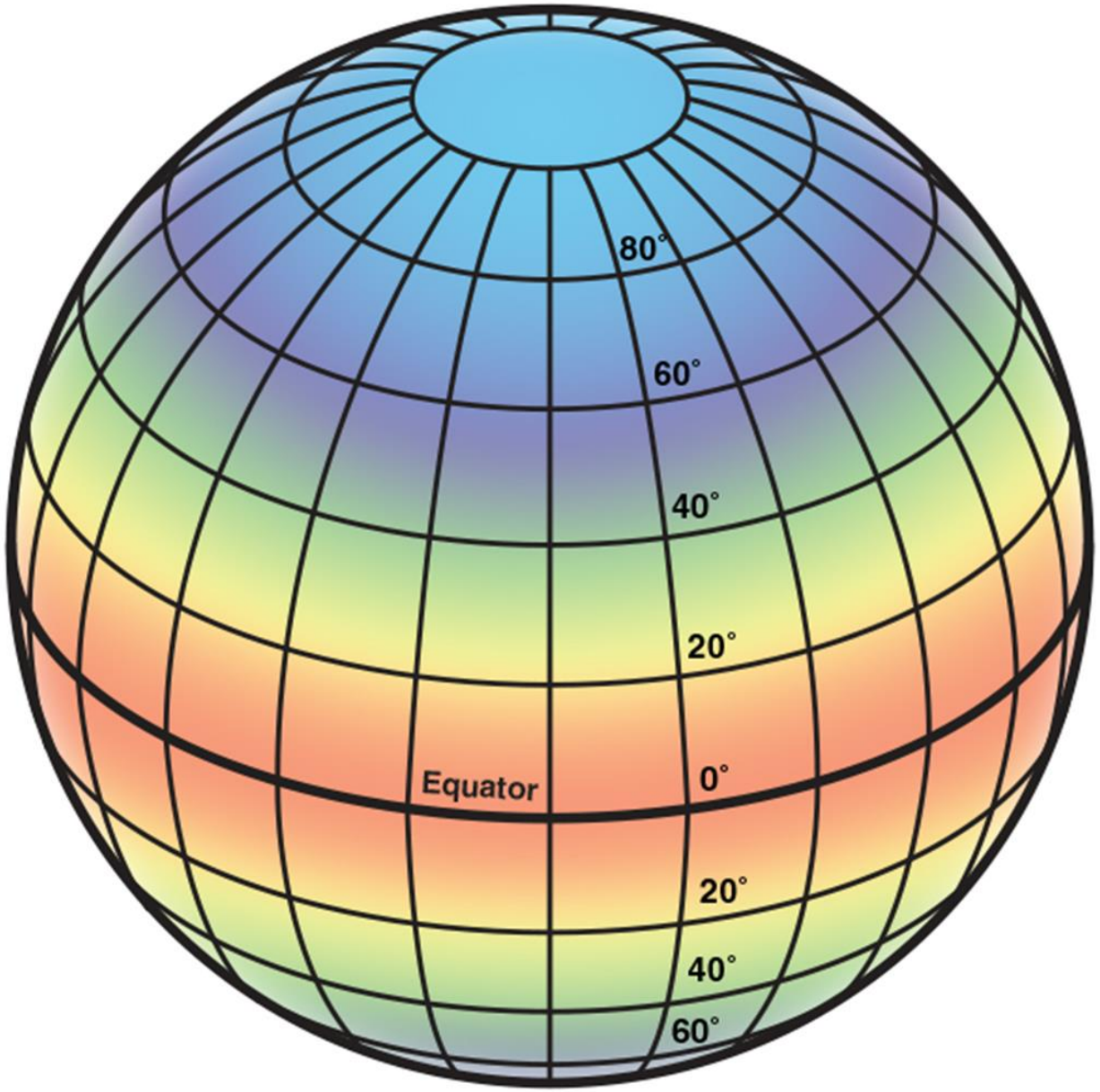
Effects of climate and soil factors on saffron yield and production of daughter corms

