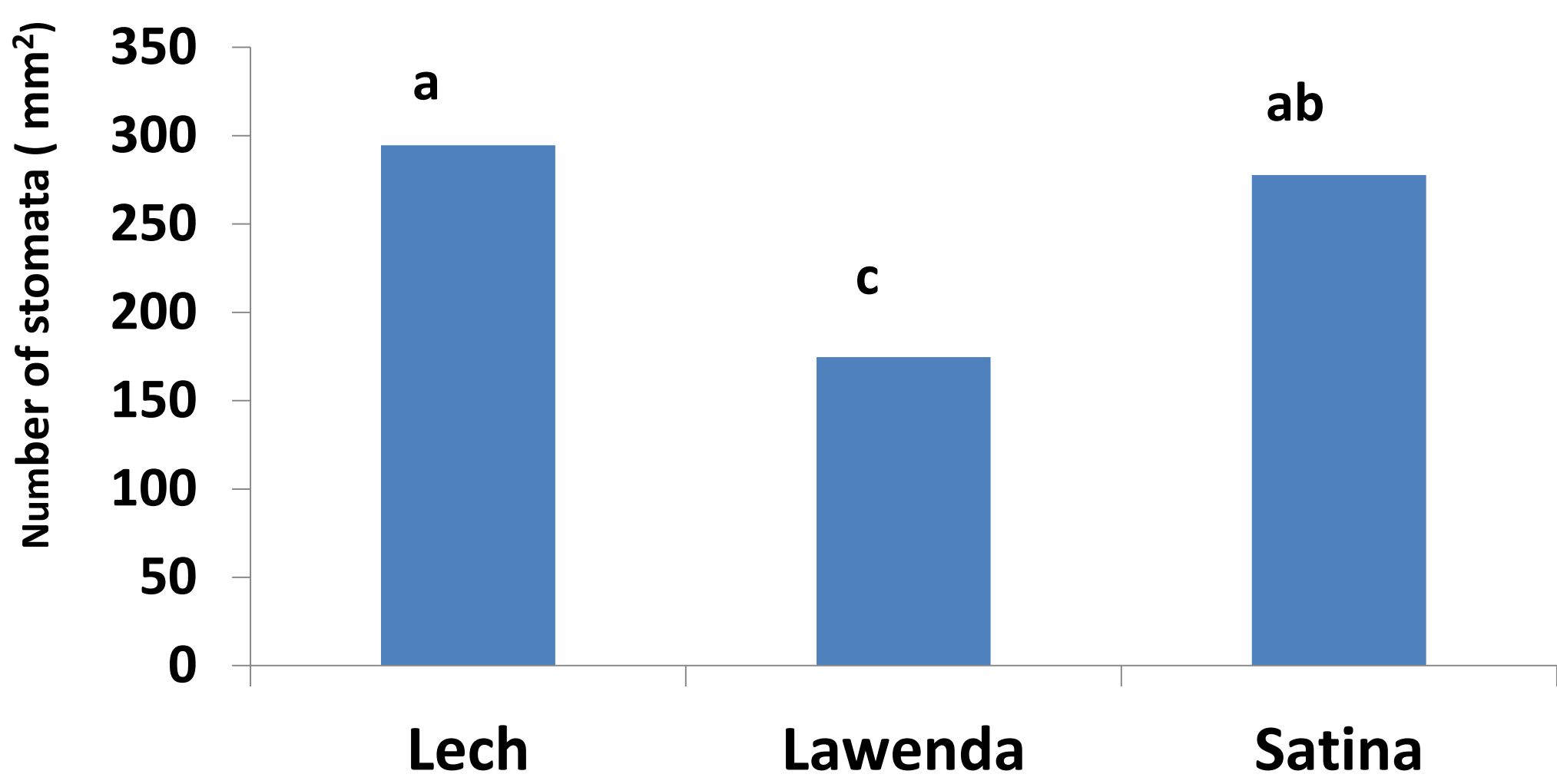
