

# Surface Hardness Measurements for Bermudagrass and Kentucky Bluegrass Grown on Four Root Zone Construction Types

A study conducted for Brock International to establish  
baseline values for natural turfgrass surface hardness  
characteristics

by

John Sorochan, Ph.D. & Adam Thoms

University of Tennessee

Center for Athletic Field Safety



# Materials and Methods



## **Surface Composition**

1. Kentucky bluegrass (cool-season) turfgrass on USGA Specification root zone
2. Bermudagrass (warm-season) turfgrass on USGA Specification root zone

## **Surface Root Zone Construction**

1. ASTM Sand Specification
2. Silt Loam Native Soil
3. 6-inch Sand Cap system
4. USGA Sand Specification

# Results



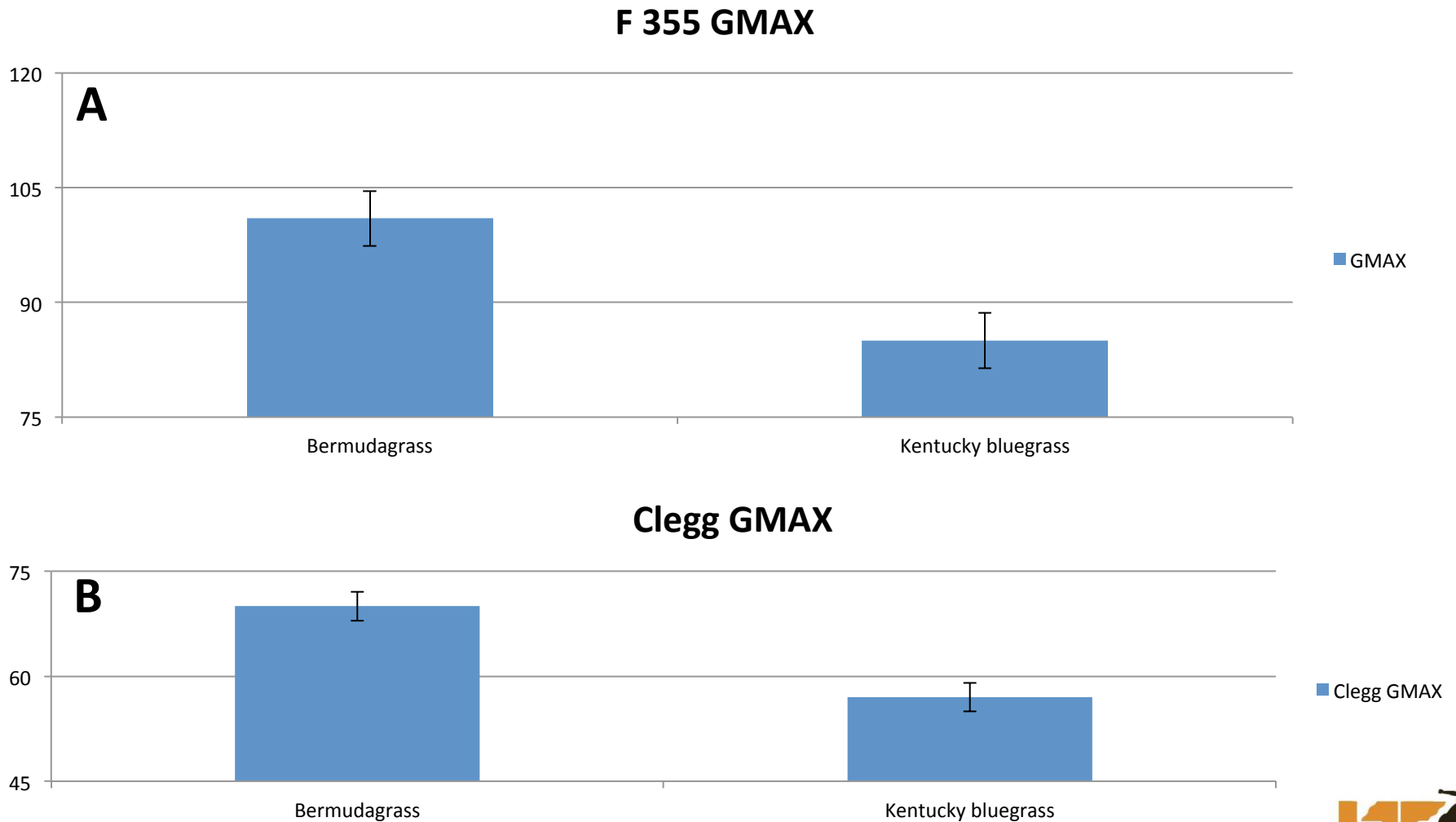
## **Surface Composition**

- Turfgrass species main effects for surface hardness determined that bermudagrass had significantly harder surface conditions for both F 355 and Clegg surface hardness measurements (Fig 1. A & B)