R. Gheshm, and R. N. Brown



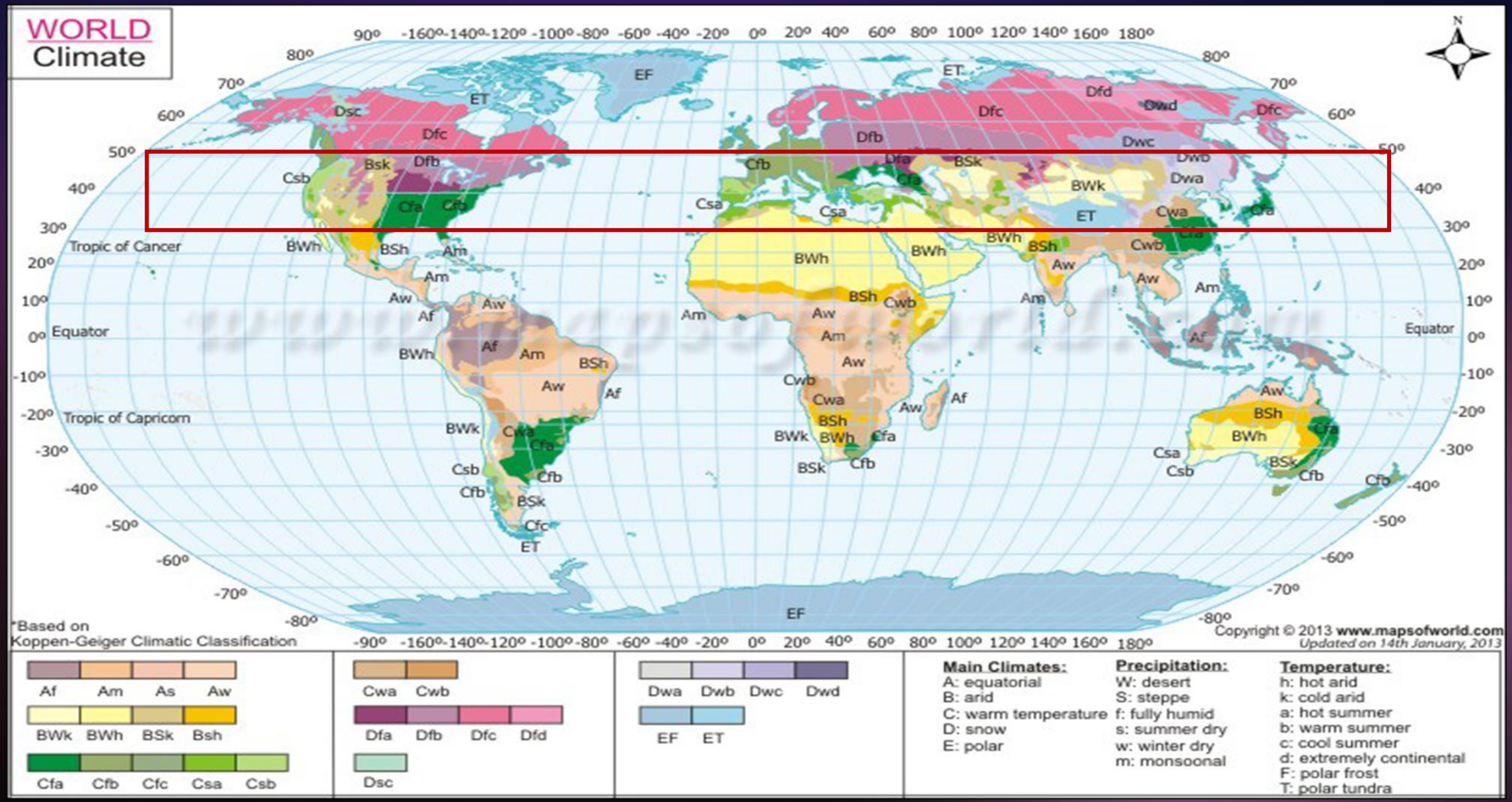
A Tropical

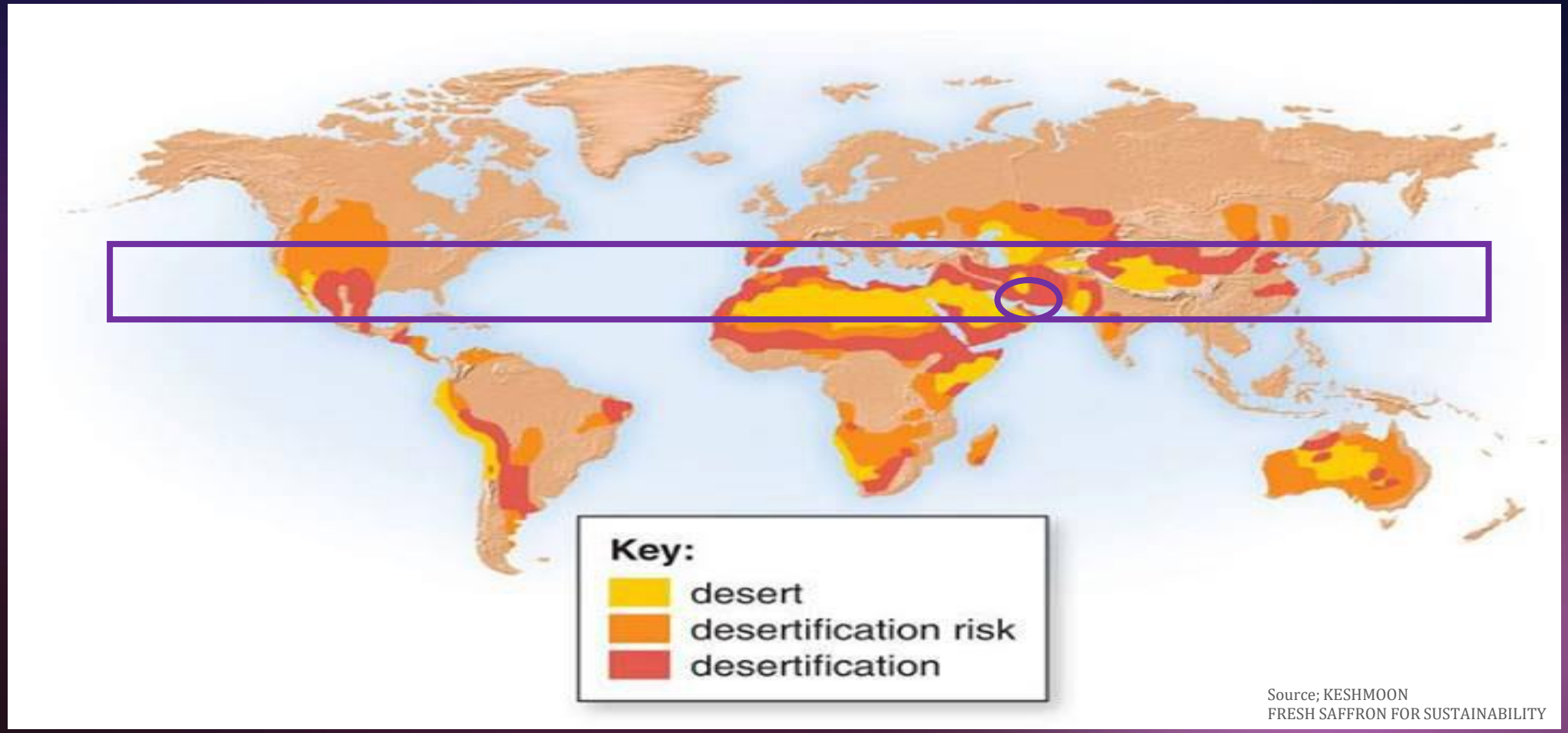
B Dry

C Temperate

D Continental

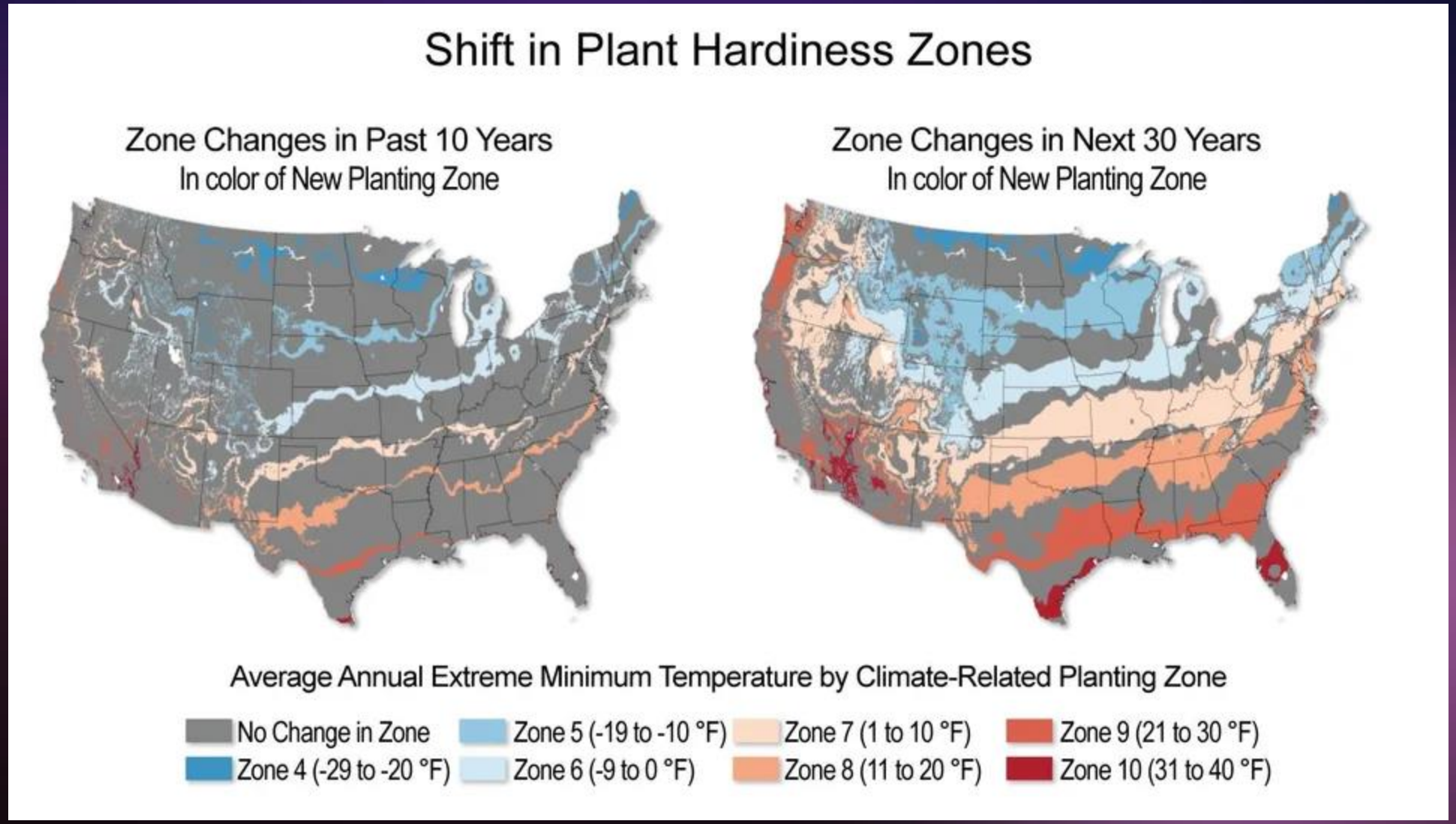
E Polar


WORLD
Climate
Tropic of Cancer
Equator
Tropic of Capricorn
*Based on
Koppen-Geiger Climatic Classification
Copyright © 2013 www.mapsofworld.com
Updated on 14th January, 2013
Af Am As Aw
BWk BWh BSk Bsh
Cfa Cfb Cfc Csa Csb
Cwa Cwb
Dfa Dfb Dfc Dfd
Dsc
Dwa Dwb Dwc Dwd
EF ET
Main Climates:
