Penn State's

Center for
Sports Surface Research

Synthetic Turf Fiber Wear Test – Progress Report

November 2011

PENNSTATE

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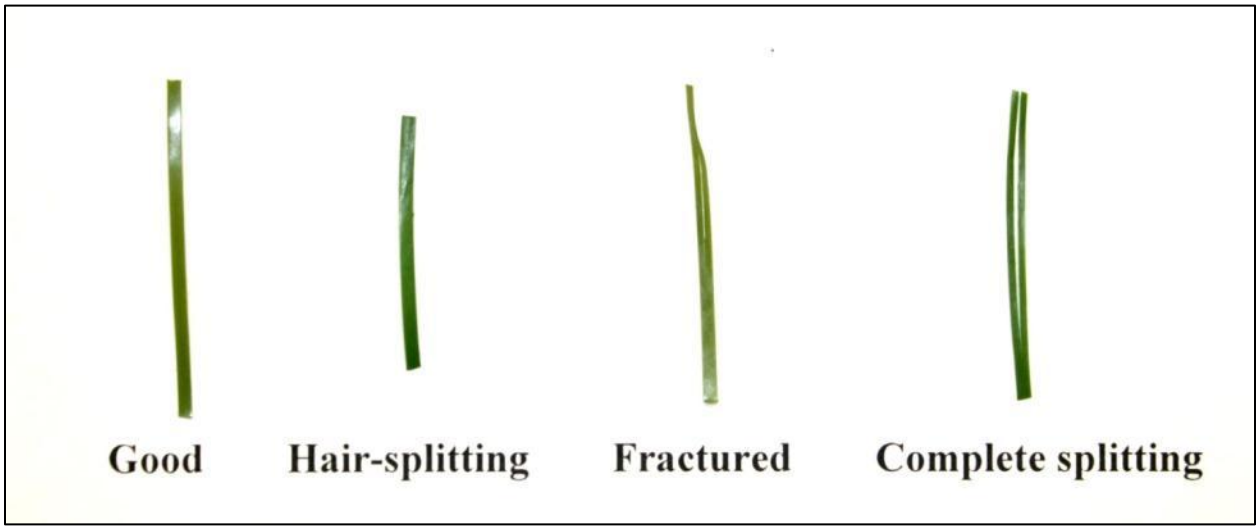
Lisport wear testing was conducted at Penn State's Center for Sports Surface Research, University Park, PA. All samples were exposed to a total of 30,000 cycles on a Lisport wear tester.

Testing Methods

Fiber wear tests were conducted using a Lisport wear tester (pictured below). The Lisport wear tester consists of two cylinders outfitted with studs (cleats) that simluate field use. Different sprocket sizes on each cylinder allows for a sliding movement of one of the cylinders. The model used in this testing also included a sample tray that produced movement transverse to the linear movement of the cylinders, allowing for even wear across the entire sample. Each cycle is roughly equivalent to one hour of field use by users wearing cleated shoes. The method used is considered a modified version of both the European standard for Surfaces for Outdoor Sports Areas - Exposure of Synthetic Turf to Simulated Wear (EN 15306) and the FIFA Quality Concept for Football Turf – Handbook of Test Methods (May, 2009 edition) as our machine includes plastic cleats with metal tips instead cleats made of 100% plastic. Each sample was filled with crumb rubber to a depth based on manufacturer specifications. Random fibers were removed after every 10,000 cycles for evaluation.

Fiber Evaluation

Each fiber was classified into one of four categories based on appearance:



Samples used in testing were obtained from athletic field managers, installers, and directly from turf manufacturers. If you would like to participate in our testing program, please visit our website for more details: http://cropsoil.psu.edu/ssrc/fibertest. This report will be updated regularly as more samples are tested. Be sure to check back often for the most current results.

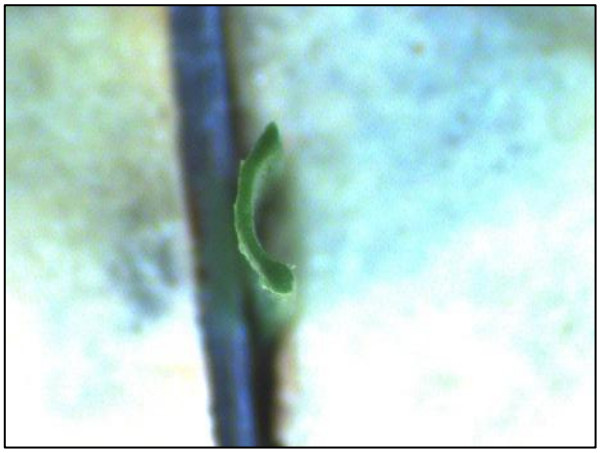
Table of Contents

AstroTurf GameDay Grass 3D60H

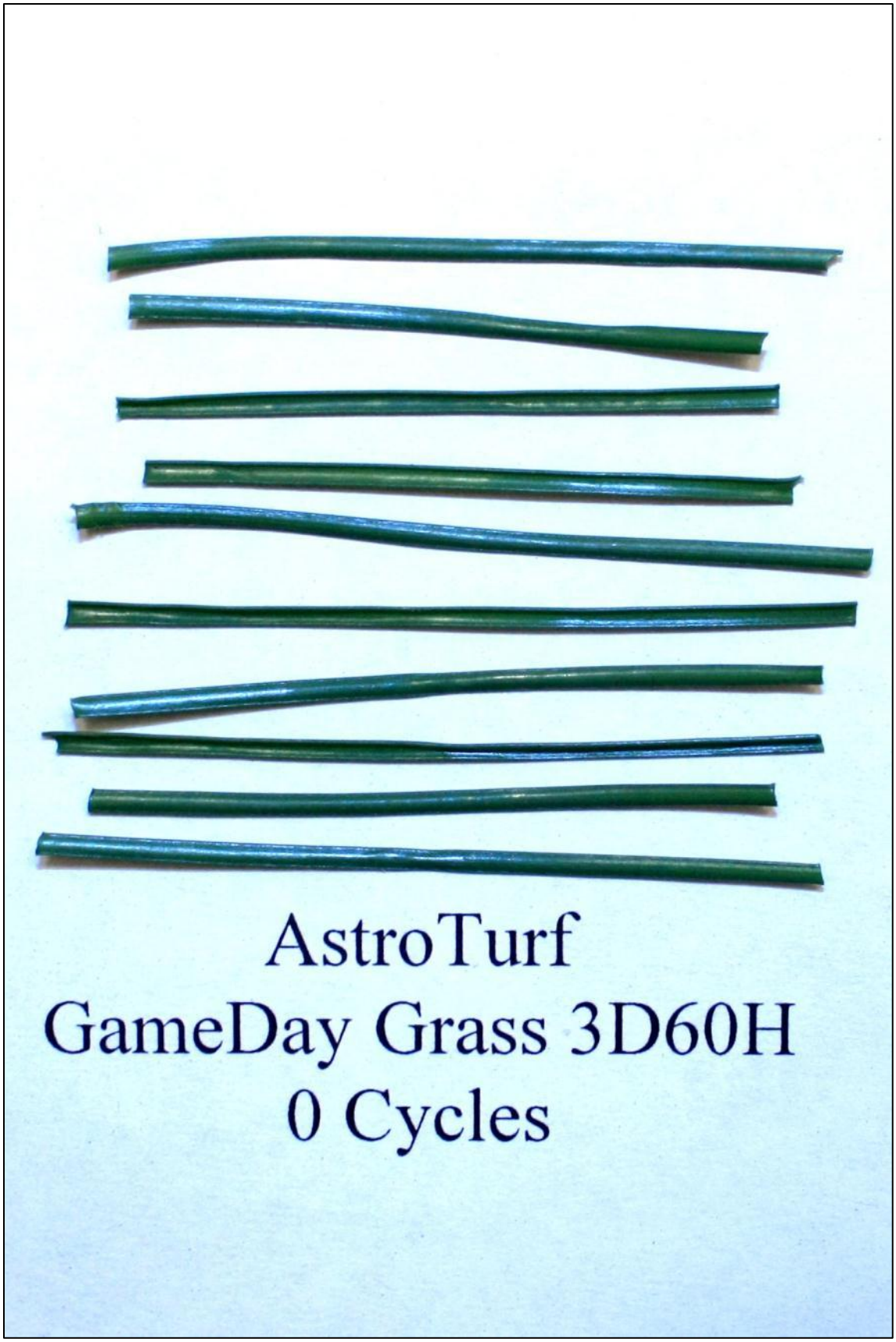
Fiber classifications for each 10,000 cycle interval from 10 random fibers removed from sample.

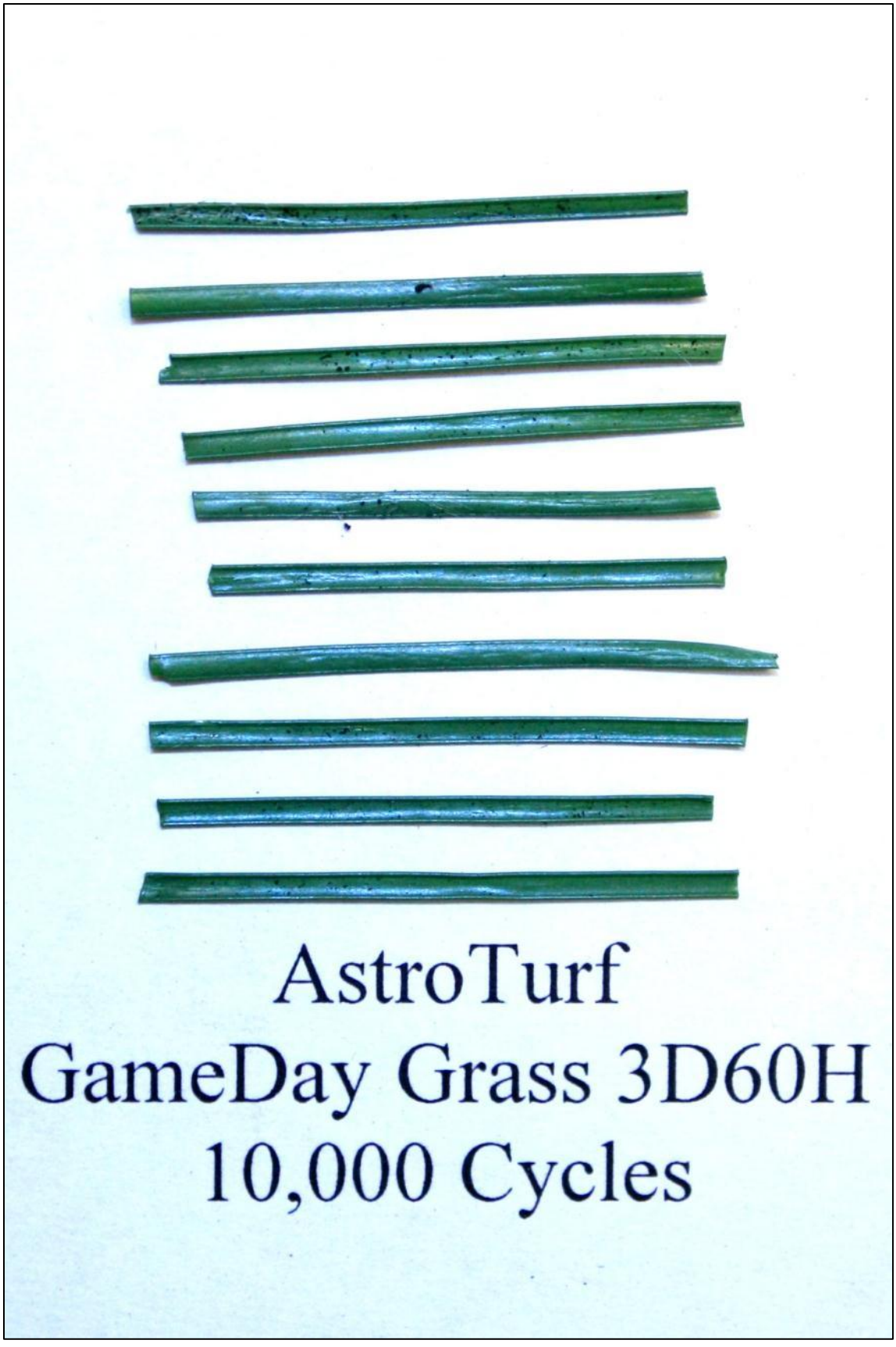
# of cycles	Good	Hair-Splitting	Fractured	Complete Splitting
0 cycles	10	0	0	0
10,000 cycles	10	0	0	0
20,000 cycles	6	0	3	1
30,000 cycles	0	1	7	2