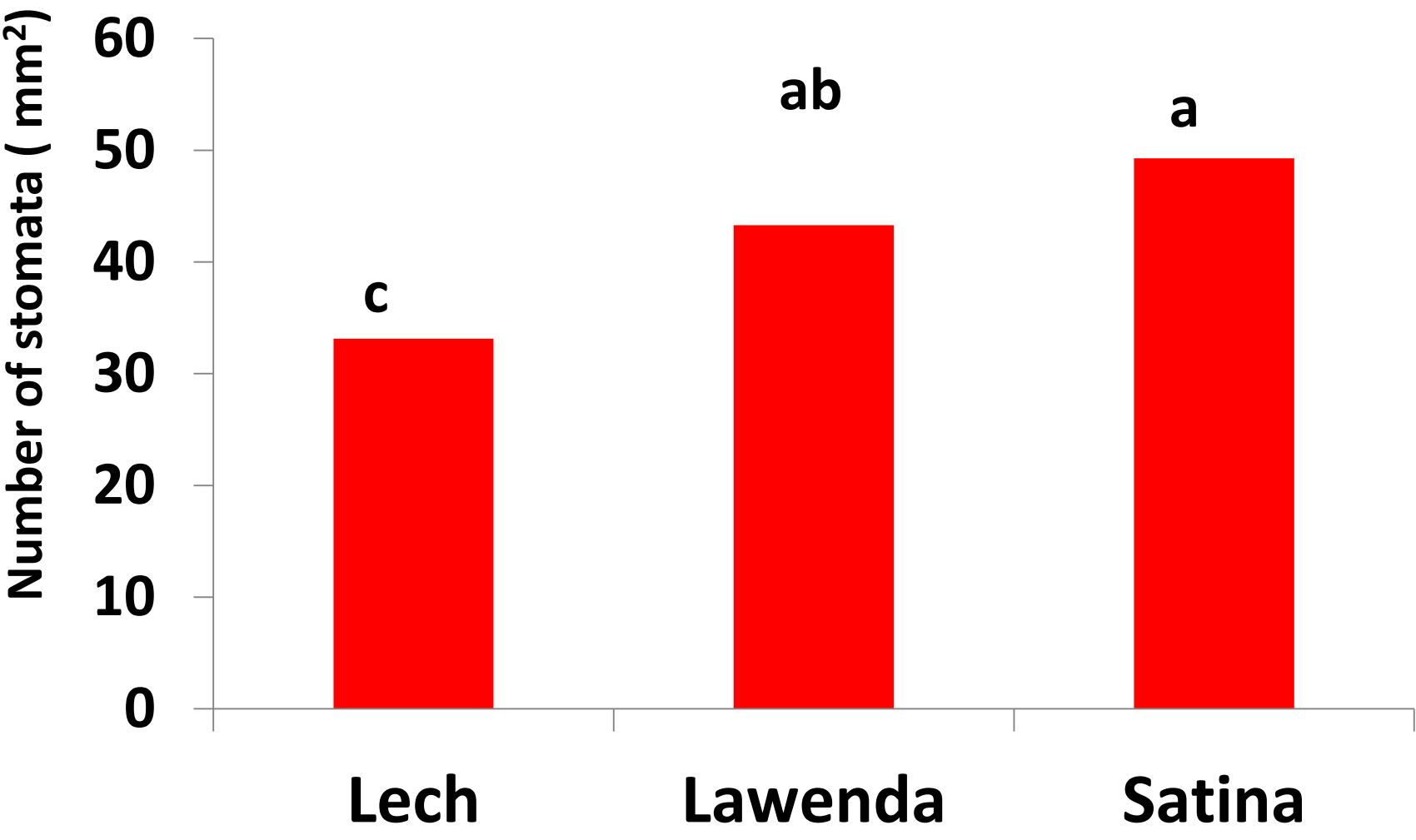
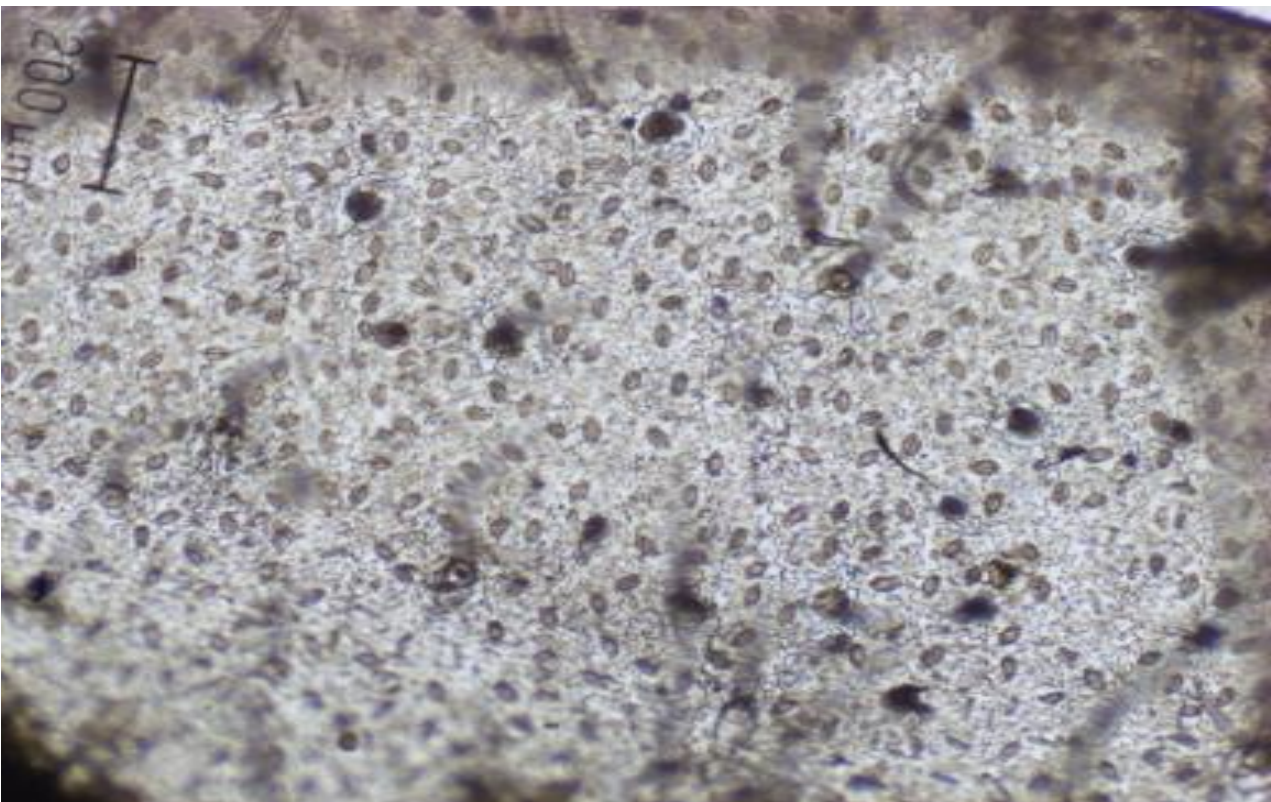