A: equatorial
B: arid
C: warm temperature
D: snow
E: polar
Precipitation:
W: desert
S: steppe
f: fully humid
s: summer dry
w: winter dry
m: monsoonal
Temperature:
h: hot arid
k: cold arid
a: hot summer
b: warm summer
c: cool summer
d: extremely continental
F: polar frost
T: polar tundra



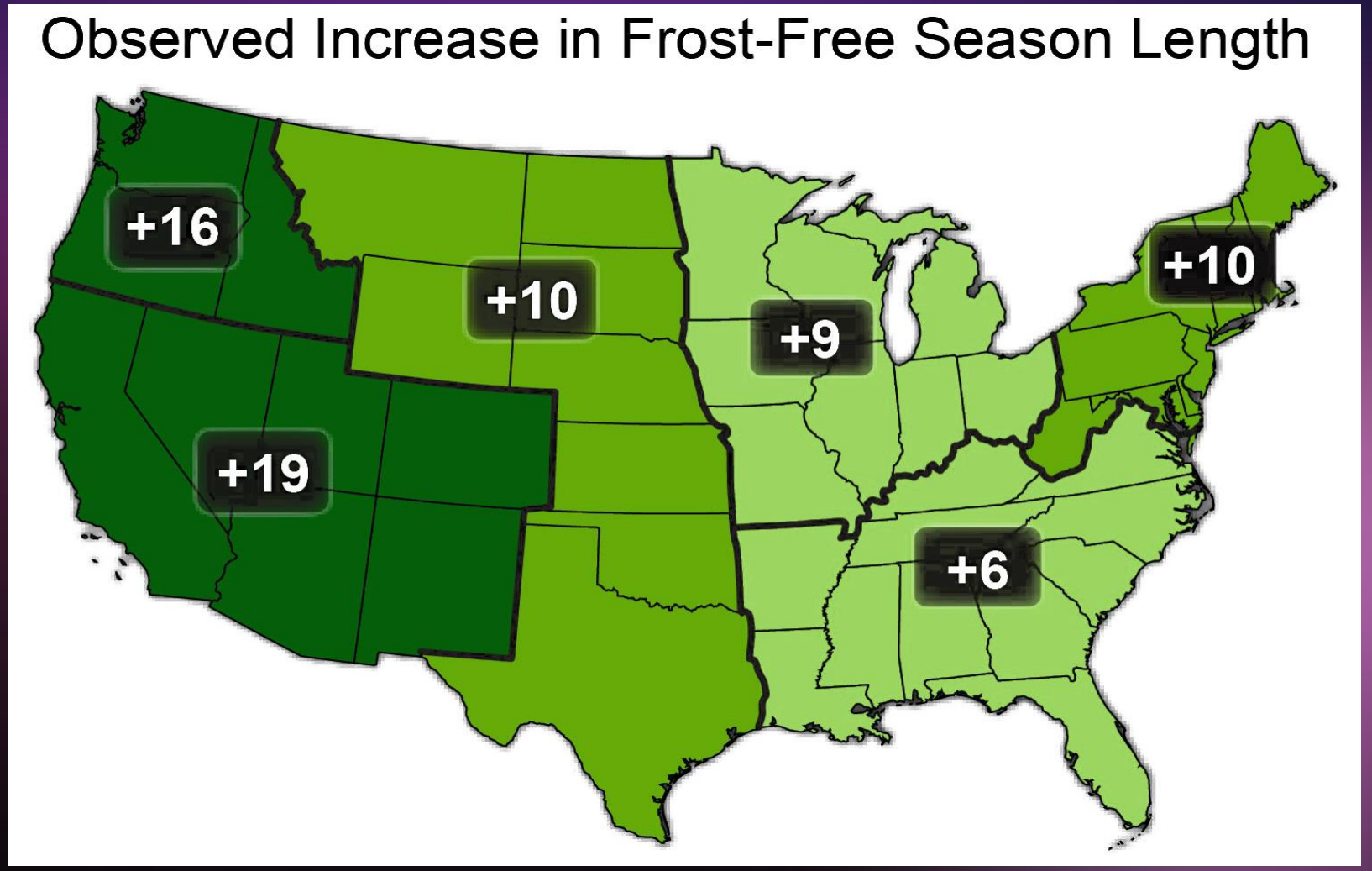
Source; KESHMOON
FRESH SAFFRON FOR SUSTAINABILITY

Desertification is happening all around the world and over Iran including Khorasan region as a biggest producer of Saffron