Tested April 2011

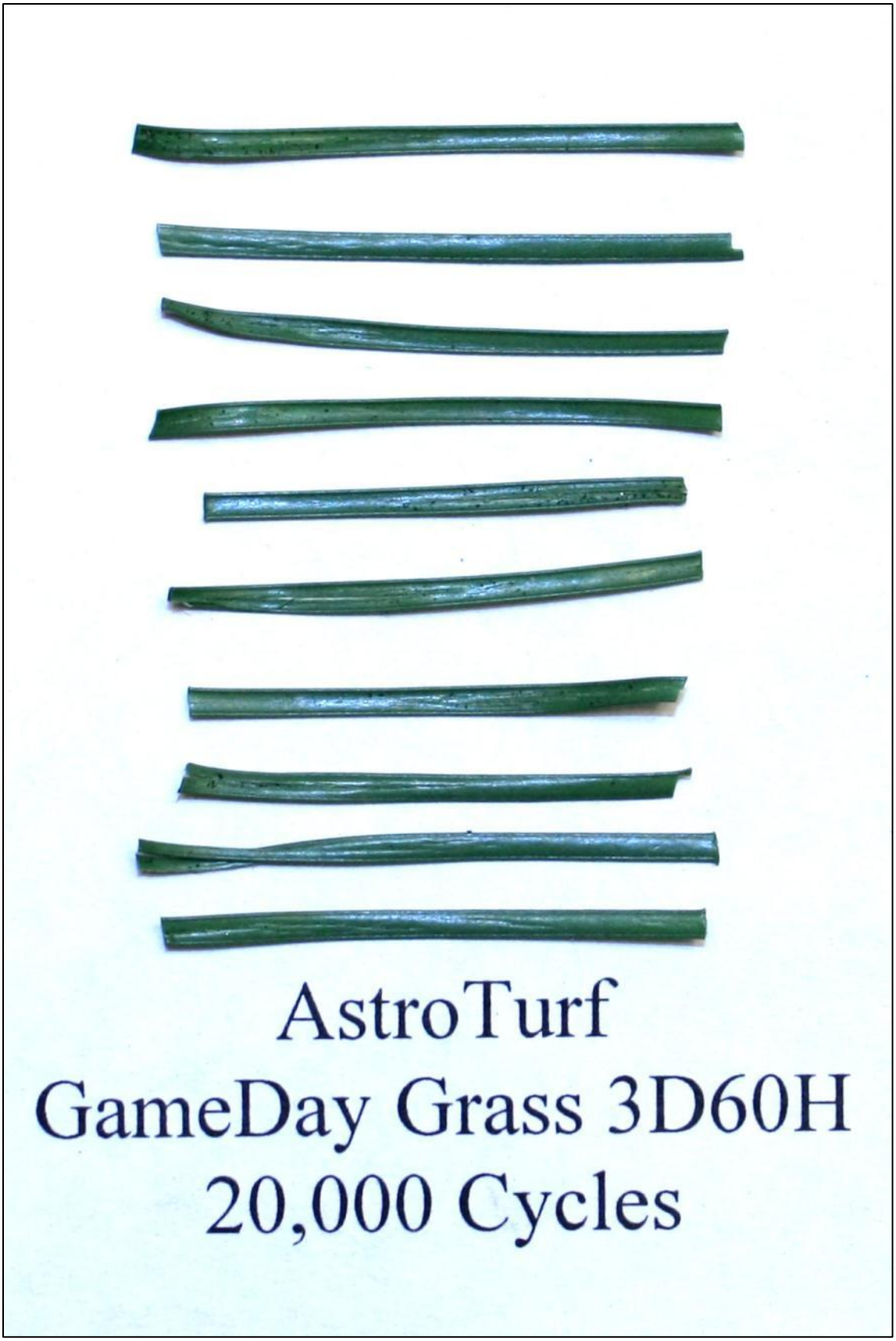


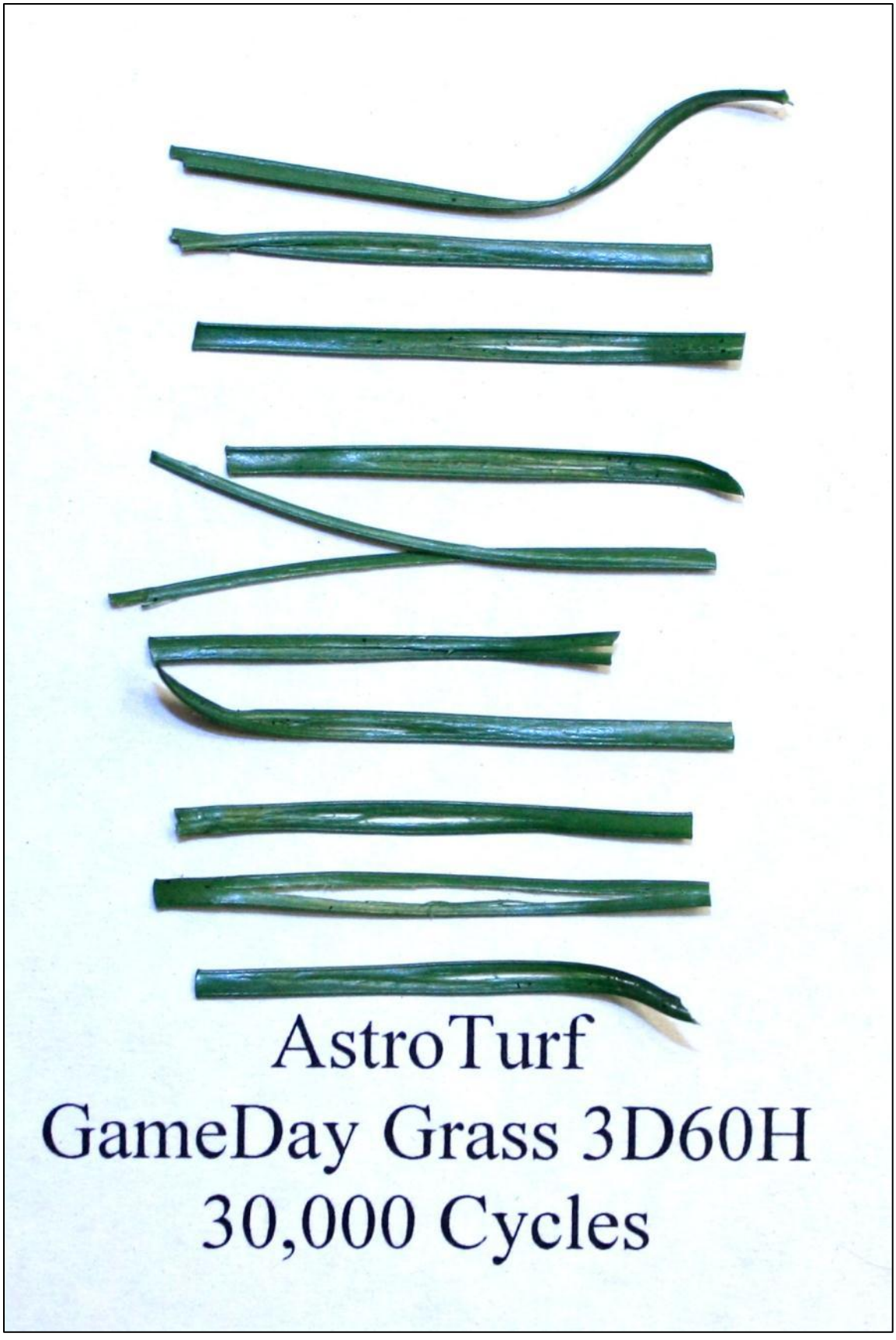
Cross section of AstroTurf GameDay Grass 3D fiber from sample tested.


AstroTurf
GameDay Grass 3D60H
0 Cycles



AstroTurf
GameDay Grass 3D60H
10,000 Cycles


AstroTurf
GameDay Grass 3D60H
20,000 Cycles


AstroTurf
GameDay Grass 3D60H
30,000 Cycles

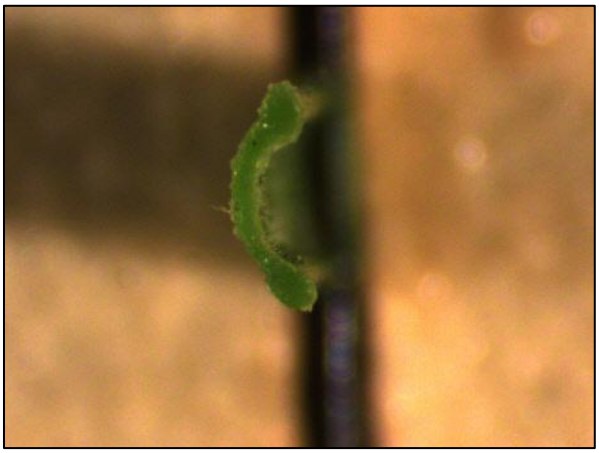
AstroTurf GameDay Grass 3D 60H after 30,000 cycles

AstroTurf GameDay Grass 3D with Astroflect

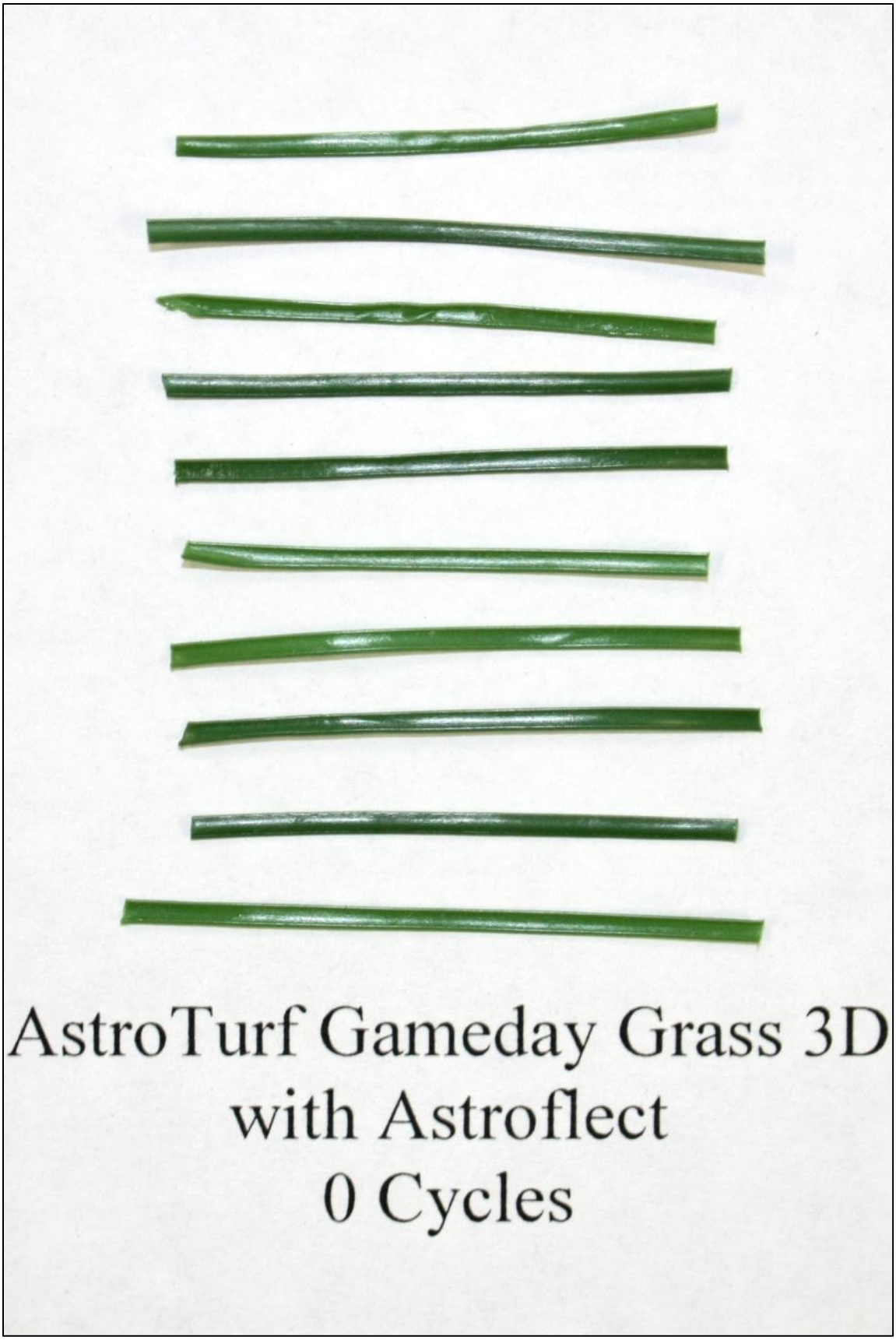
Fiber classifications for each 10,000 cycle interval from 10 random fibers removed from sample.

# of cycles	Good	Hair-Splitting	Fractured	Complete Splitting
0 cycles	10	0	0	0
10,000 cycles	5	2	2	1
20,000 cycles	0	2	4	4
30,000 cycles	0	0	3	7

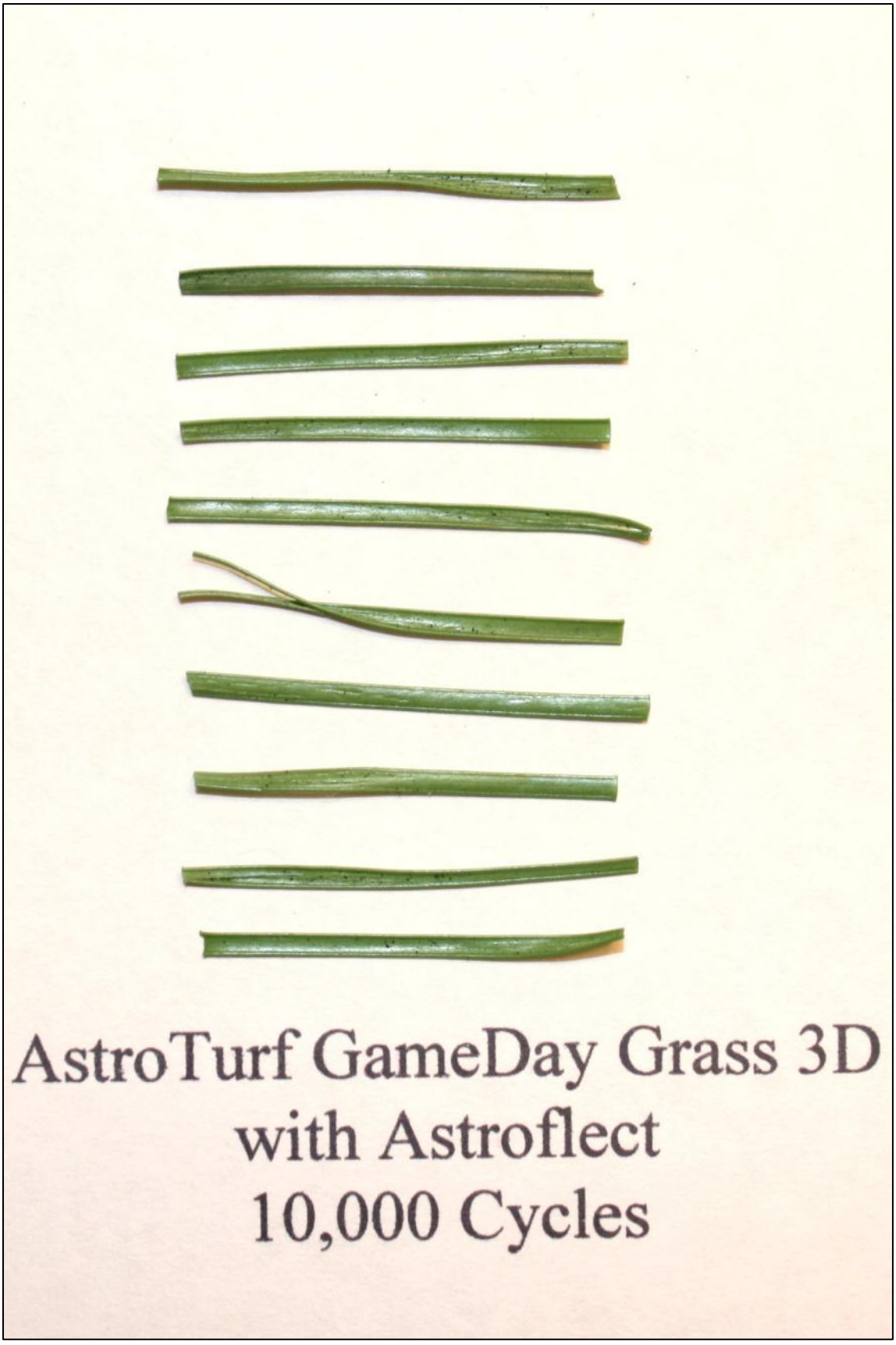
Tested May 2011



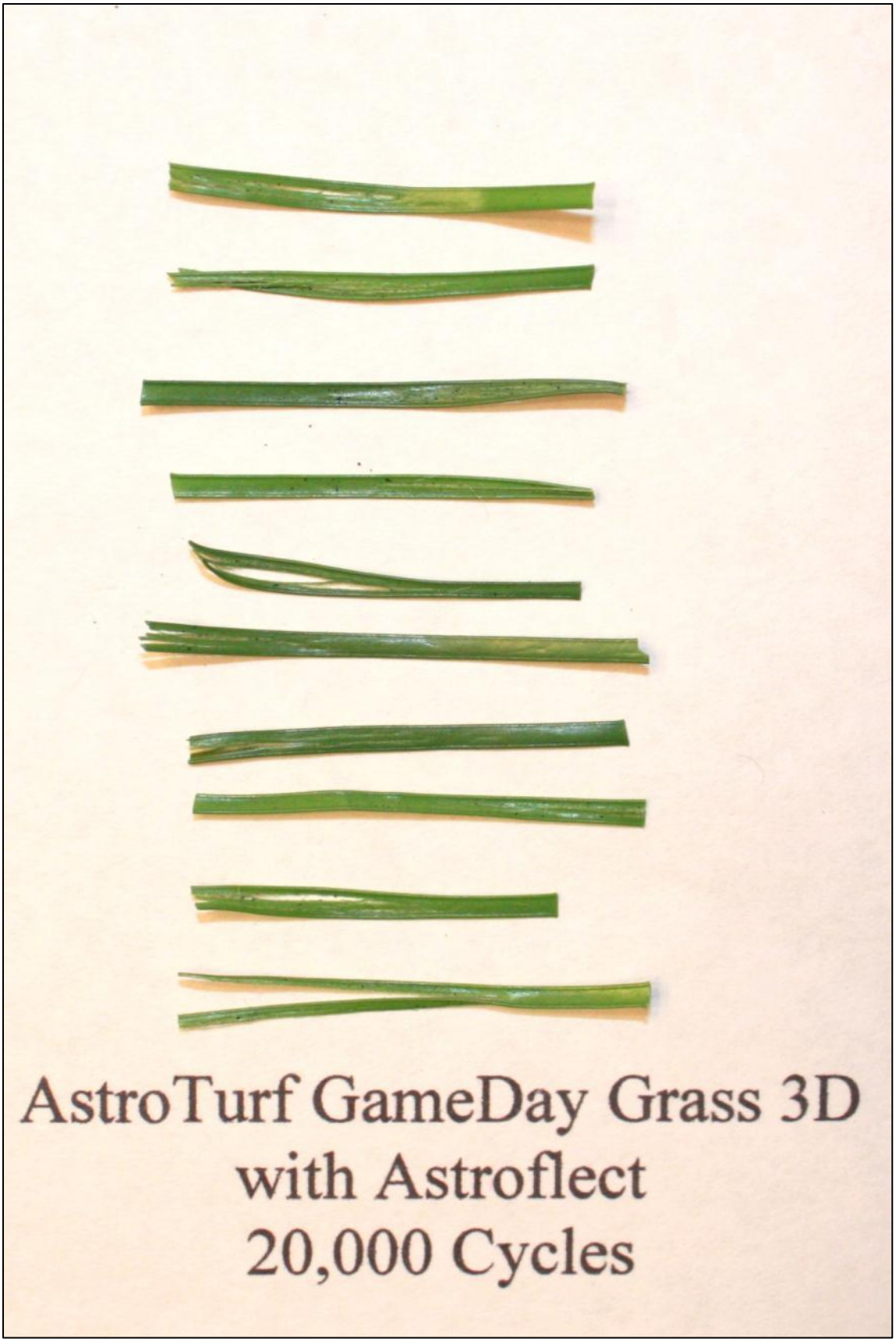
Cross section of AstroTurf GamedayGrass 3D with Astroflect fiber from sample tested.