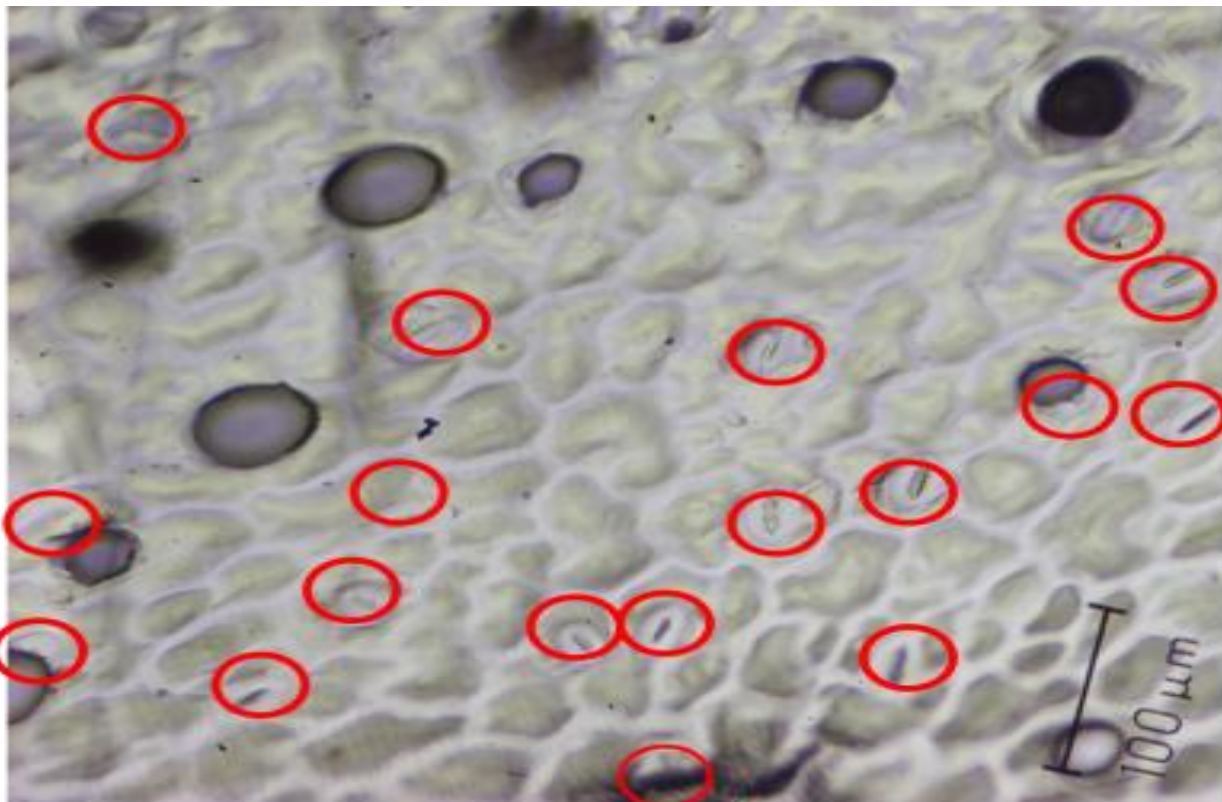