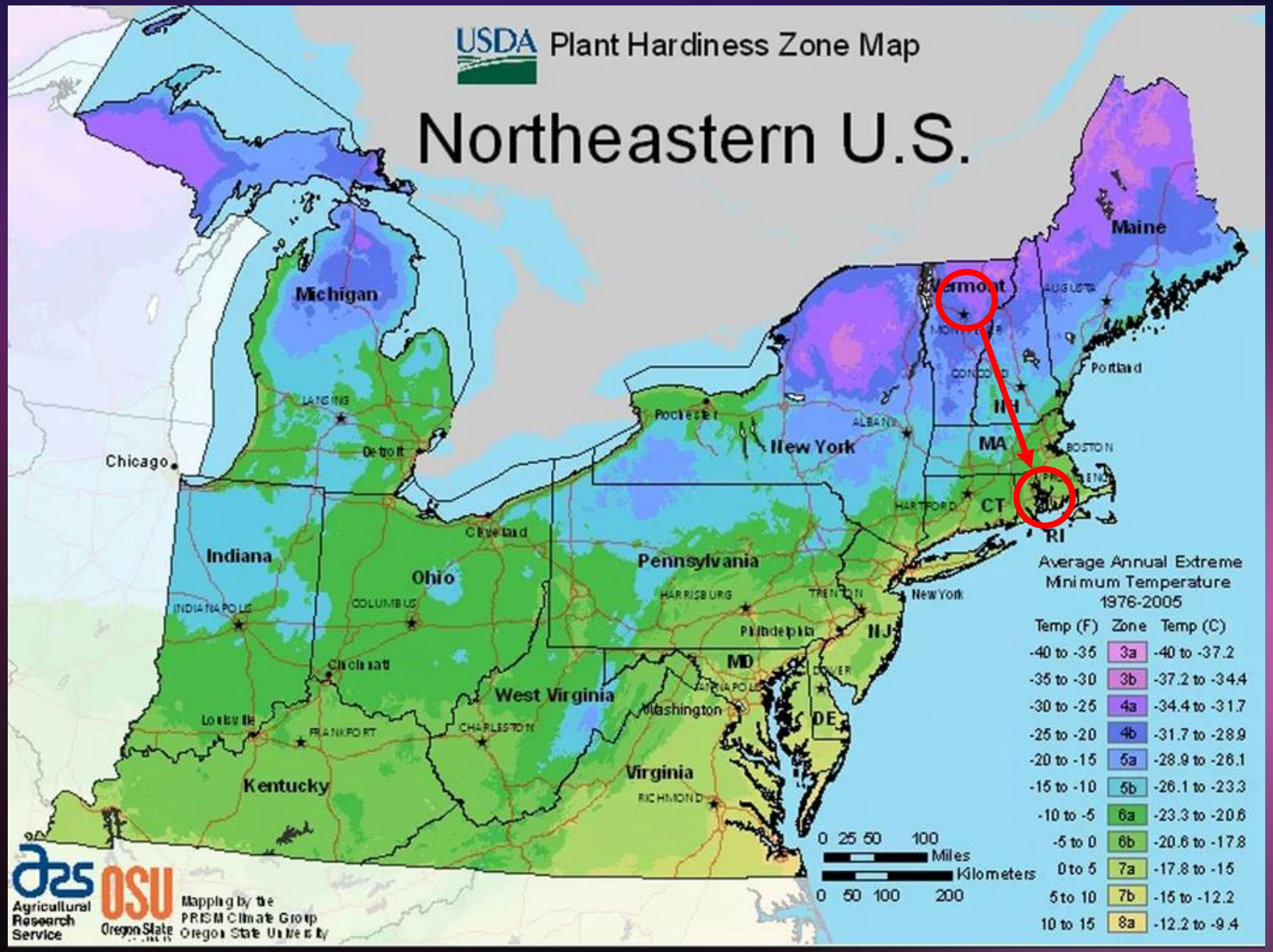


USDA Hardiness Zone Changes For The US In The Future

Observed change in the frost-free season length in the United States. The Midwestern and Northeastern U.S. experienced an increase in the frost-free season of 9 and 10 days, respectively, from 1958-2012.



The Northeastern climate is experiencing noticeable changes that are expected to increase in the future. Between 1895 and 2011, temperatures rose by almost 2°F. USGCRP (2014)


USDA Plant Hardiness Zone Map
Northeastern U.S.
Michigan
Chicago
Indiana
Ohio
Pennsylvania
New York
Maine
Vermont
NH
MA
CT
RI
NJ
MD
DE
West Virginia
Virginia
Kentucky
Average Annual Extreme Minimum Temperature 1976-2005
Temp (F) Zone Temp (C)
-40 to -35 3a -40 to -37.2
-35 to -30 3b -37.2 to -34.4
-30 to -25 4a -34.4 to -31.7
-25 to -20 4b -31.7 to -28.9
-20 to -15 5a -28.9 to -26.1
-15 to -10 5b -26.1 to -23.3
-10 to -5 6a -23.3 to -20.6
-5 to 0 6b -20.6 to -17.8
0 to 5 7a -17.8 to -15
5 to 10 7b -15 to -12.2
10 to 15 8a -12.2 to -9.4
0 25 50 100 Miles
0 50 100 200 Kilometers
Agricultural Research Service
OSU Oregon State University
Mapping by the PRISM Climate Group Oregon State University

C1 = Cover 1= Out door planting in bare ground and without cover

C2 = Cover 2= Out door, in the bare ground, under plastic cover (low tunnels)