AstroTurf Gameday Grass 3D
with Astroflect
0 Cycles



AstroTurf GameDay Grass 3D
with Astroflect
10,000 Cycles



AstroTurf GameDay Grass 3D
with Astroflect
20,000 Cycles


AstroTurf GameDay Grass 3D
with Astroflect
30,000 Cycles

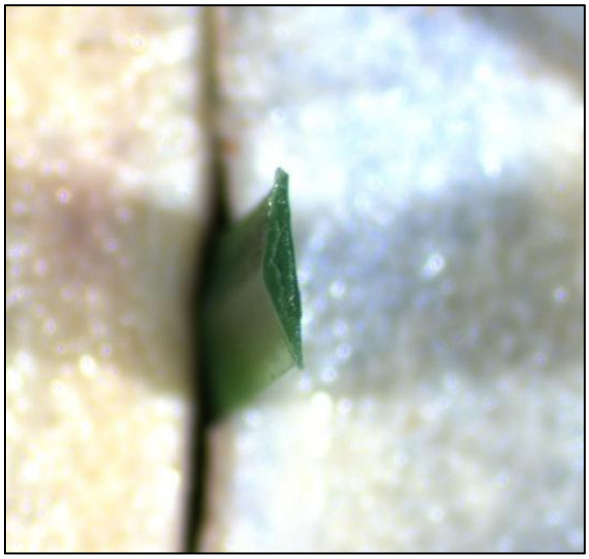
AstroTurf GameDay Grass 3D with Astroflect after 30,000 cycles

ATG Sports RamTurf

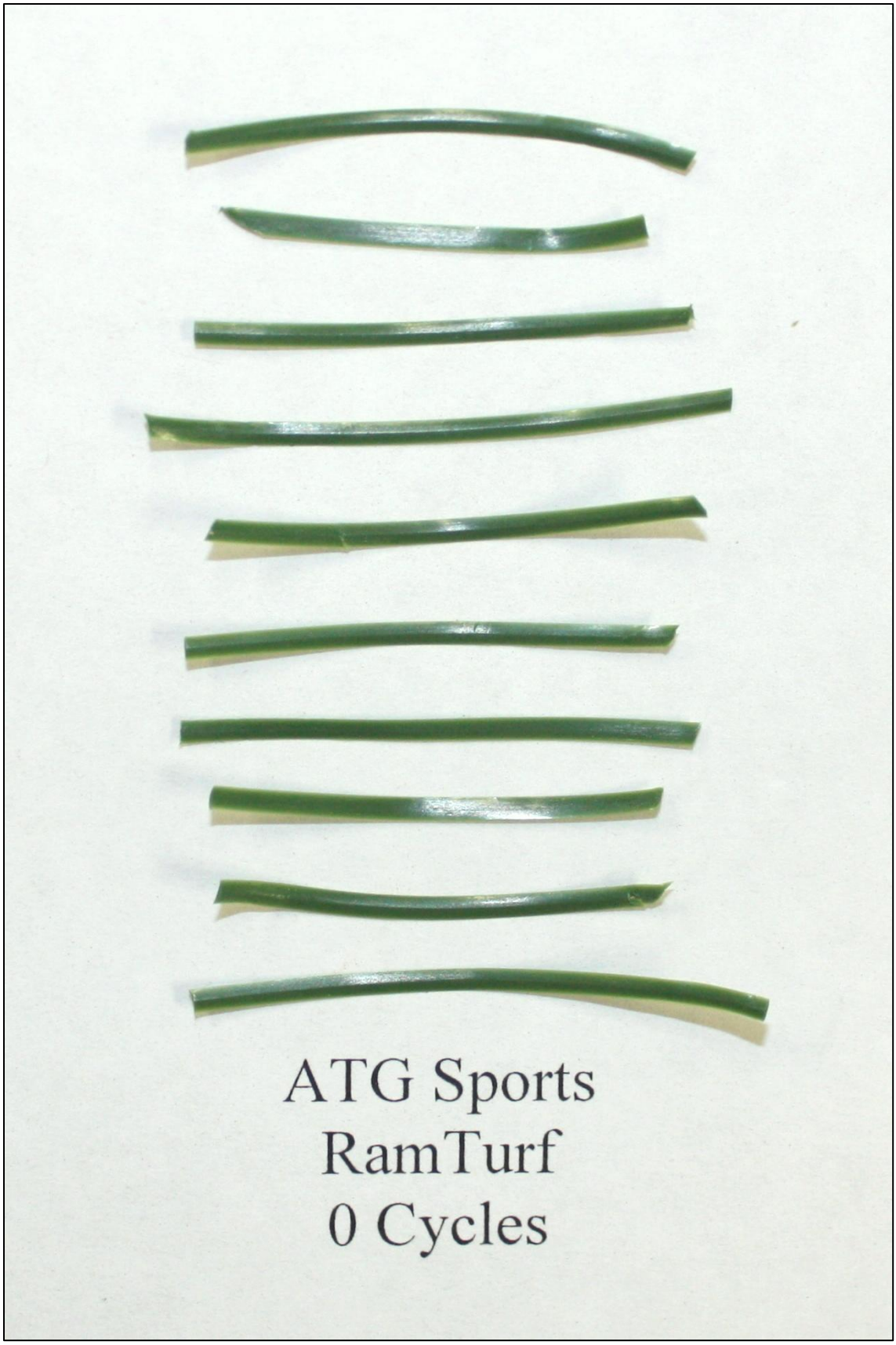
# of cycles	Good	Hair-Splitting*	Fractured	Complete Splitting
0 cycles	10	0	0	0
10,000 cycles	10	0	0	0
20,000 cycles	5	5	0	0
30,000 cycles	4	6	0	0