## Material and Methods

Analysis of stomatal densities was performed on the fully developed and mature apical leaves of third and fourth level of potato plants grown under standard conditions. Cleared epidermal peels from the potato abaxial and imprints on transparent nail polish of adaxial leaf surfaces were prepared according to Pei, Kuchitsu, Ward, Schwarz, and Schroeder (1997) and examined on a microscope (Olympus Provis AX70). The stomata counts were taken for seven areas of one leaf and then averaged. Analysis of stomatal densities on the abaxial and adaxial part of the potato leaves was made for three potato varieties differing in tolerance to soil drought: Lech, Lawenda and Satina

## Results

In the conditions of optimal irrigation, the smallest number of stomata on the adaxial part of the potato leaves was observed in the Lech cultivar (33/mm<sup>2</sup>), the largest in the Satina cultivar (49/mm<sup>2</sup>). On the abaxial part of potato leaves the smallest stomata density had cultivar Lavenda (175/mm<sup>2</sup>), the highest cultivar Lech (295/mm<sup>2</sup>). Among the tested cultivars Lech was characterized by the smallest yield loss, Satina the largest.



Variety	Control	Drought	Yield decrease (%)
Lech	1406	957	31,9
Lawenda	1281	799	37,6
Satina	1256	733	41,9

Figure 1.Comparison of the stomata density on the upper (left )and lower (right) surface of the potato leaf of the cultivar: Lech, Lawenda and Satina..

Table 1. Yield (g/plant) of varieties under control and drought conditions and decrease of yield (%)

## Conclusion

The number of stomata on the upper side of the epidermis may be related to the tolerance of varieties to soil drought.