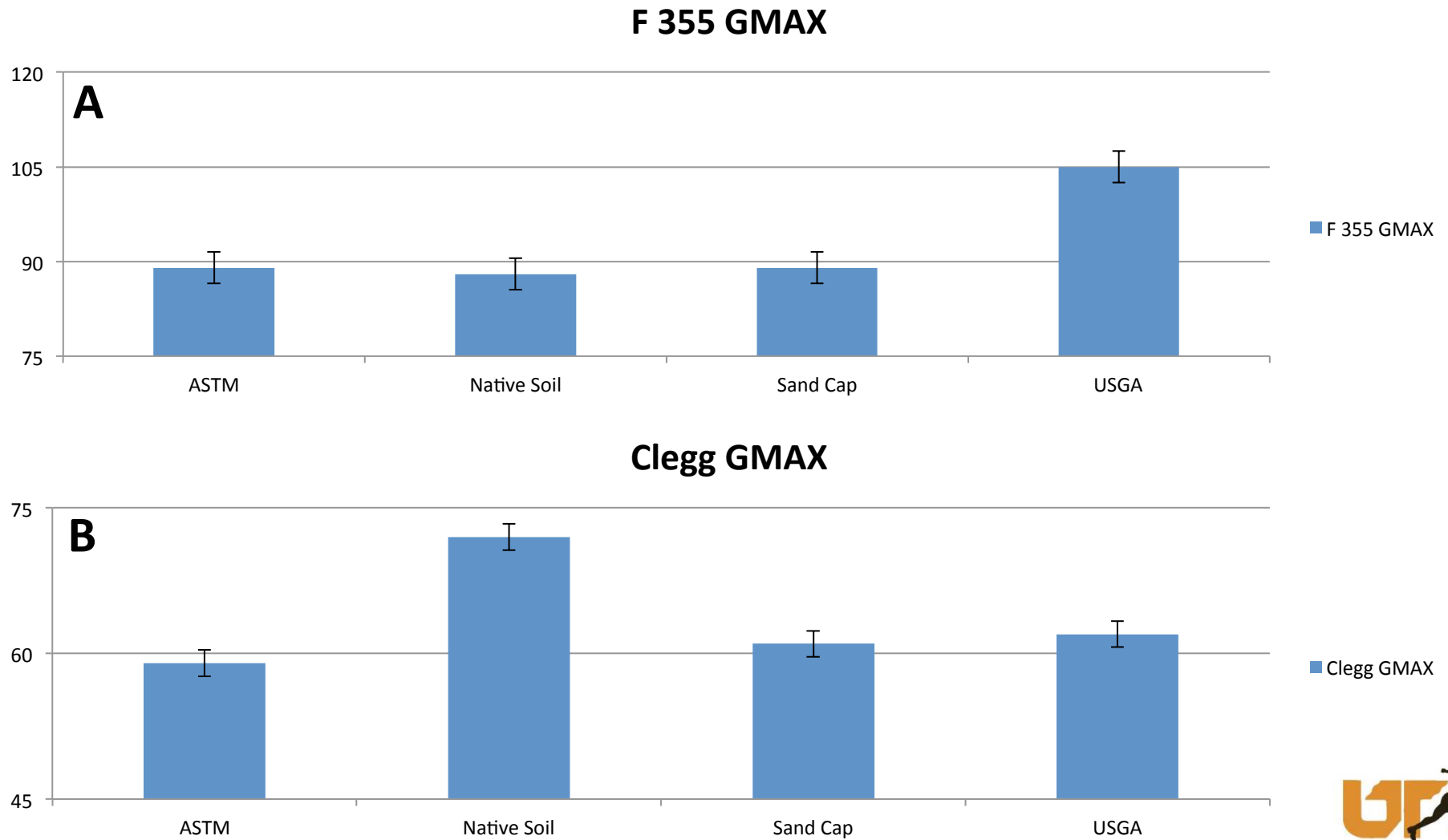
## **Surface Root Zone Construction**

- USGA Specification sand had significantly higher F 355 surface hardness measurements compared to the other three soil types (Fig 2. A)
- The native silt loam soil had significantly higher Clegg surface hardness measurements compared to the three soil types (Fig 2. B)