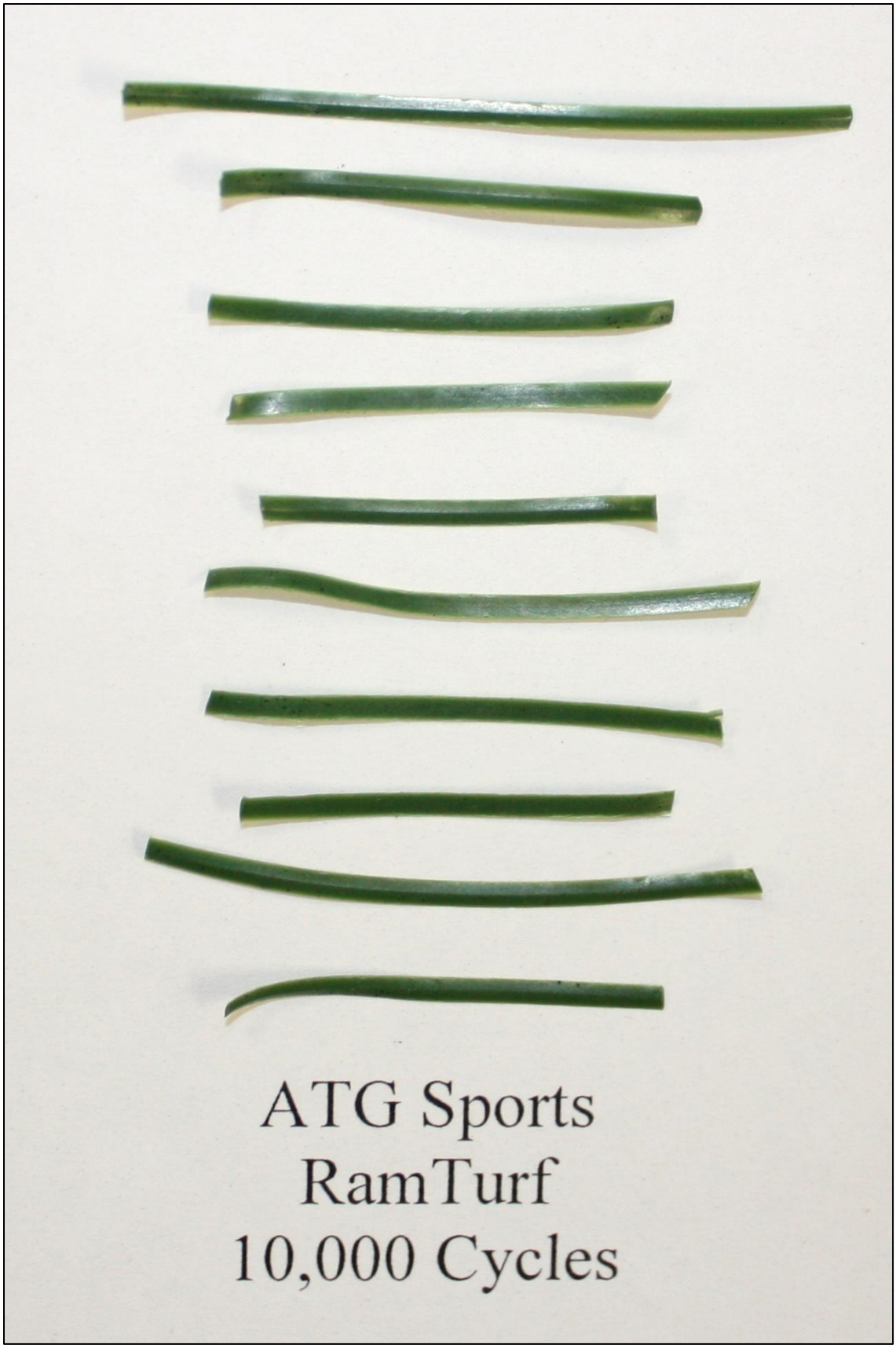
*Hairsplitting on edges of fibers only

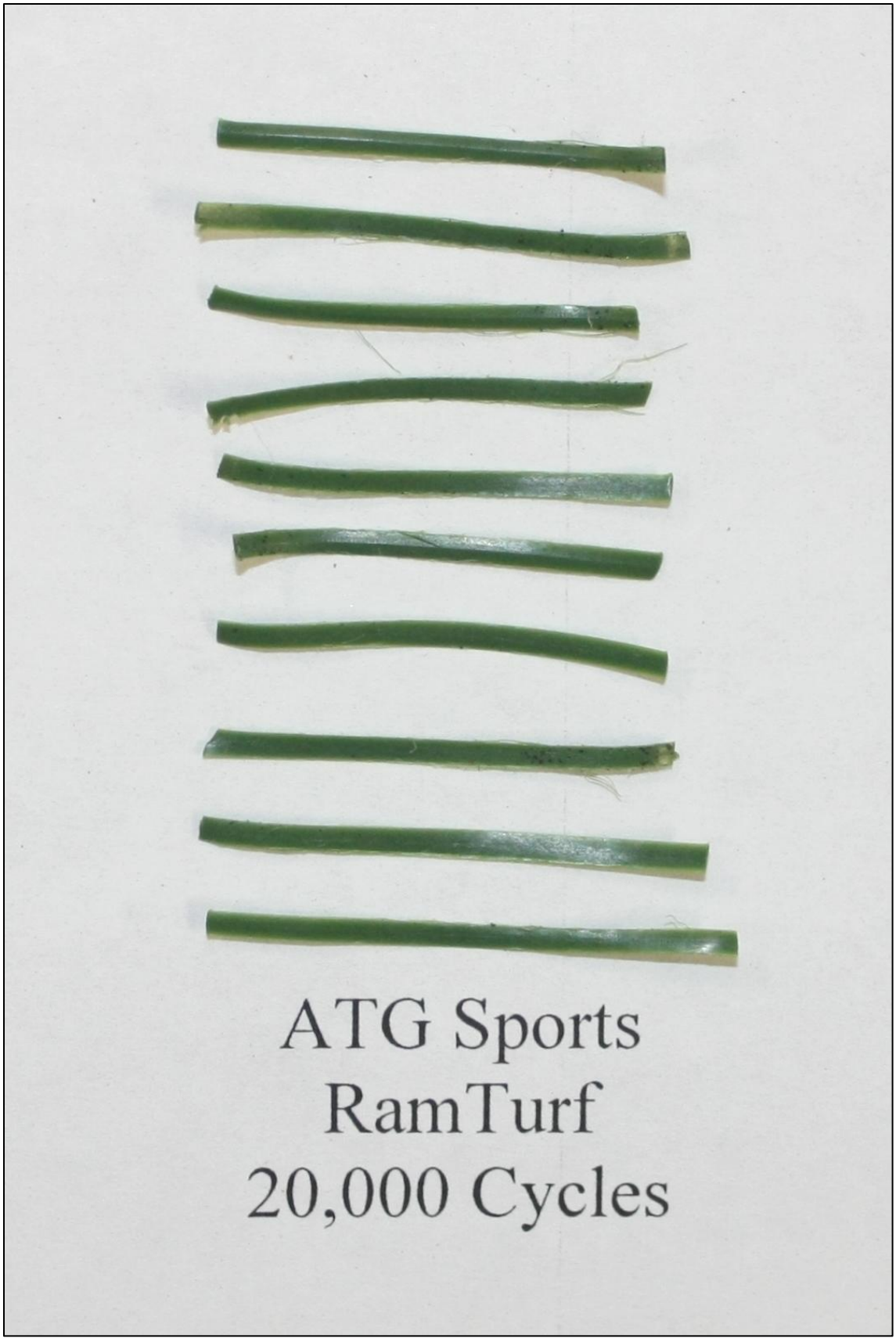
Tested August 2011

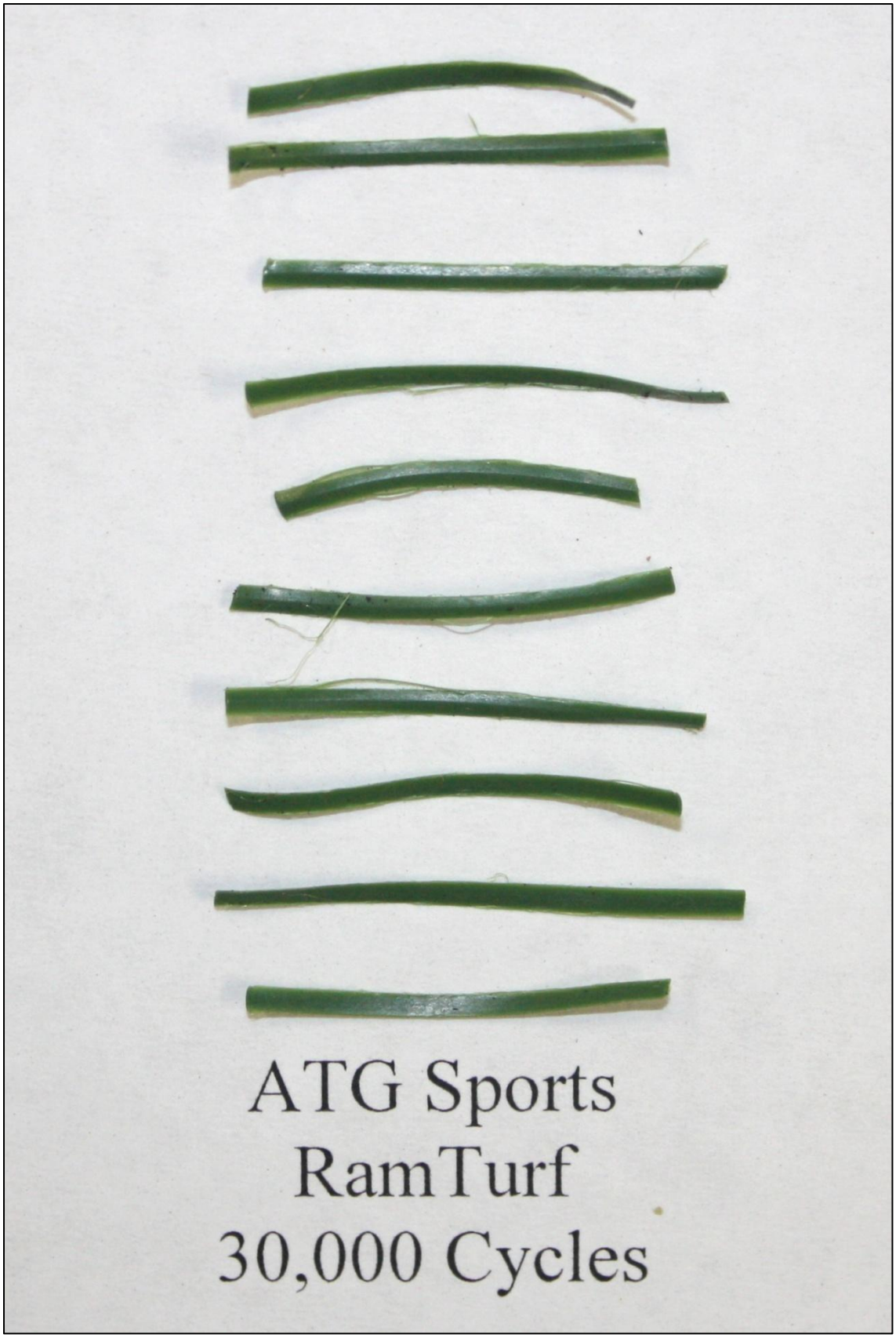


Cross section of ATG Sports RamTurf fiber from sample tested.


ATG Sports
RamTurf
0 Cycles


ATG Sports
RamTurf
10,000 Cycles


ATG Sports
RamTurf
20,000 Cycles

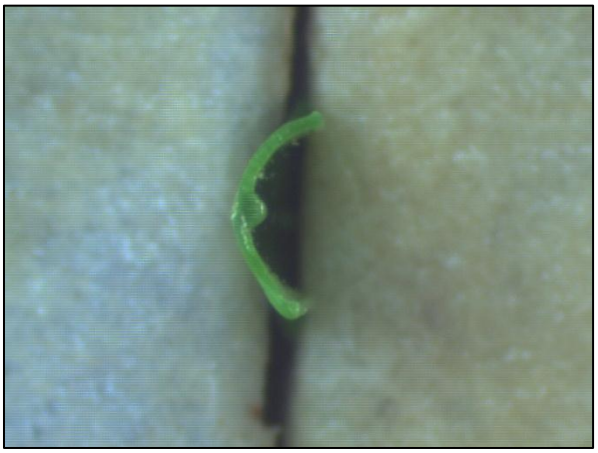

ATG Sports
RamTurf
30,000 Cycles

ATG Sports RamTurf after 30,000 cycles

FieldTurf Duraspine Pro

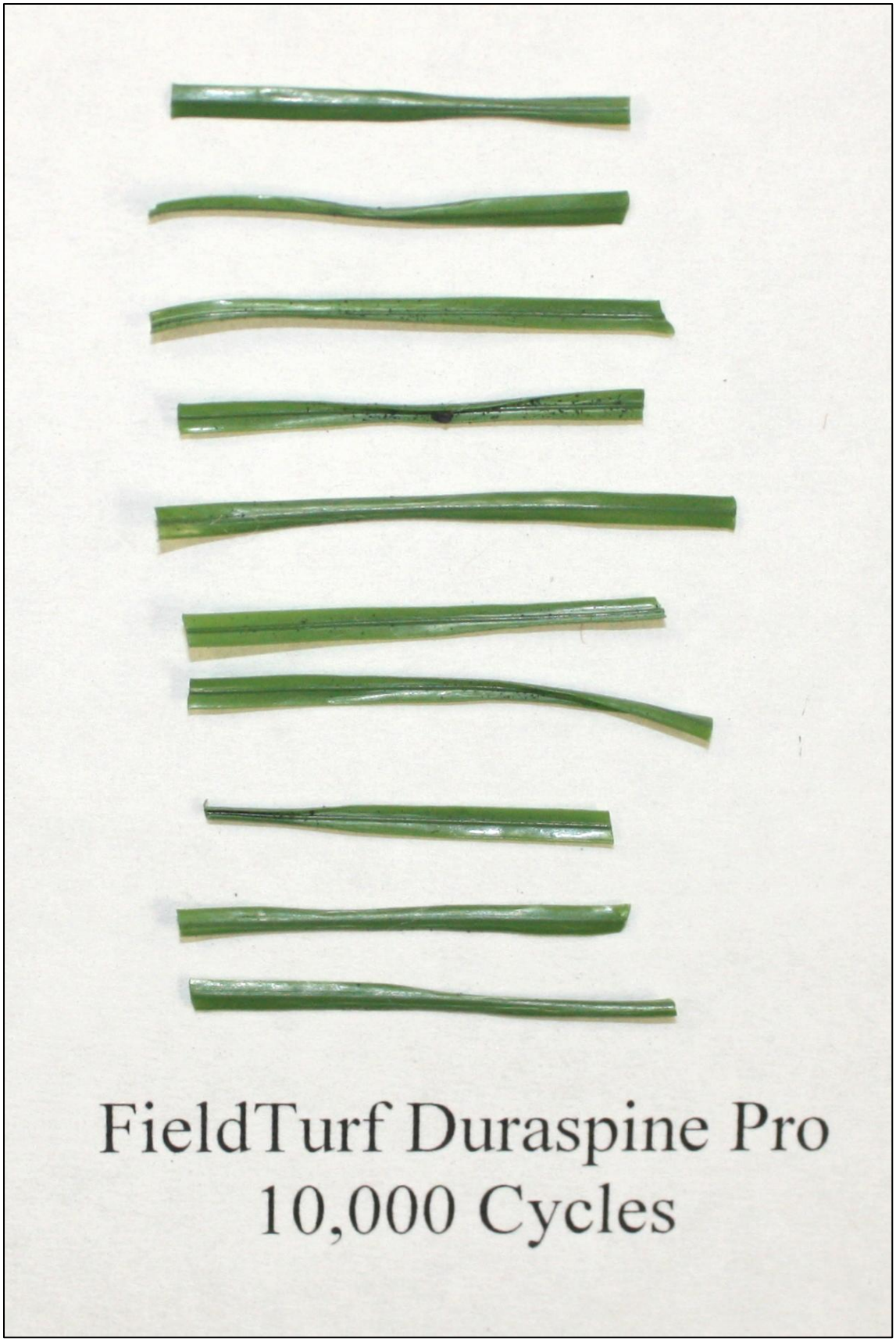
# of cycles	Good	Hair-Splitting	Fractured	Complete Splitting
0 cycles	10	0	0	0
10,000 cycles	6	4	0	0
20,000 cycles	4	4	2	0
30,000 cycles	1	1	3	5

Tested June 2011



Cross section of FieldTurf Duraspine Pro fiber from sample tested.


FieldTurf Duraspine Pro
0 Cycles


FieldTurf Duraspine Pro
10,000 Cycles


FieldTurf Duraspine Pro
20,000 Cycles


FieldTurf Duraspine Pro
30,000 Cycles

FieldTurf Duraspine Pro after 30,000 cycles

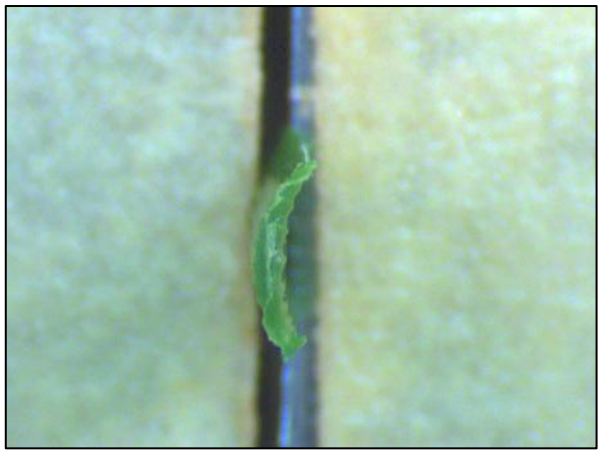
FieldTurf Revolution

Fiber classifications for each 10,000 cycle interval from 10 random fibers removed from sample.

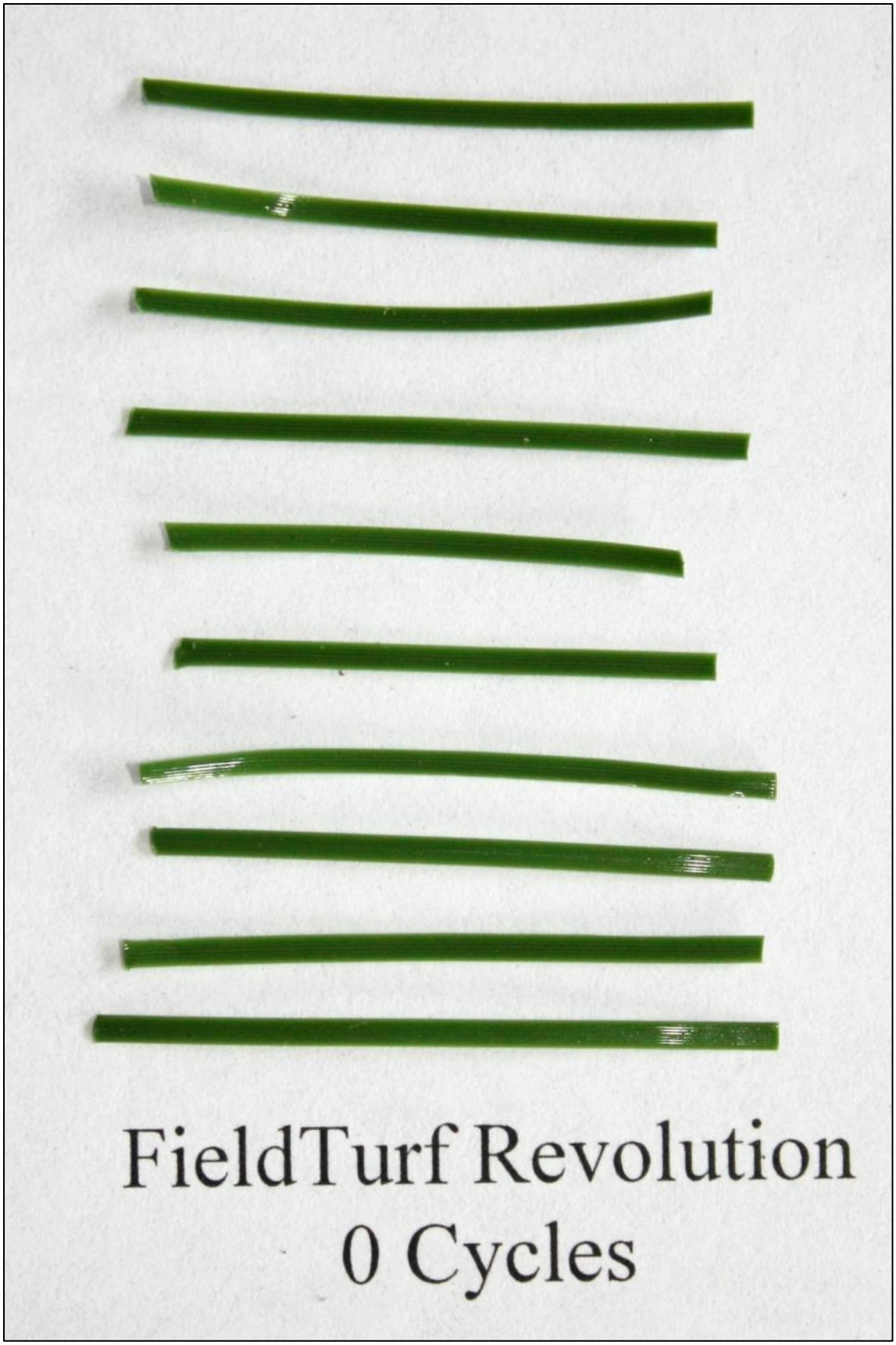
# of cycles	Good	Hair-Splitting*	Fractured	Complete Splitting
0 cycles	10	0	0	0
10,000 cycles	10	0	0	0
20,000 cycles	9	1	0	0
30,000 cycles	7	3	0	0