D1=> 3m² * 120 corms/m² = 360 corms/sub-plot * 8 sub-plot = 2880 corms

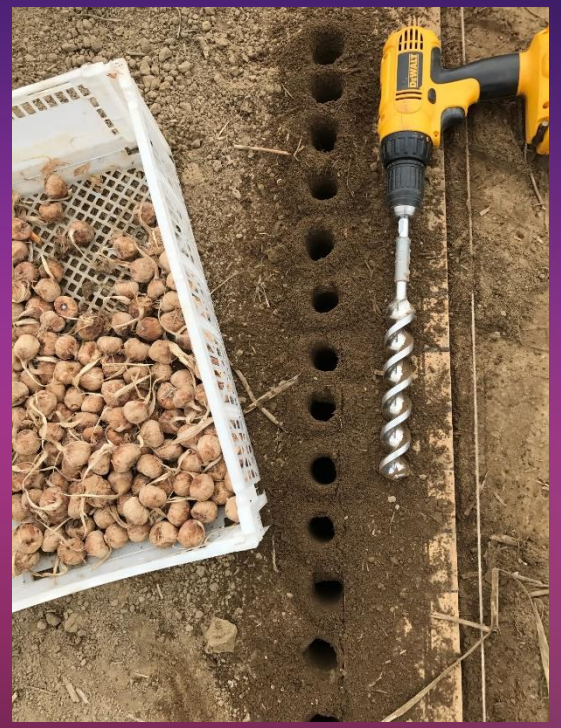
D1=> Distances between rows =12 cm

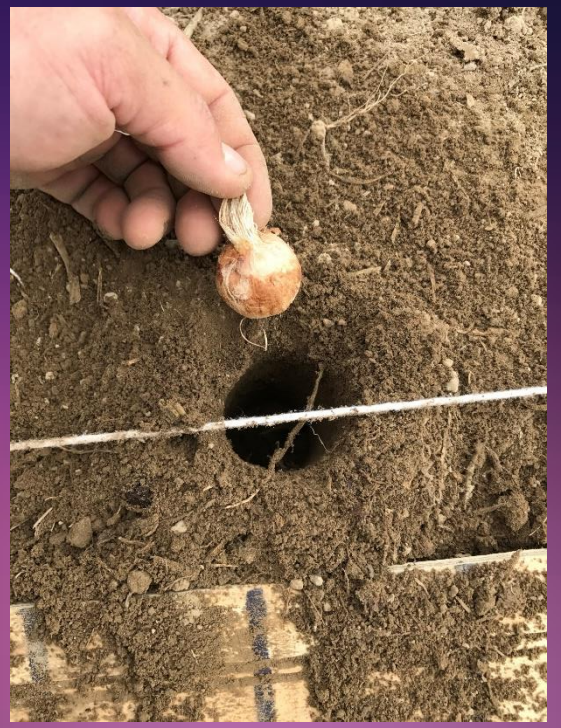
Distances within rows = 6.5 cm

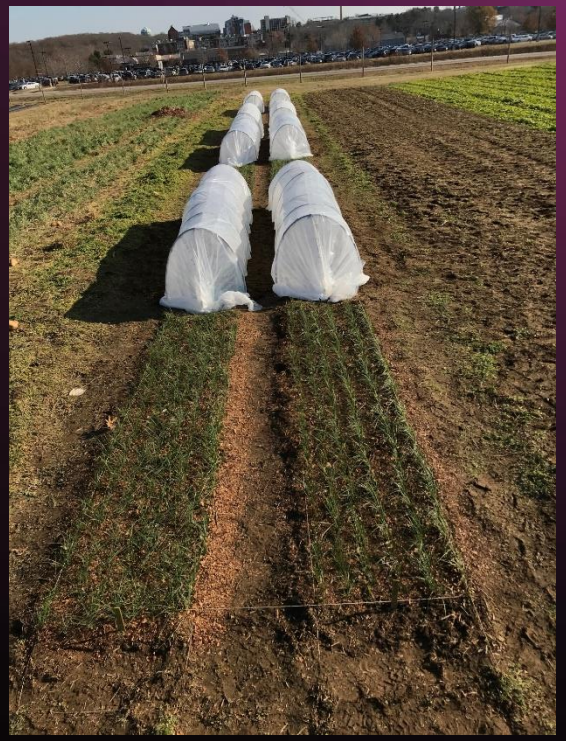
D2=> 3m² * 162 corms/m² = 486 corms/sub-plot * 8 sub-plot = 3888 corms