# Fig 1. Clegg Surface Hardness main effects for Bermudagrass and Kentucky Bluegrass. Knoxville, TN Fall 2012



# Fig 2. F 355 Surface Hardness main effects for Root Zone Construction Type. Knoxville, TN Fall 2012



# Results



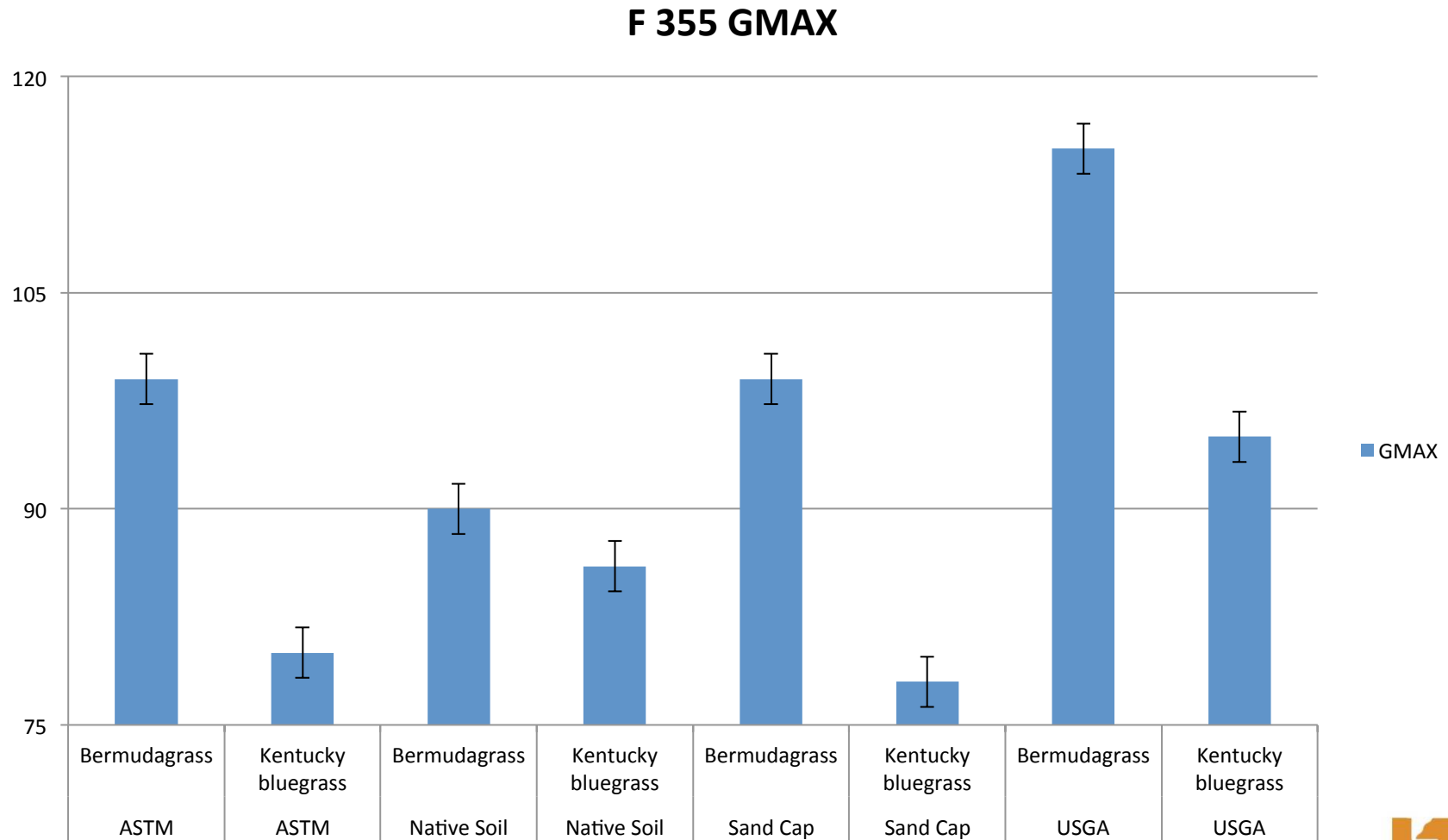
## **F 355 Interaction (Fig 3.)**

- Bermudagrass grown on a USGA Specification sand root zone had significantly higher surface hardness than Kentucky bluegrass grown on the same root zone
  - However, Kentucky bluegrass grown on USGA Specification sand was not different than bermudagrass grown on the ASTM sand or the sand cap root zones
  - Conversely, there was no difference in surface hardness for bermudagrass grown on any root zone with sand
- Kentucky bluegrass grown on the ASTM sand and sand cap root zones had lowest surface hardness measurements

## **Hardest to softest**

BG (USGA) > BG (ASTM) = BG (cap) = KBG (USGA) > BG (native) > KBG (native) > KBG (ASTM) = KBG (cap)

**Fig 3. F 355 surface hardness for turfgrass type by root zone construction type interaction. Knoxville, TN Fall 2012**



# Results



## Clegg Interaction (Fig 4.)

- Bermudagrass grown on a native soil root zone had the highest surface hardness, but was not different than Kentucky bluegrass grown on the same root zone (Fig 4.)
  - However, Kentucky bluegrass grown on the native soil was not different than bermudagrass grown on the sand cap or USGA Spec root zones
  - The aforementioned treatments were all significantly harder than the native soil bermudagrass which was harder than the native soil Kentucky bluegrass
- Kentucky bluegrass grown on the ASTM sand and sand cap root zones had lowest surface hardness measurements followed by Kentucky bluegrass grown on the USGA sand



# Fig 4. Clegg surface hardness for turfgrass type by root zone construction type interaction. Knoxville, TN Fall 2012

Clegg GMAX