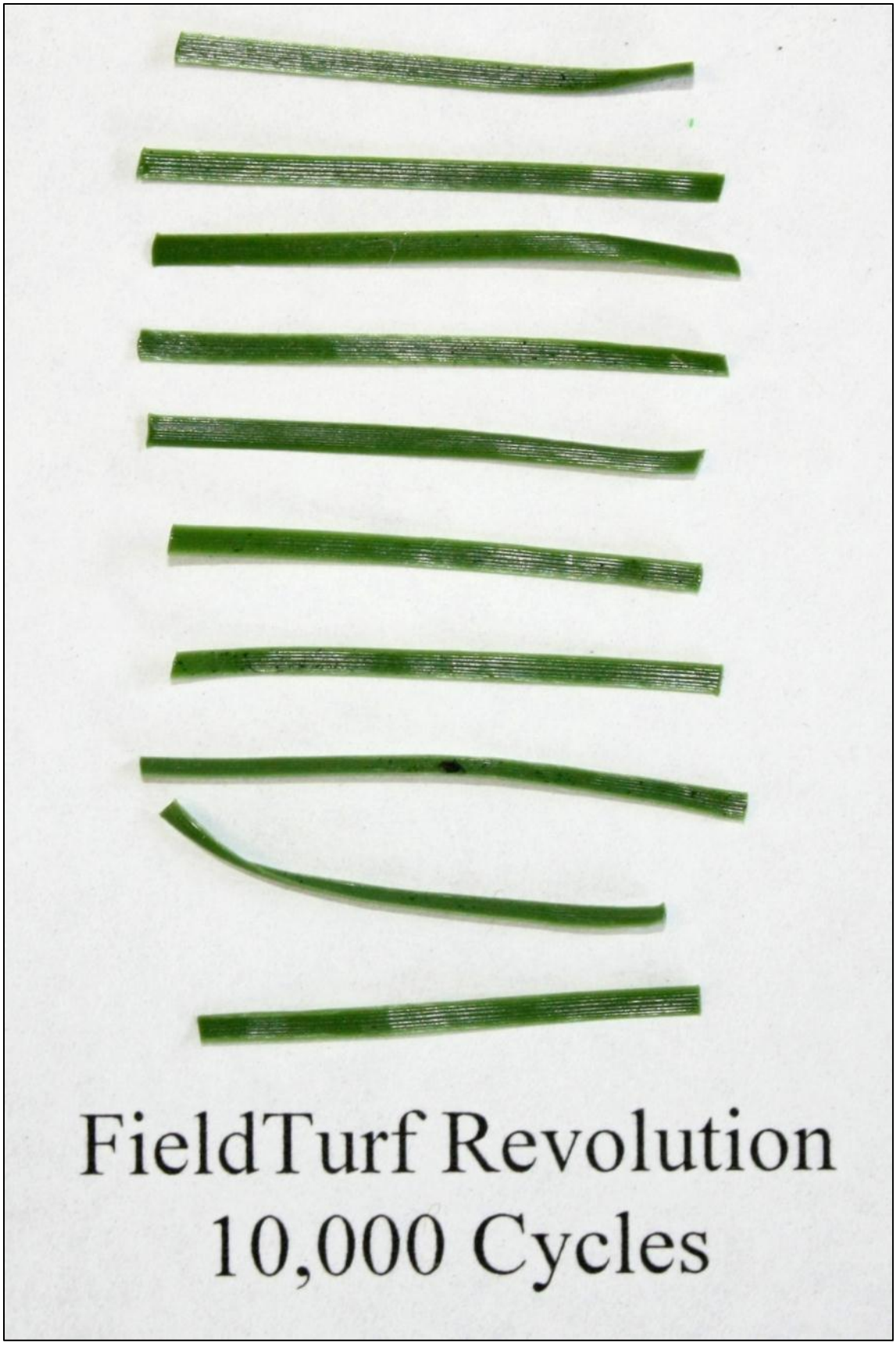
*Hairsplitting on edges of fibers only

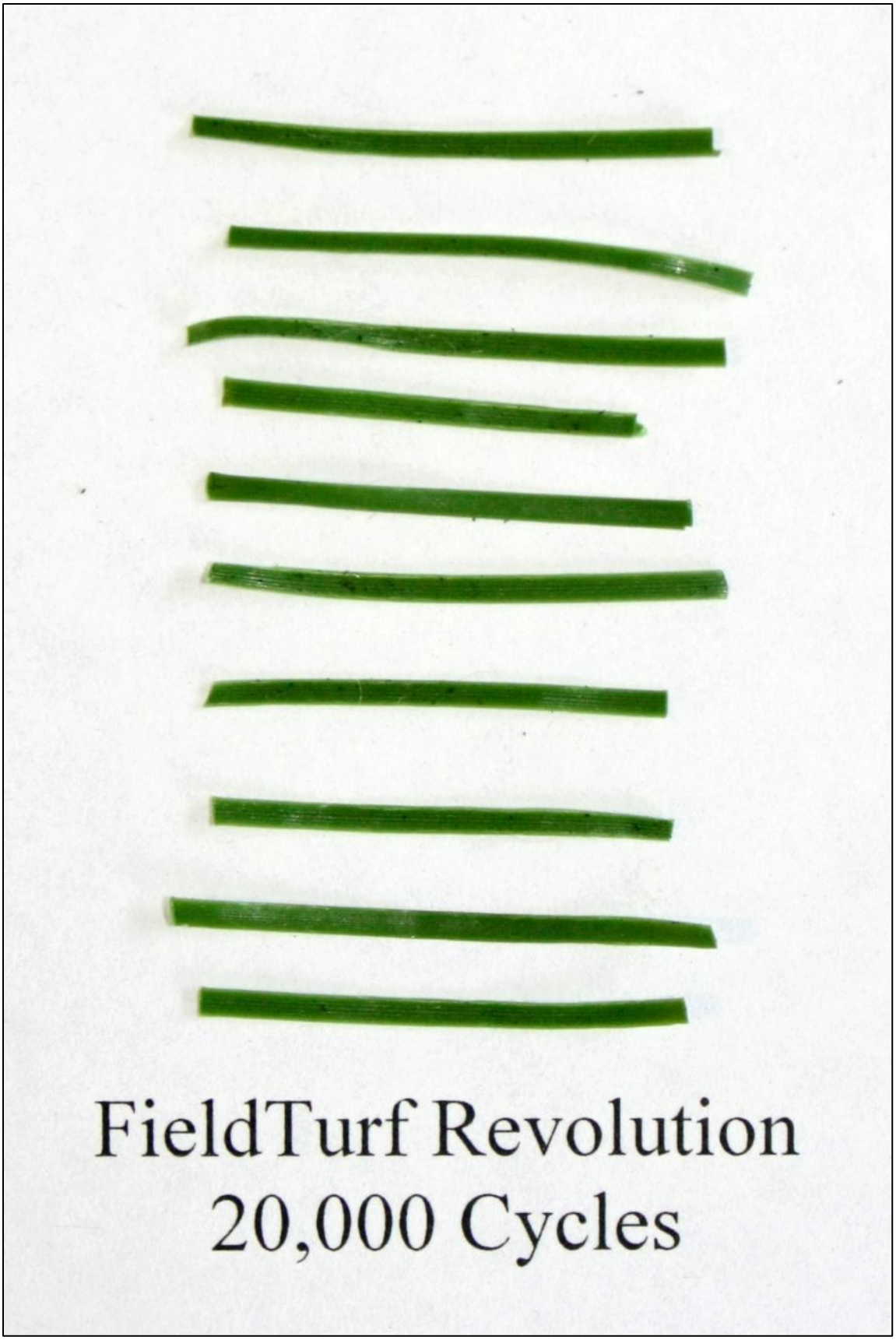
Tested April 2011



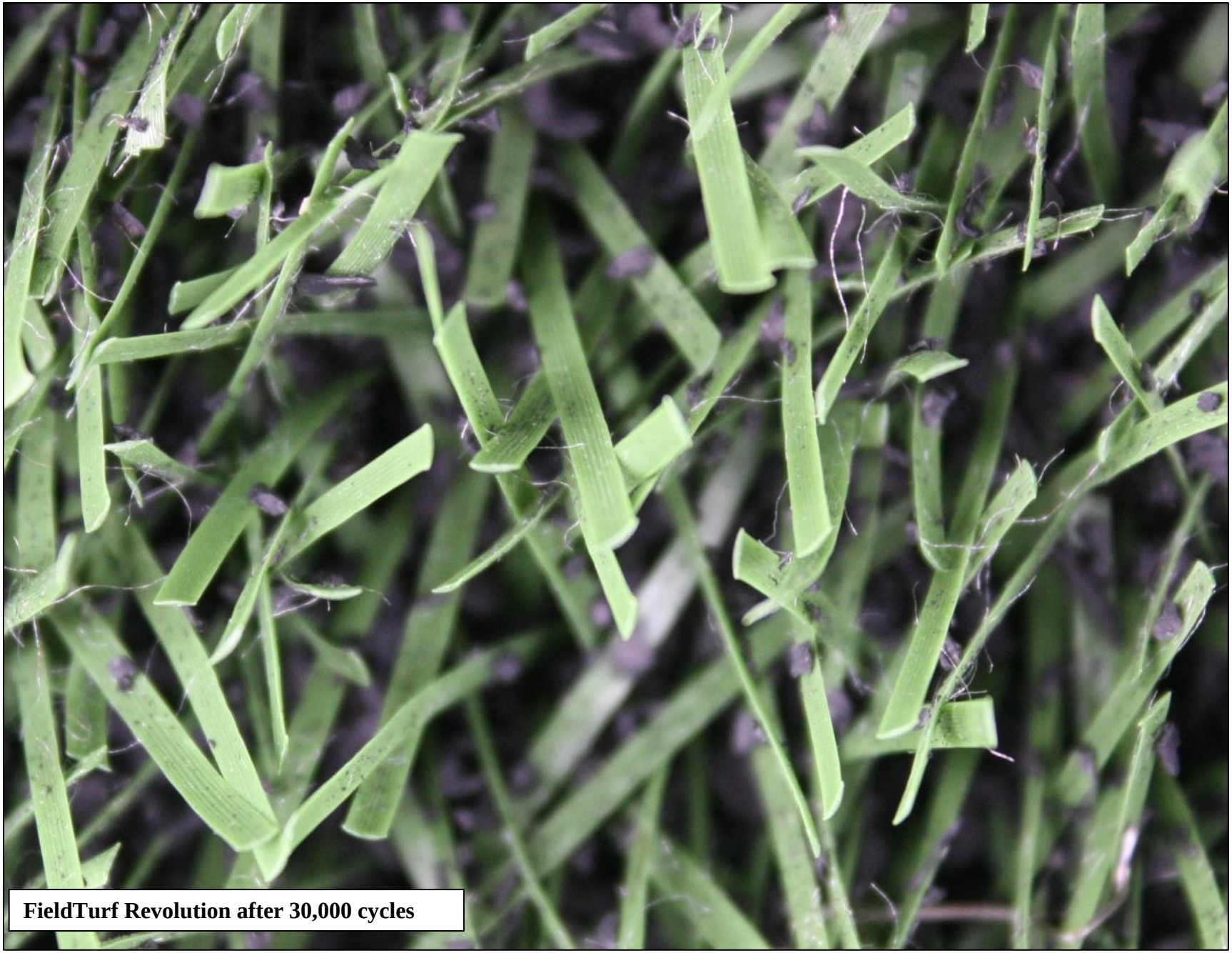
Cross section of FieldTurf Revolution fiber from sample tested.


FieldTurf Revolution
0 Cycles


FieldTurf Revolution
10,000 Cycles


FieldTurf Revolution
20,000 Cycles


FieldTurf Revolution
30,000 Cycles



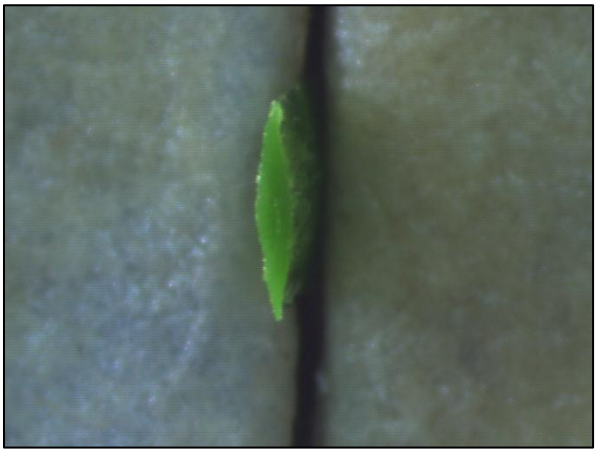
FieldTurf Revolution after 30,000 cycles

Hellas Matrix

# of cycles	Good	Hair-Splitting*	Fractured*	Complete Splitting
0 cycles	10	0	0	0
10,000 cycles	4	5	1	0
20,000 cycles	4	6	0	0
30,000 cycles	1	7	2	0

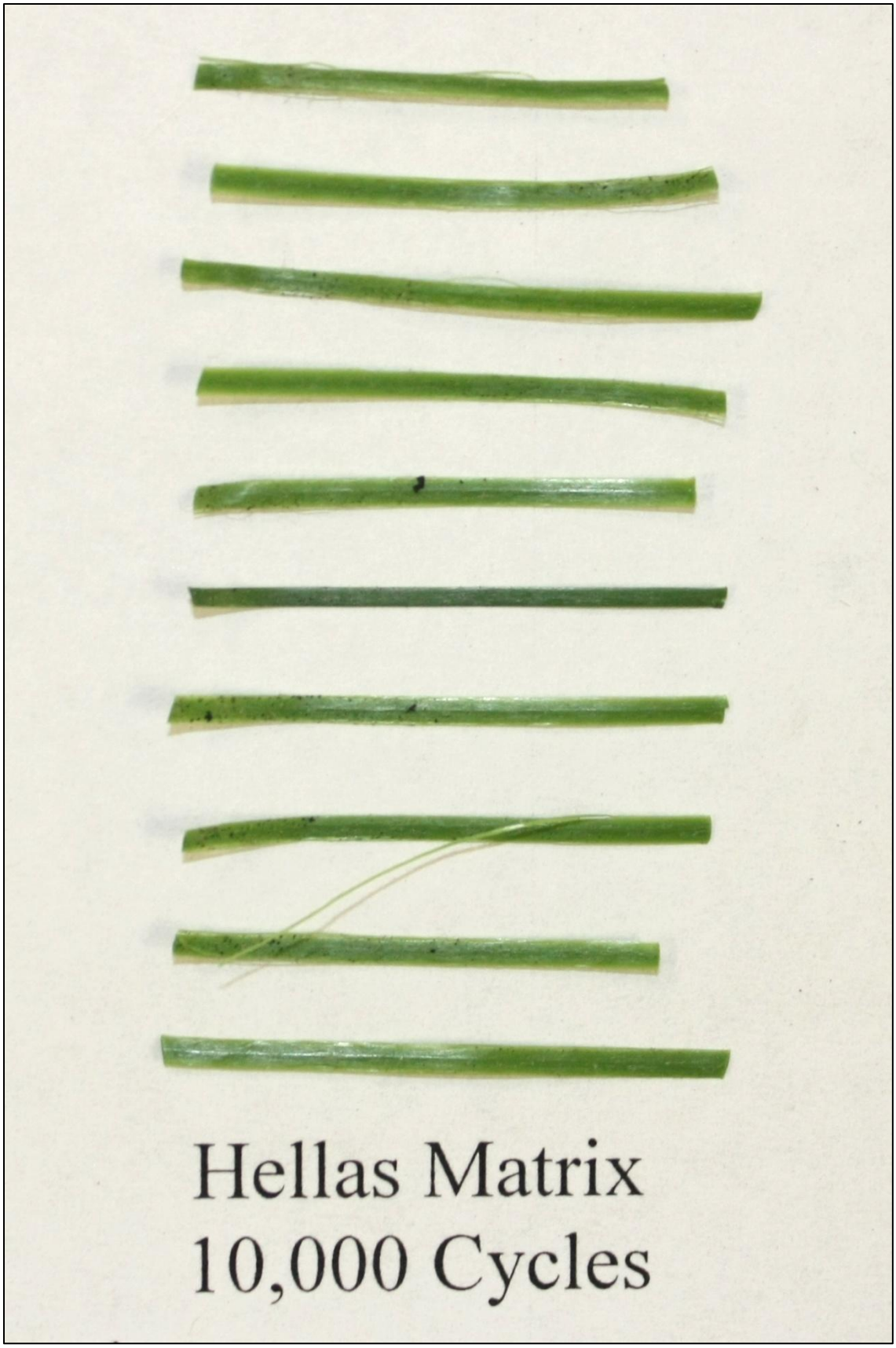
*Hairsplitting and fracturing on edges of fibers only

Tested June 2011



Cross section of Hellas Matrix fiber from sample tested.


Hellas Matrix
0 Cycles


Hellas Matrix
10,000 Cycles


Hellas Matrix
20,000 Cycles


Hellas Matrix
30,000 Cycles

Hellas Matrix after 30,000 cycles

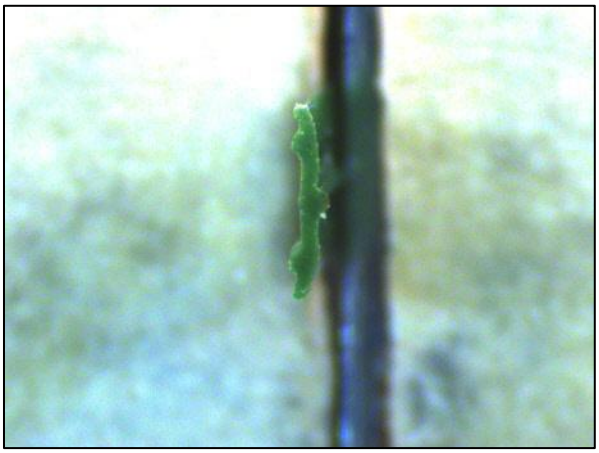

Buildup of fiber “debris” from Hellas Matrix after 30,000 cycles.
This was not observed on any other product tested.