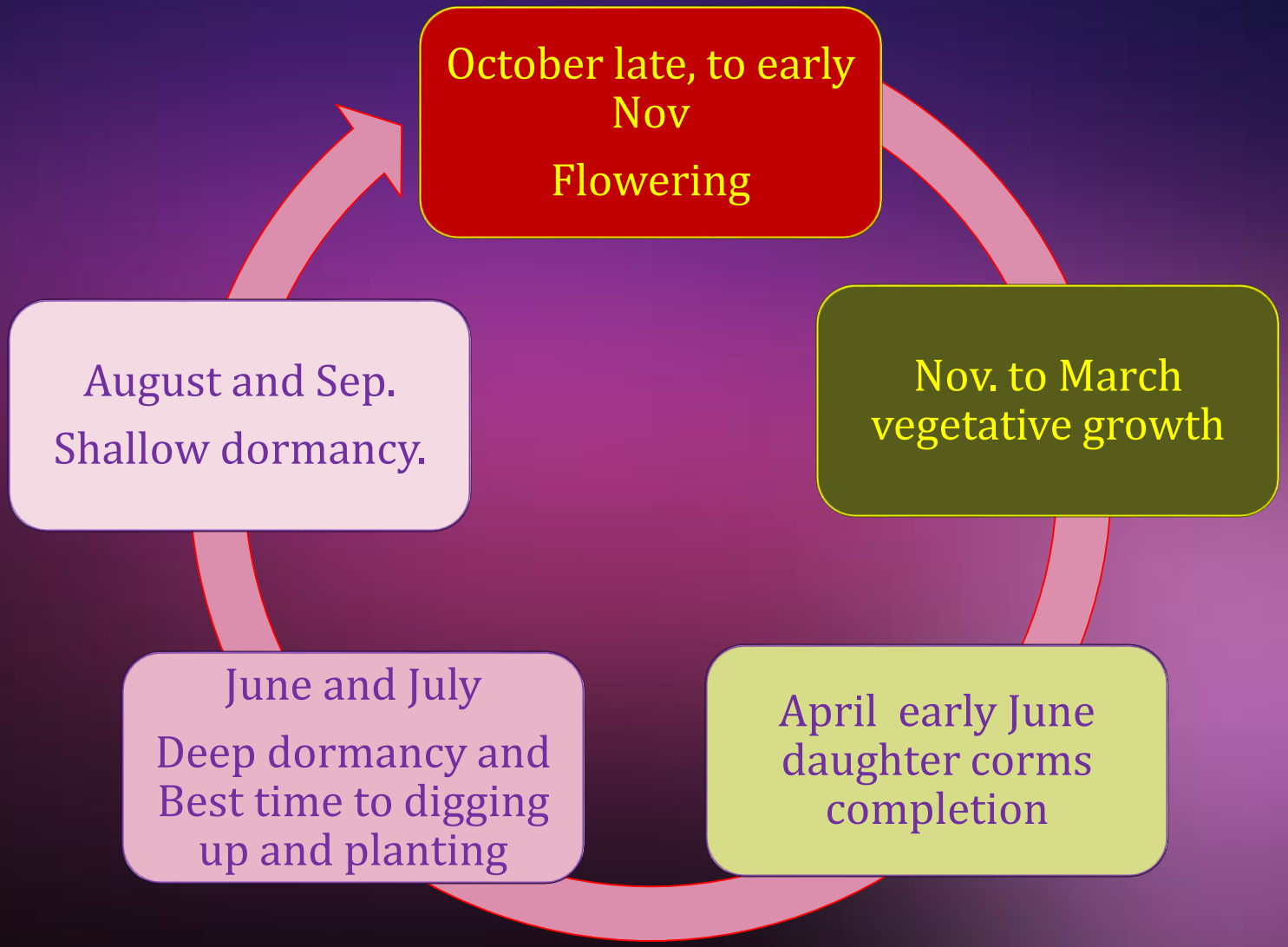
D2=> Distances between rows = 8 cm

Distances within rows = 7.5 cm





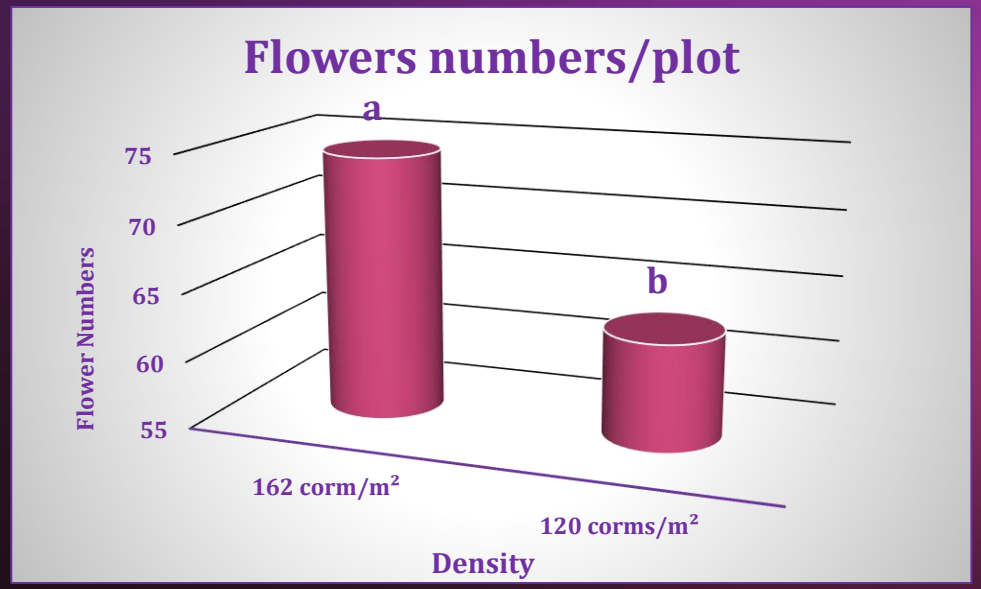


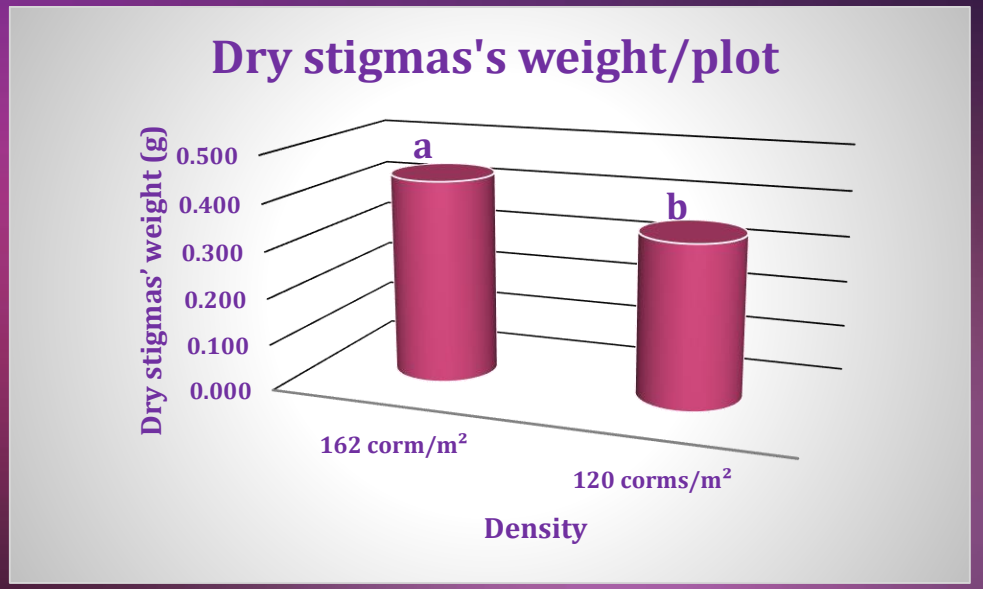

October late, to early Nov
Flowering
Nov. to March vegetative growth
April early June daughter corms completion
June and July
Deep dormancy and Best time to digging up and planting
August and Sep.
Shallow dormancy.

