# What is infiltration and how do you measure Infiltration Rate?



# Infiltration test equipment







#### Infiltrometer

#### 12 and 24 Inch Infiltration Rings (ASTM 3385)





#### 6 and 12 inch Infiltration Rings



#### 5 and 12 foot Infiltration Rings (ASTM 5093)

# A tale of two greens

# Infiltration rate of 5 cm (2 inches) per hour





# 5 cm (2 inches) per hour

# Infiltration rate of 60 cm (24 inches) per hour



# 60 cm (24 inches) per hour

# 2" per Hour 5 cm

# 24" per Hour 60 cm

#### It doesn't matter if it is soil on top of sand...

the second second



#### ... sand on top of clay...

#### ... or soil on top of clay, on top of sand, on top of ...



1/2

## Layers stop water movement

# If water cannot move through the profile, than either can air.

If a cannot move through the profile, than roots cannot grow.

Why do layers cause problems?







# 100% Saturated















100% Saturated

100% Saturated

#### 100% Saturated

#### 100% Saturated







100% Saturated

100% Saturated

#### 100% Saturated

#### 100% Saturated



# How do you eliminate layers in the soil?

# What is Aerification?





## Tom Mascaro (1915 – 1997)

## Tony Mascaro (1912-1989)

Started West Point Products in 1932 to sell topdressing soil to Golf Courses.











# After some regular customers, they started running out of mushroom soil







n 1944 the Mascaro brothers invented a modified leaf rake that would gather leaves. They were giving these to the Phila. Parks district in exchange for their leaves

to - list here

In 1945 the Mascaro brothers met Dr. Fred Grau, Agronomist USDA



# In 1946 Tom Mascaro invents The "Aerifier"

Entration in



To All To Whom These PRESENTS Shall Come:

This is to Certify That by the records of the UNITED STATES PATENT OFFICE it appears that WEST POINT LAWN PRODUCTS.

West Point. 13th did, on the Office an application for REGISTRATION of a certain

Pennsylvania. day of February, 1945 , duly file in said

#### TRADE-MARK

shown in the drawing for the goods specified in the statement, copies of which drawing and statement are hereto annexed, and duly complied with the requirements of the law in such case made and provided, and with the regulations prescribed by the COMMISSIONER OF PATENTS.

And, upon due examination, it appearing that the said applicant s ar e entitled to have said TRADE-MARK registered under the law, the said TRADE-MARK has been duly REGISTERED this day in the UNITED STATES PATENT OFFICE, to

West Point Lawn Products, their successors or assigns.

This certificate shall remain in force for TWENTY YEARS, unless sooner ated by law.

In Testimony Whereof I have hereunto set my hand and caused the seal of the PATENT OFFICE to be affixed, at the city of Washington, this fourteenth day of August, in the year of our Lord one thousand nine hundred and forty-five, and of the independence of the United States the one hundred and seventieth.

Casper W. Ooms Commissioner of Patenss.

1945 The name "Aerifier" was trademarked and subsequently, the machine was also patented.







## The original Aerifier had one inch (2.5 cm) diameter spoons

## **Designed for fairways**

However golf greens were hard and needed Aerification

### Different size and shaped spoons were invented for green to minimize surface disturbance and springs held down the turf

### GL Self Propelled Aerifier 1949 for greens

# Golfers did not like my father!

Taking something that is supposed to be smooth and putting holes in it