Mondo Monofibre 3NX

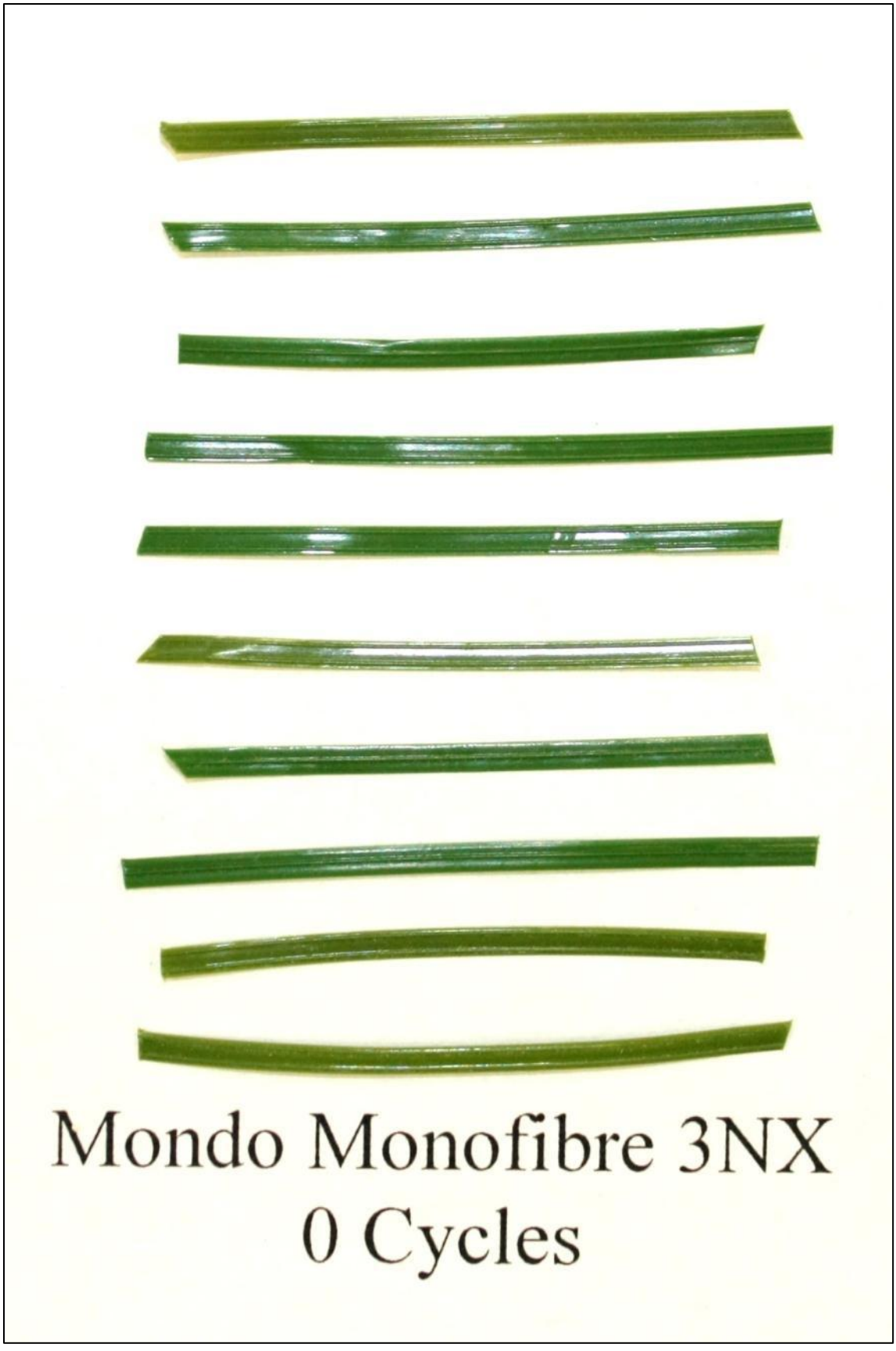
Fiber classifications for each 10,000 cycle interval from 10 random fibers removed from sample.

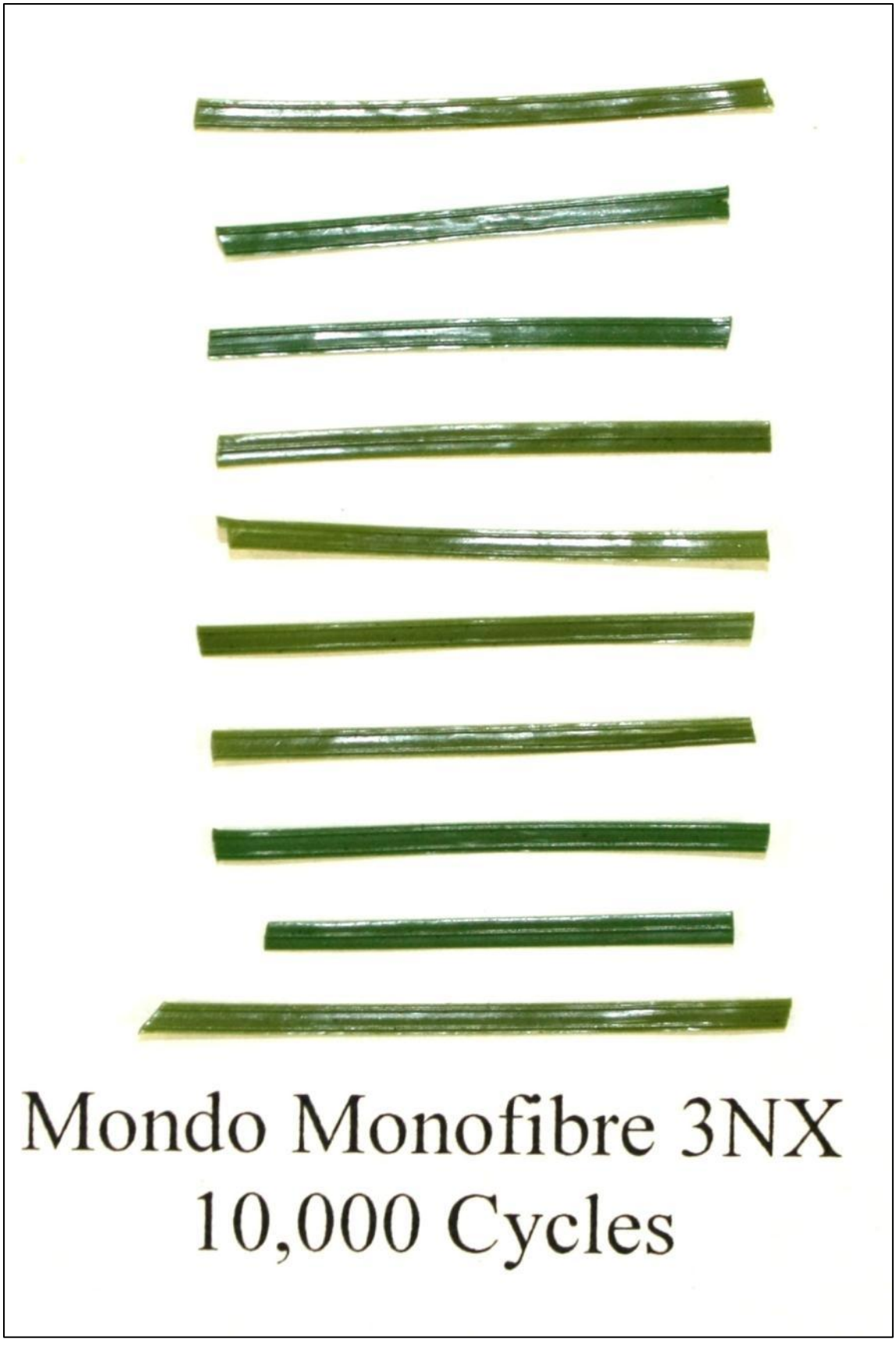
# of cycles	Good	Hair-Splitting	Fractured	Complete Splitting
0 cycles	10	0	0	0
10,000 cycles	9	1	0	0
20,000 cycles	2	2	1	5
30,000 cycles	1	1	2	6

Tested May 2011



Cross section of Mondo Monofibre 3NX fiber from sample tested.


Mondo Monofibre 3NX
0 Cycles



Mondo Monofibre 3NX
10,000 Cycles


Mondo Monofibre 3NX
20,000 Cycles


Mondo Monofibre 3NX
30,000 Cycles

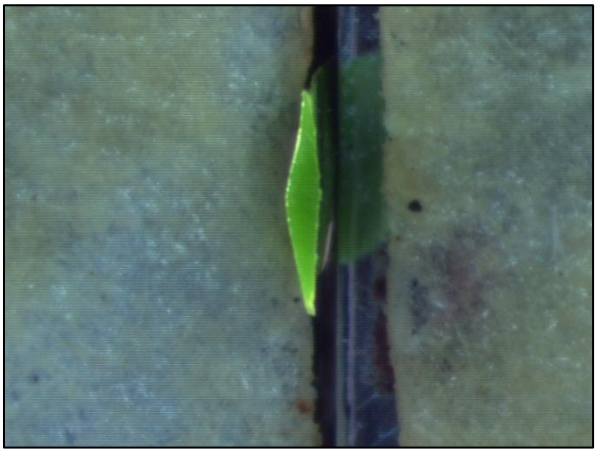
Mondo Monofibre 3NX after 30,000 cycles

Shaw Sportexe PowerBlade HP+

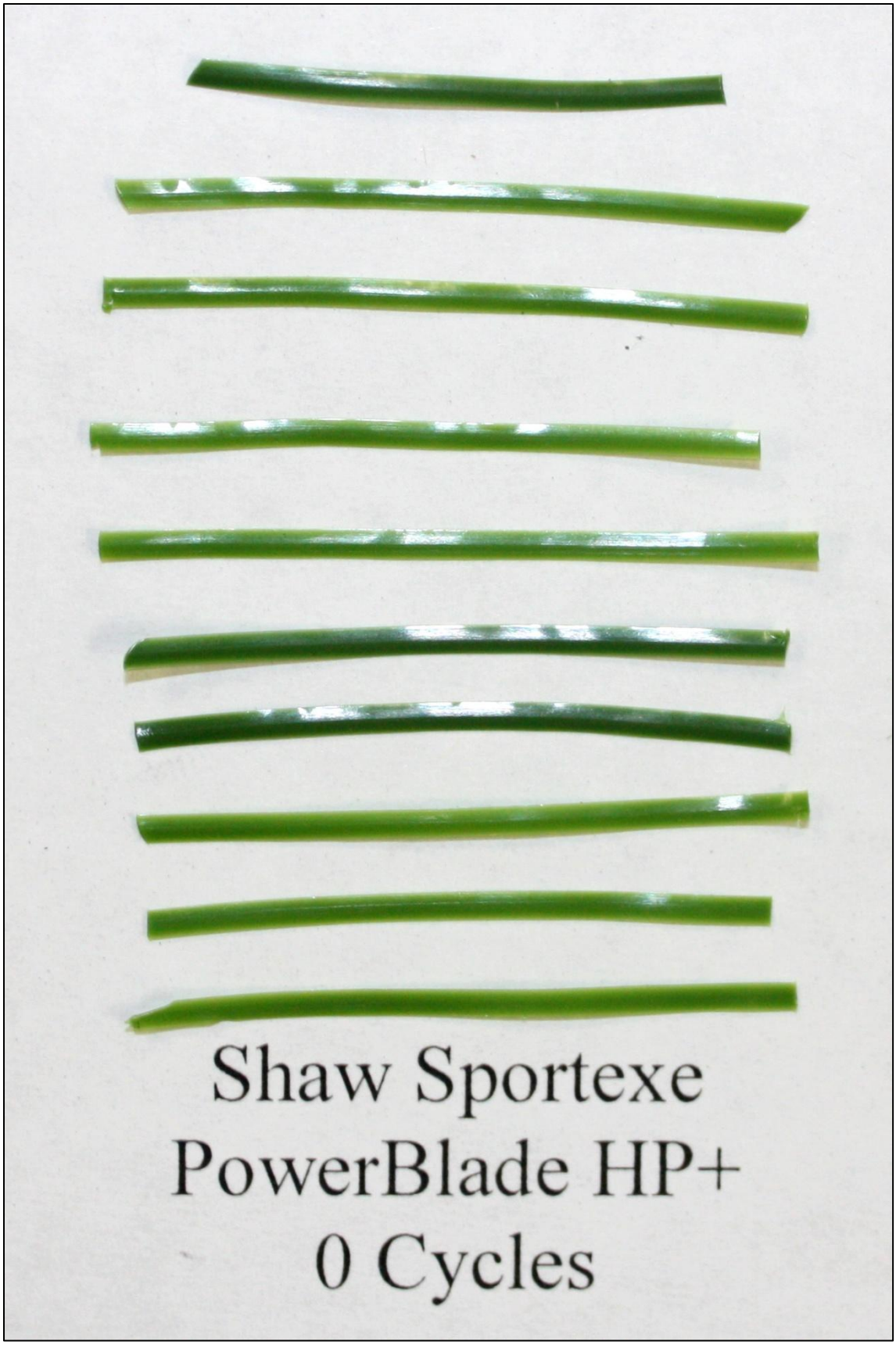
# of cycles	Good	Hair-Splitting*	Fractured*	Complete Splitting
0 cycles	10	0	0	0
10,000 cycles	8	2	0	0
20,000 cycles	6	4	0	0
30,000 cycles	4	5	1	0

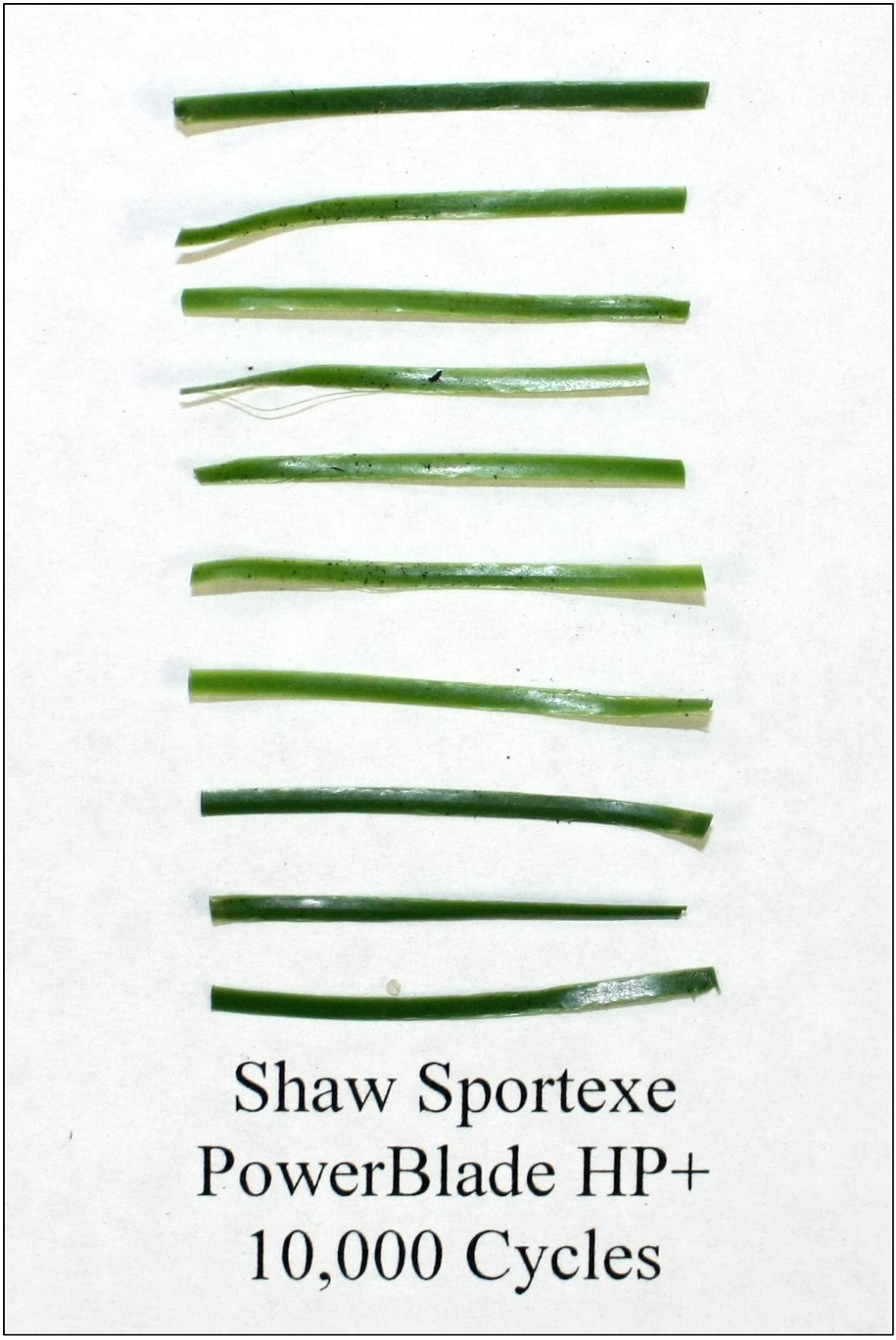
*Hairsplitting and fracturing on edges of fibers only