2017

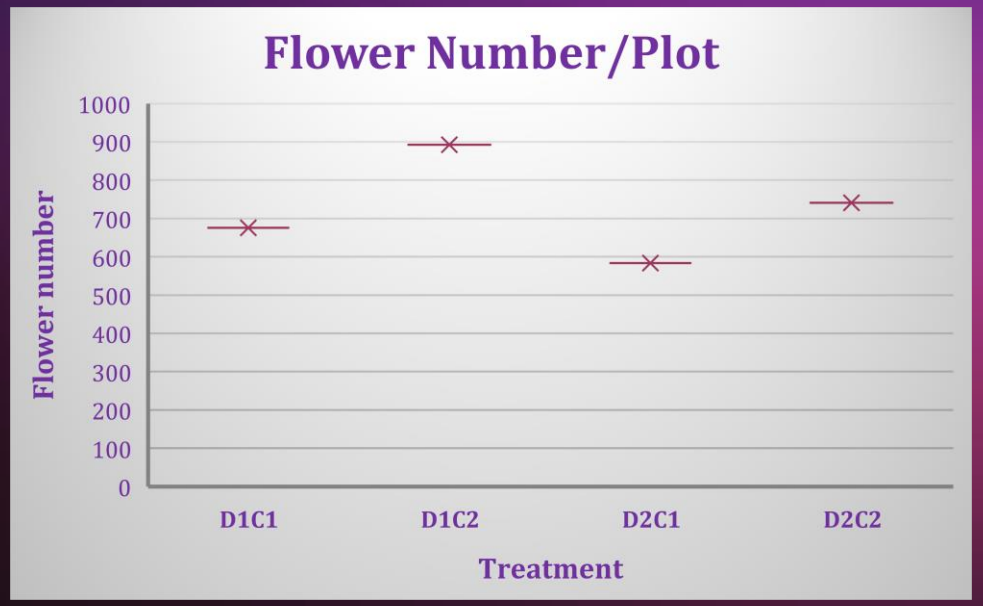
2018

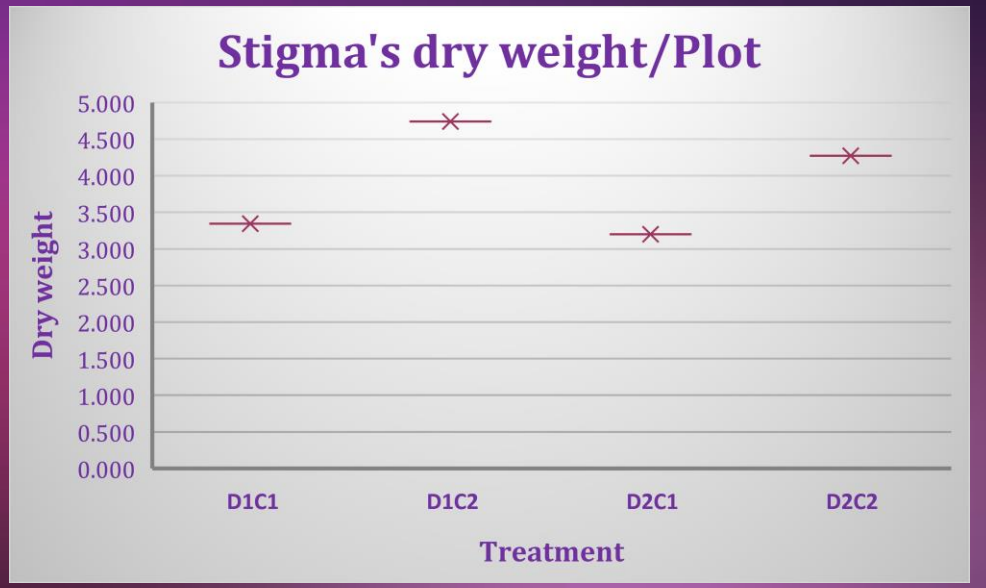
2017


Flowers numbers/plot
a
b
75
70
65
60
55
Flower Numbers
162 corm/m²
120 corms/m²
Density


Dry stigmas's weight/plot
a
b
0.500
0.400
0.300
0.200
0.100
0.000
Dry stigmas' weight (g)
162 corm/m²
120 corms/m²
Density

2018





C1= Uncovered D1= 162 corm/m²

C2= Covered D2= 120 corms/m²

(Source: Carbon Economy Series)

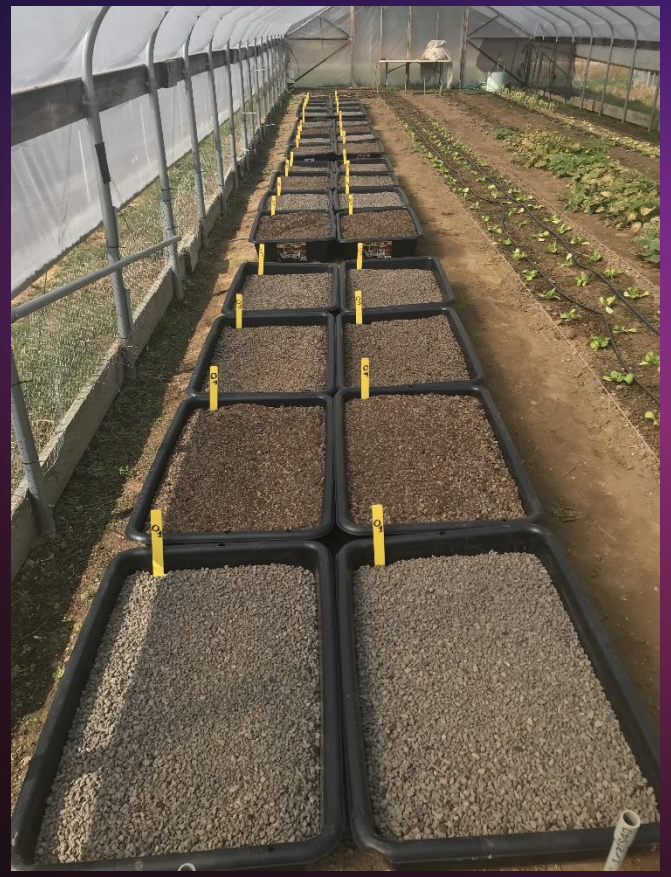
AmericanMeadows.com

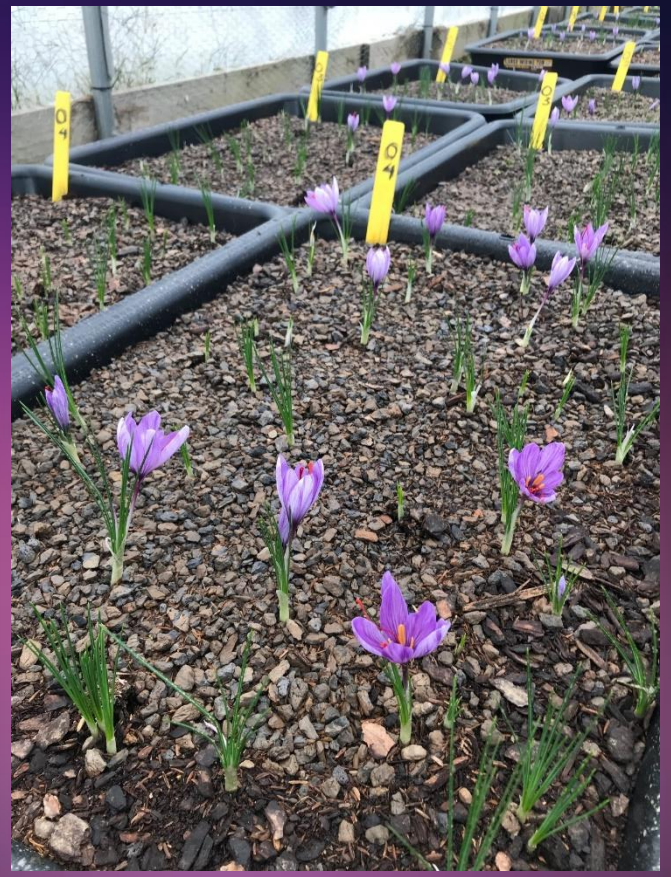
Taken by: Alper Aytekin

Organic matter affects both the chemical and physical properties of the soil and its overall health. Properties influenced by organic matter include: soil structure; moisture holding capacity (FAO)

The larger the mother corm, the more daughter corms are produced in the annual cycle, which influences production of flowers/plant, as higher number of shoots form on larger corms.

The amount of soil organic matter and organic carbon in Iran is very low in many agricultural lands (Kalbasi, 1996). More than 60% of agricultural lands have less than one percent organic matter, and a significant portion of which have less than half a percent