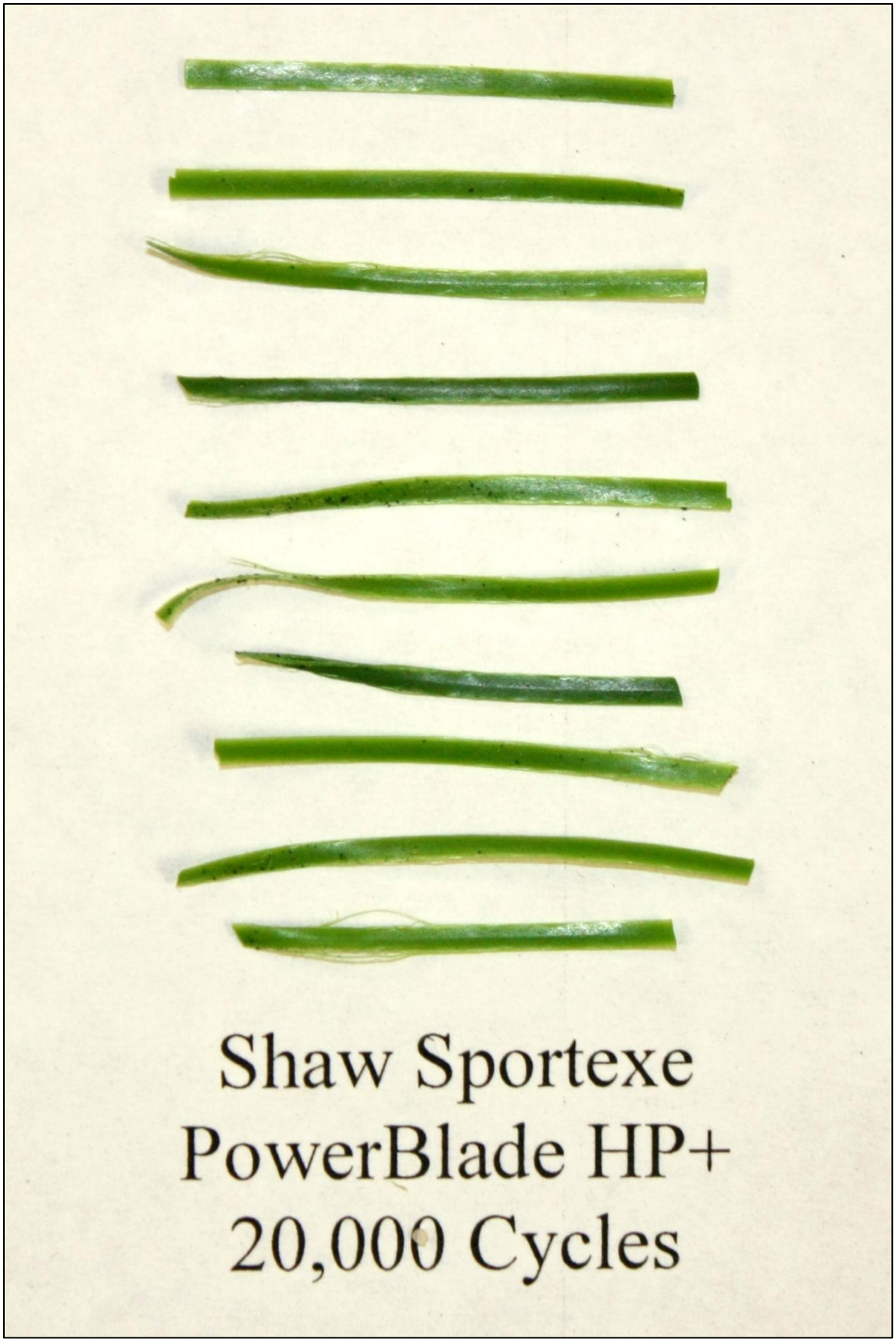
Tested June 2011



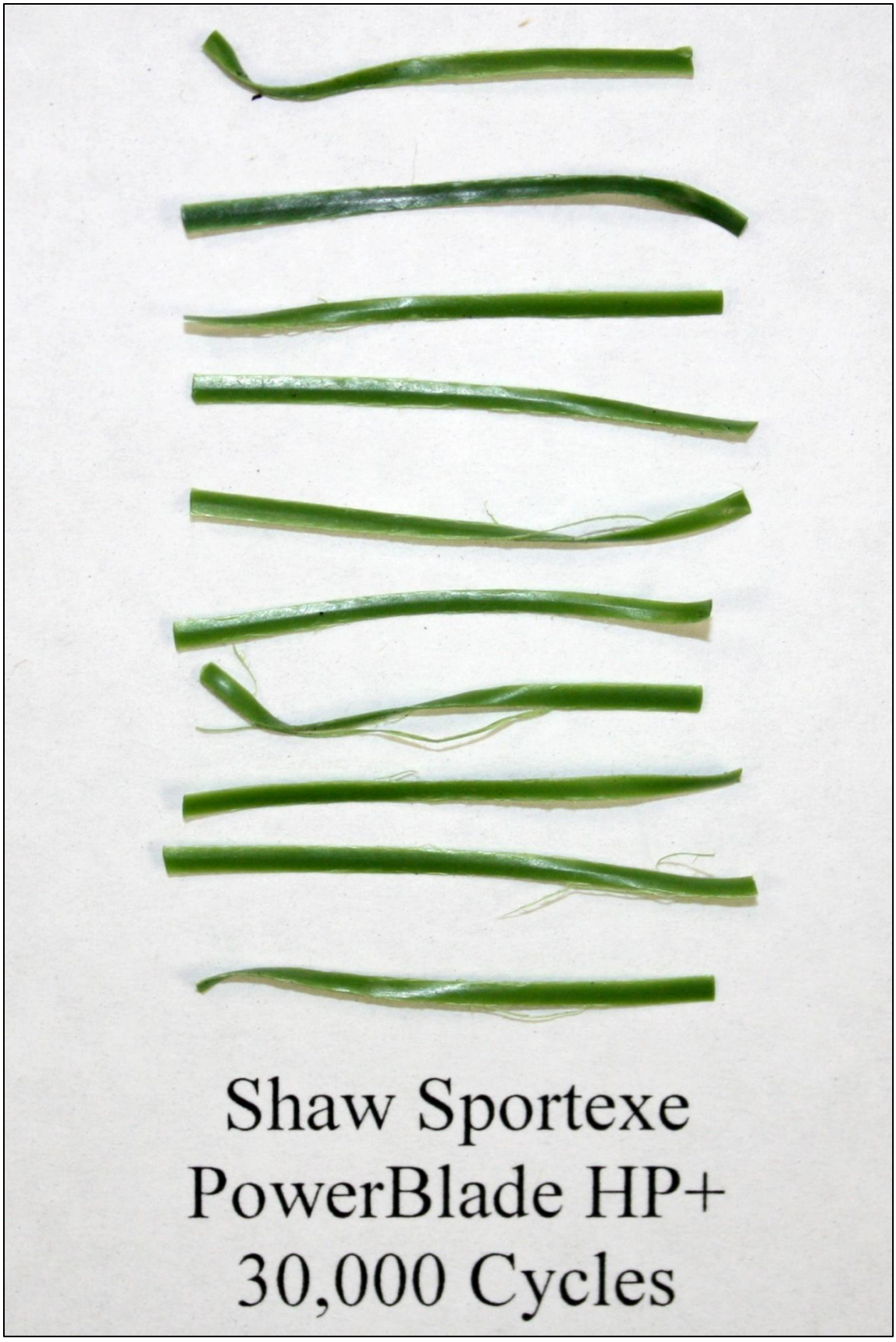
Cross section of Shaw Sportexe PowerBlade HP+ fiber from sample tested.


Shaw Sportexe
PowerBlade HP+
0 Cycles


Shaw Sportexe
PowerBlade HP+
10,000 Cycles



Shaw Sportexe
PowerBlade HP+
20,000 Cycles


Shaw Sportexe
PowerBlade HP+
30,000 Cycles

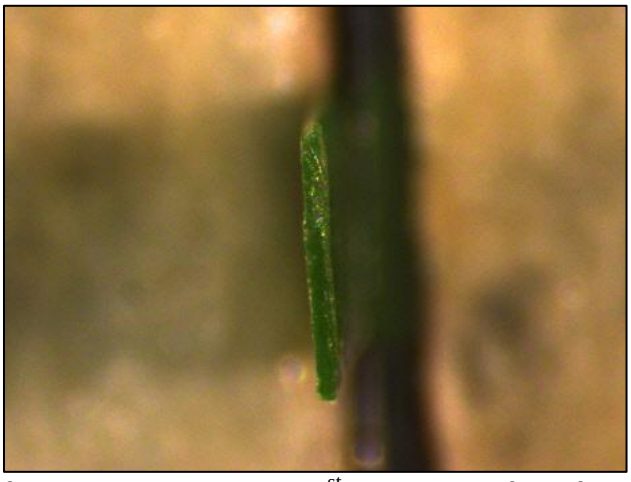
Shaw Sportexe PowerBlade HP+ after 30,000 cycles

Sportexe Powerblade (1st Generation)

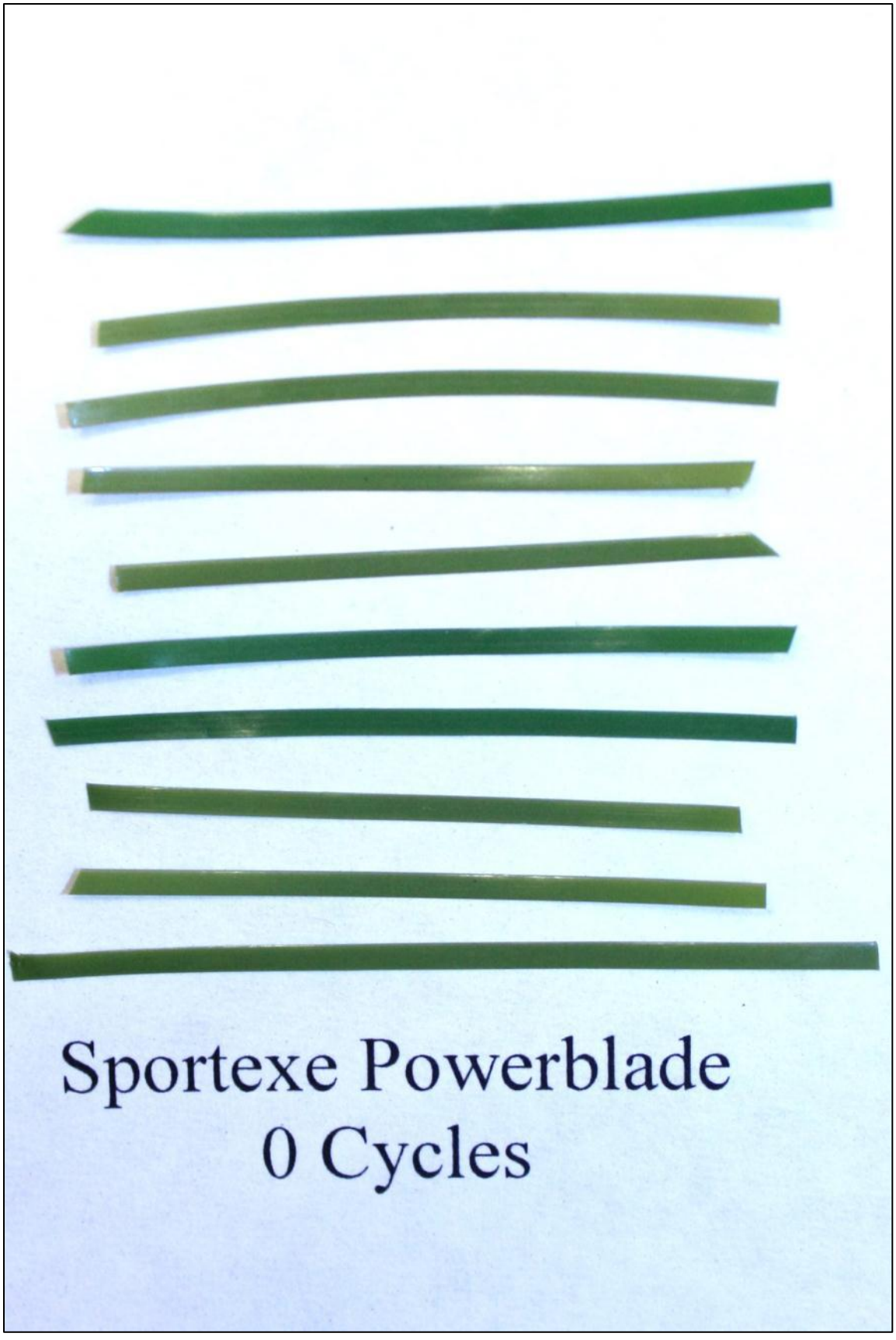
Fiber classifications for each 10,000 cycle interval from 10 random fibers removed from sample.