O1= 1% OM

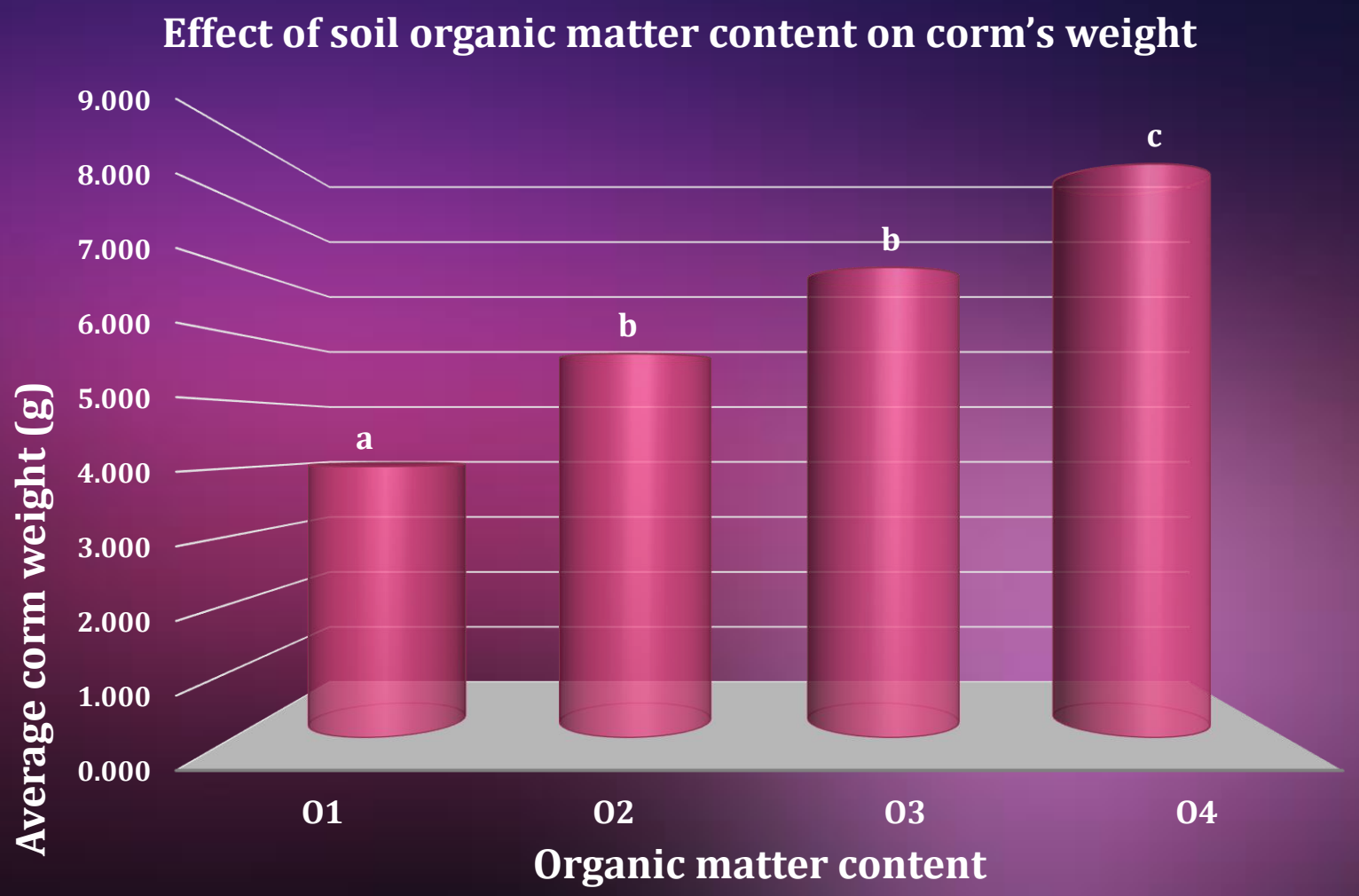
O2= 2.6% OM

O3=6.4% OM

O4= 11.8% OM

O1= 1% Organic matter
O2= 2.6% Organic matter
O3=6.4% Organic matter
O4= 11.8% Organic matter

Density= 100 corm/m^2



O1= 1% Organic matter
O2= 2.6% Organic matter
O3=6.4% Organic matter
O4= 11.8% Organic matter

Density= 100 corm/m^2

Effect of soil organic matter content on corms' number

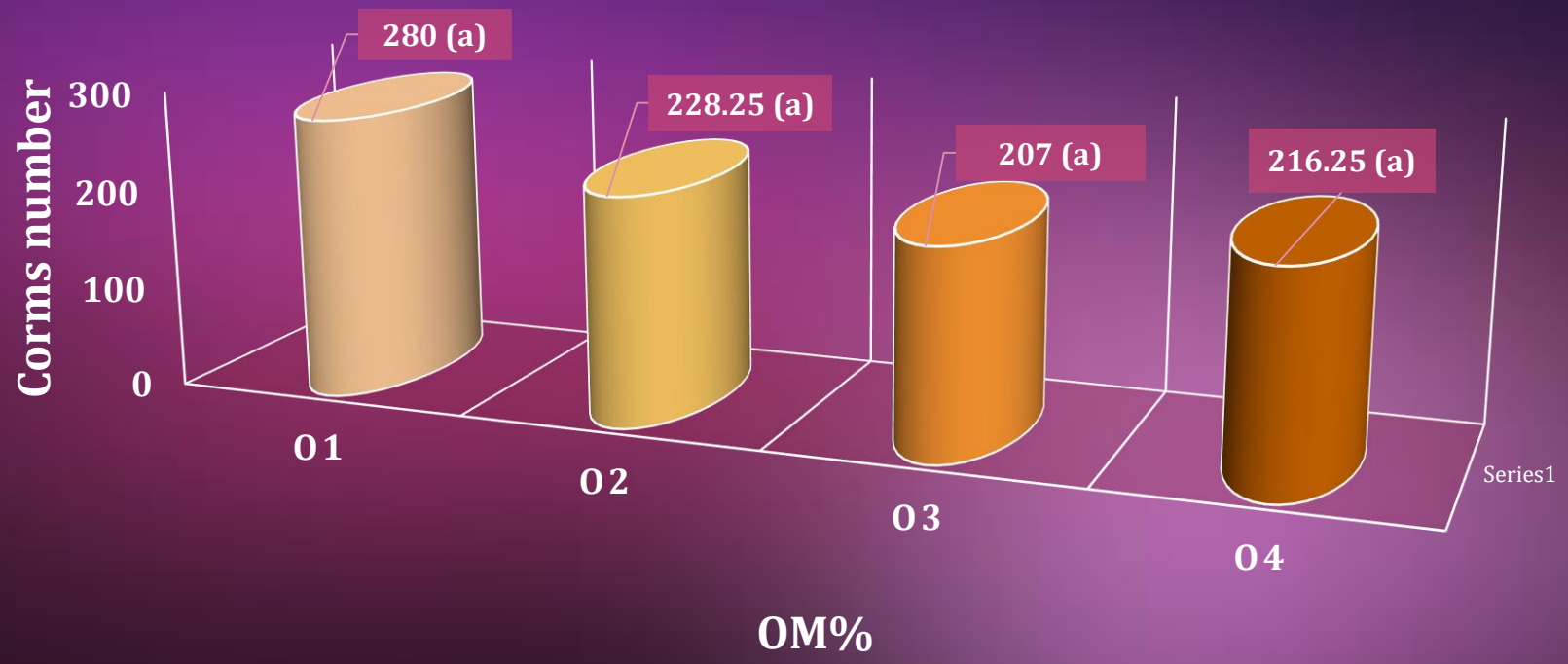


Photo by James Wheeler https://ourworld.unu.edu