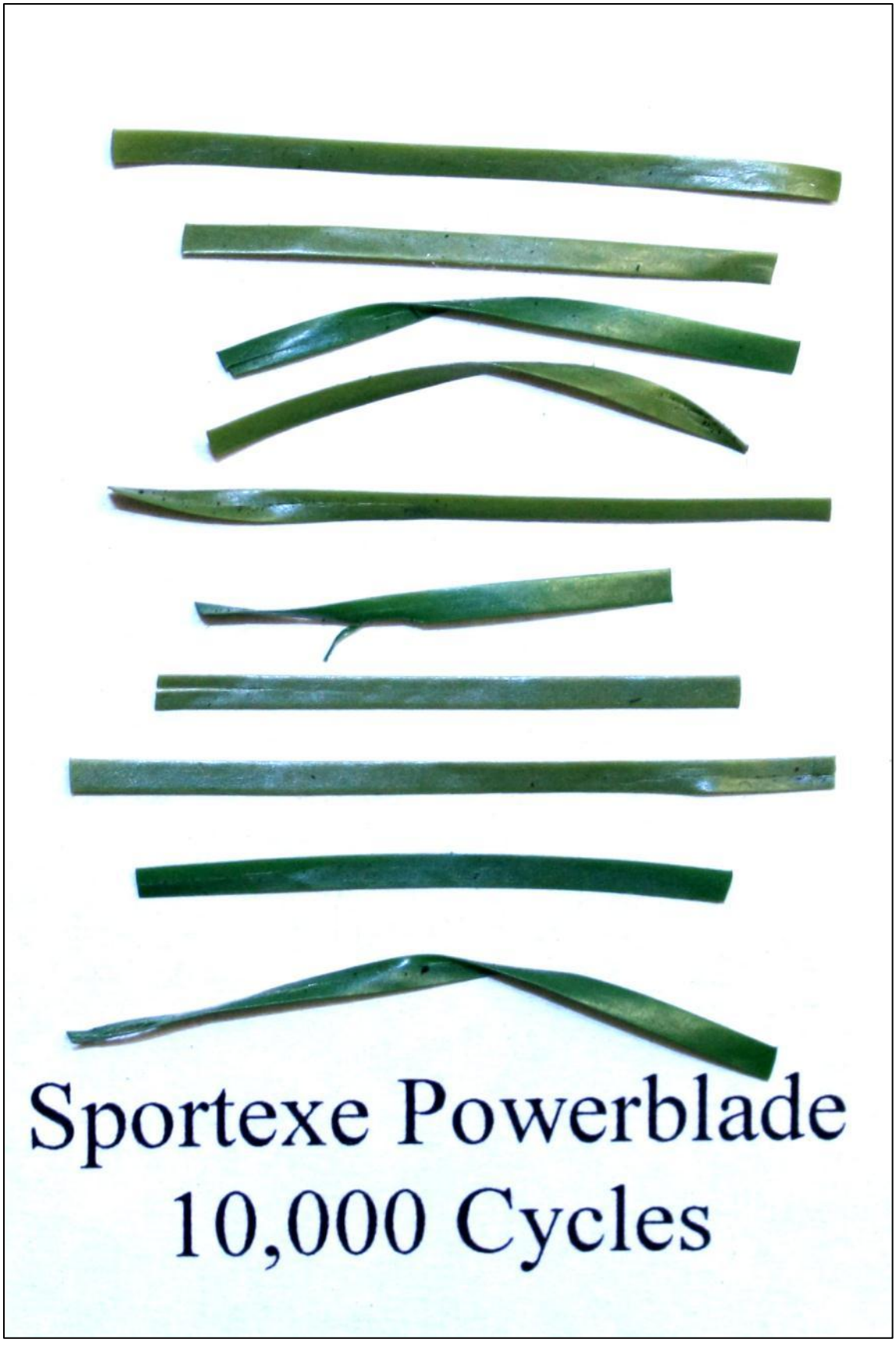
# of cycles	Good	Hair-Splitting	Fractured	Complete Splitting
0 cycles	10	0	0	0
10,000 cycles	3	4	3	0
20,000 cycles	3	3	2	2
30,000 cycles	0	2	4	4

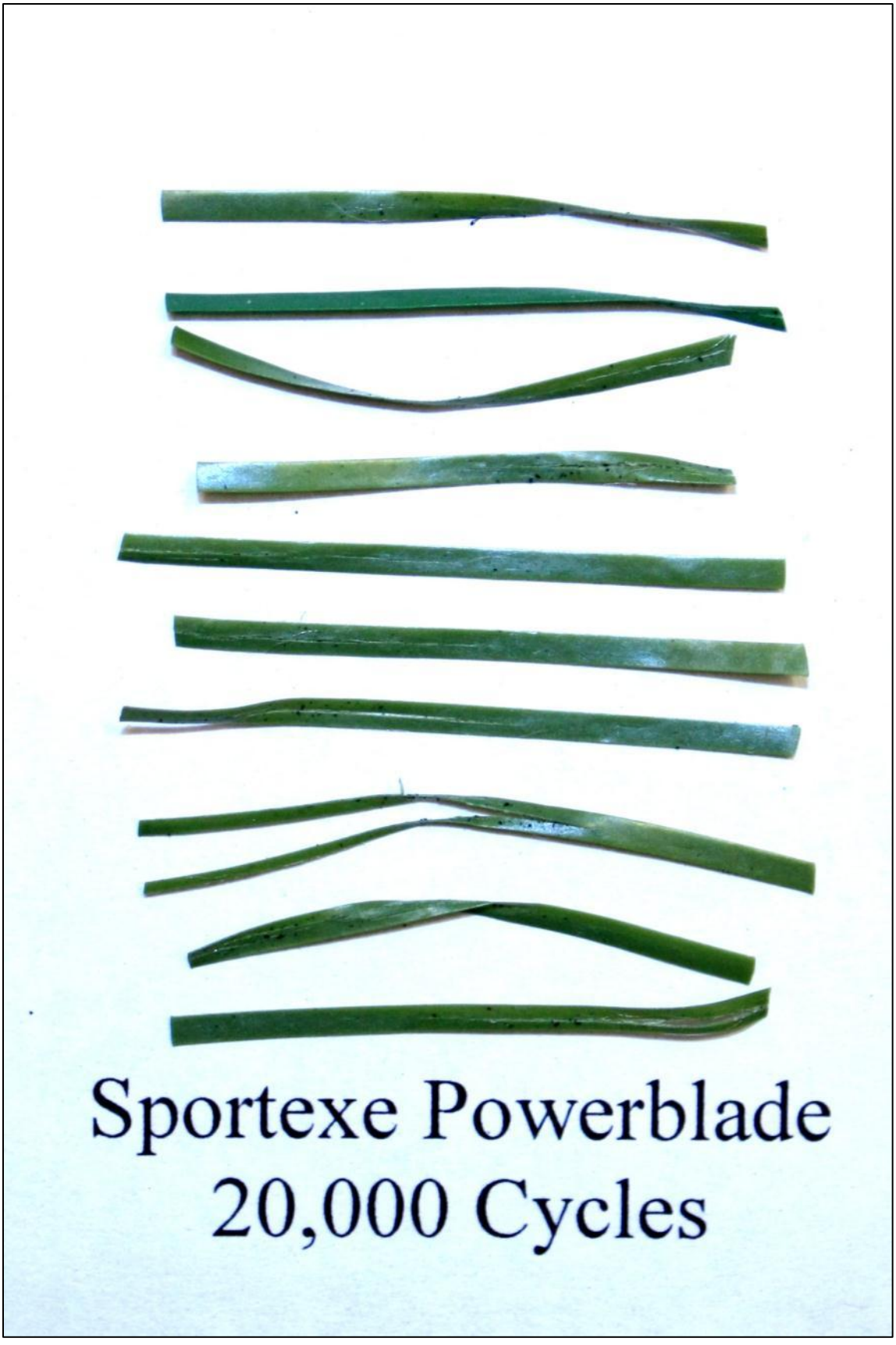
Tested April 2011

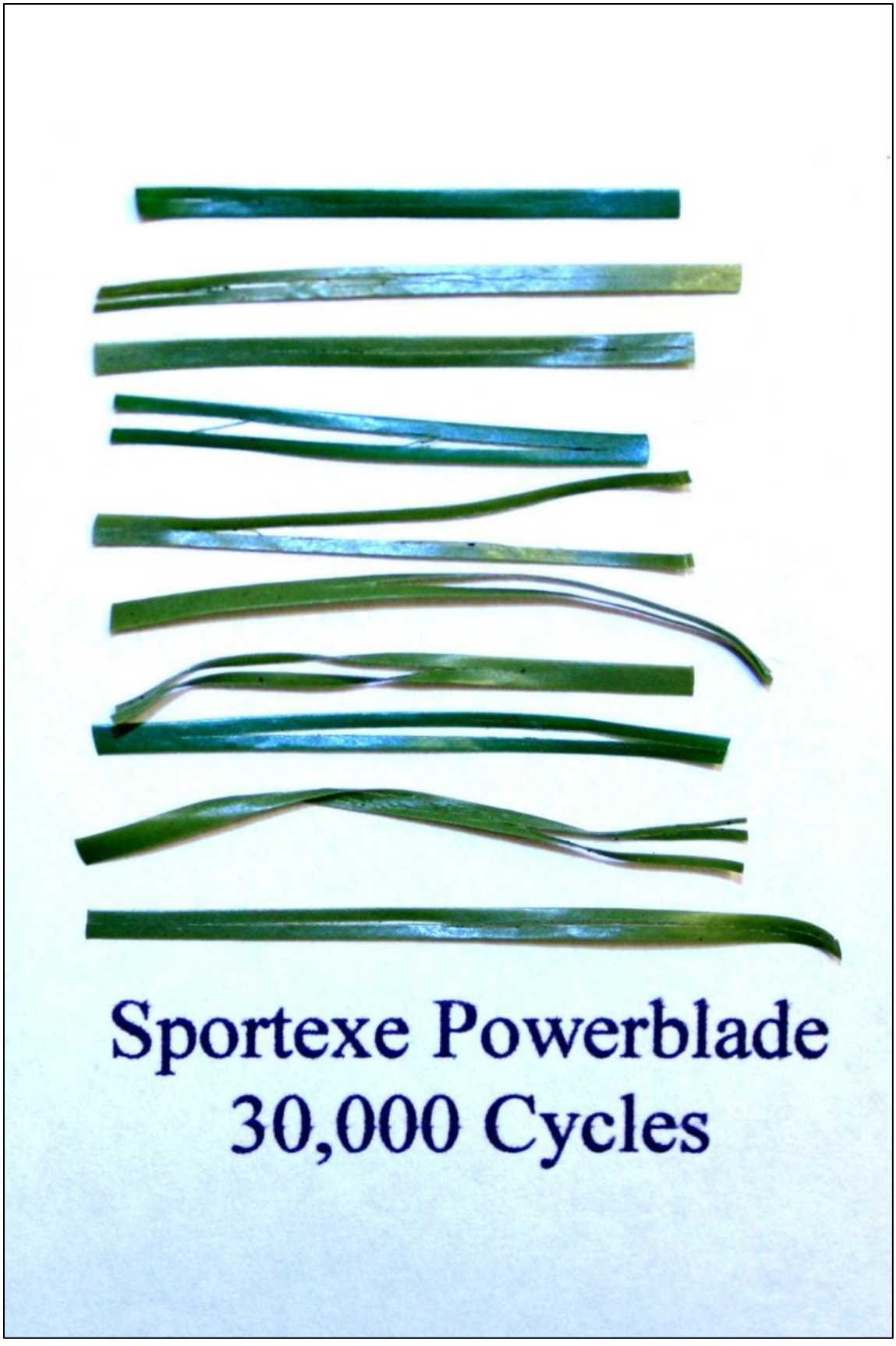


Cross section of Sportexe Powerblade (1st generation) fiber from sample tested.


Sportexe Powerblade
0 Cycles


Sportexe Powerblade
10,000 Cycles


Sportexe Powerblade
20,000 Cycles


Sportexe Powerblade
30,000 Cycles

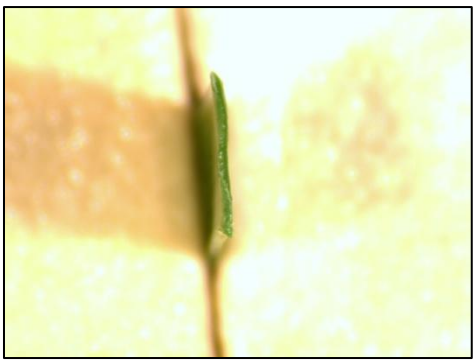
Sportexe PowerBlade after 30,000 cycles

Sprinturf Ultrablade DF*

# of cycles	Good	Hair-Splitting	Fractured	Complete Splitting
0 cycles	10	0	0	0
10,000 cycles	3	6	1	0
20,000 cycles	0	2	6	2
30,000 cycles	0	1	6	3

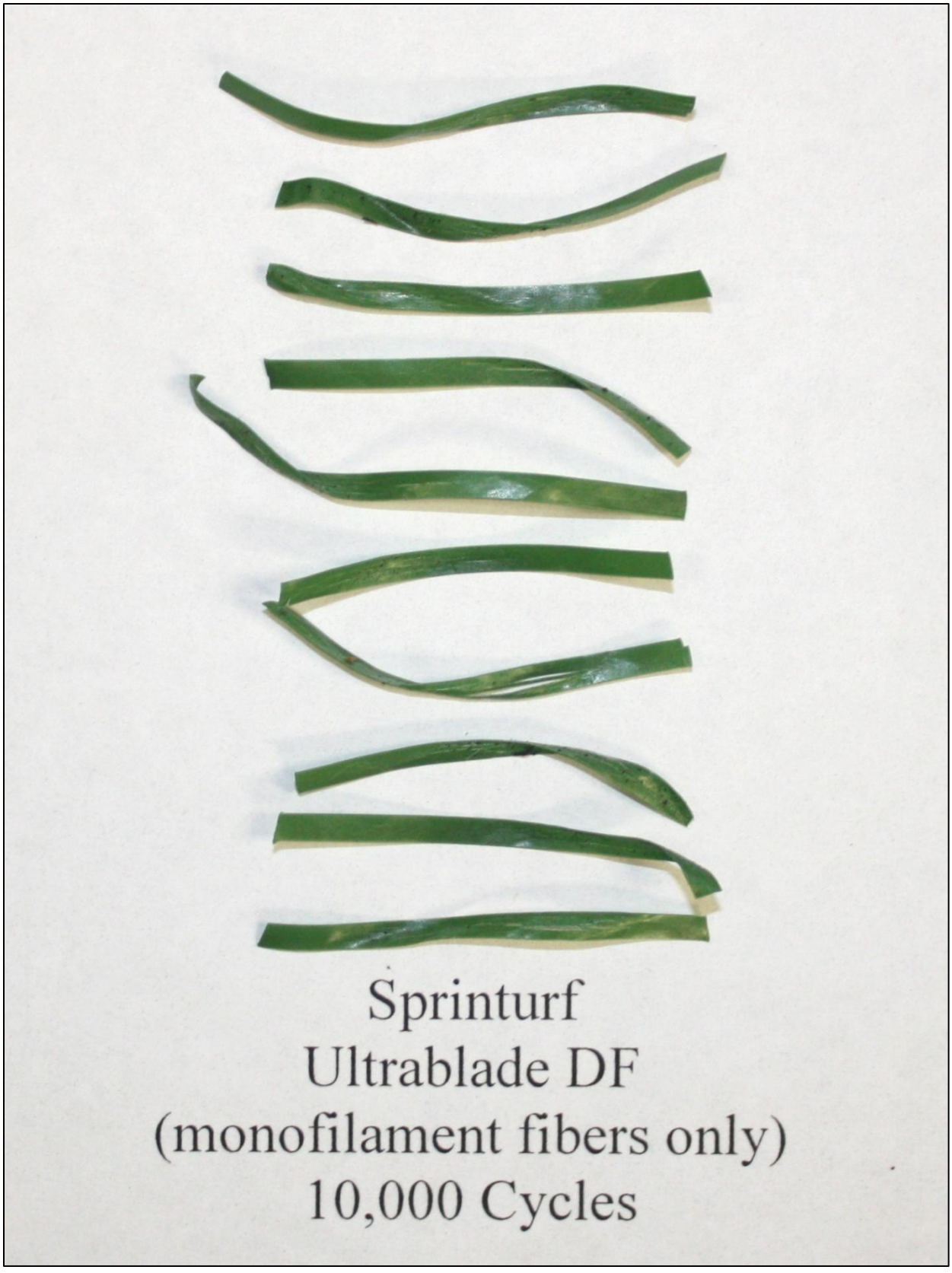
*Sprinturf Ultrablade contains both parallel-fibrilated (slit-film) fibers and monofilament fibers. In this test, only monofilament fibers were removed for evaluation

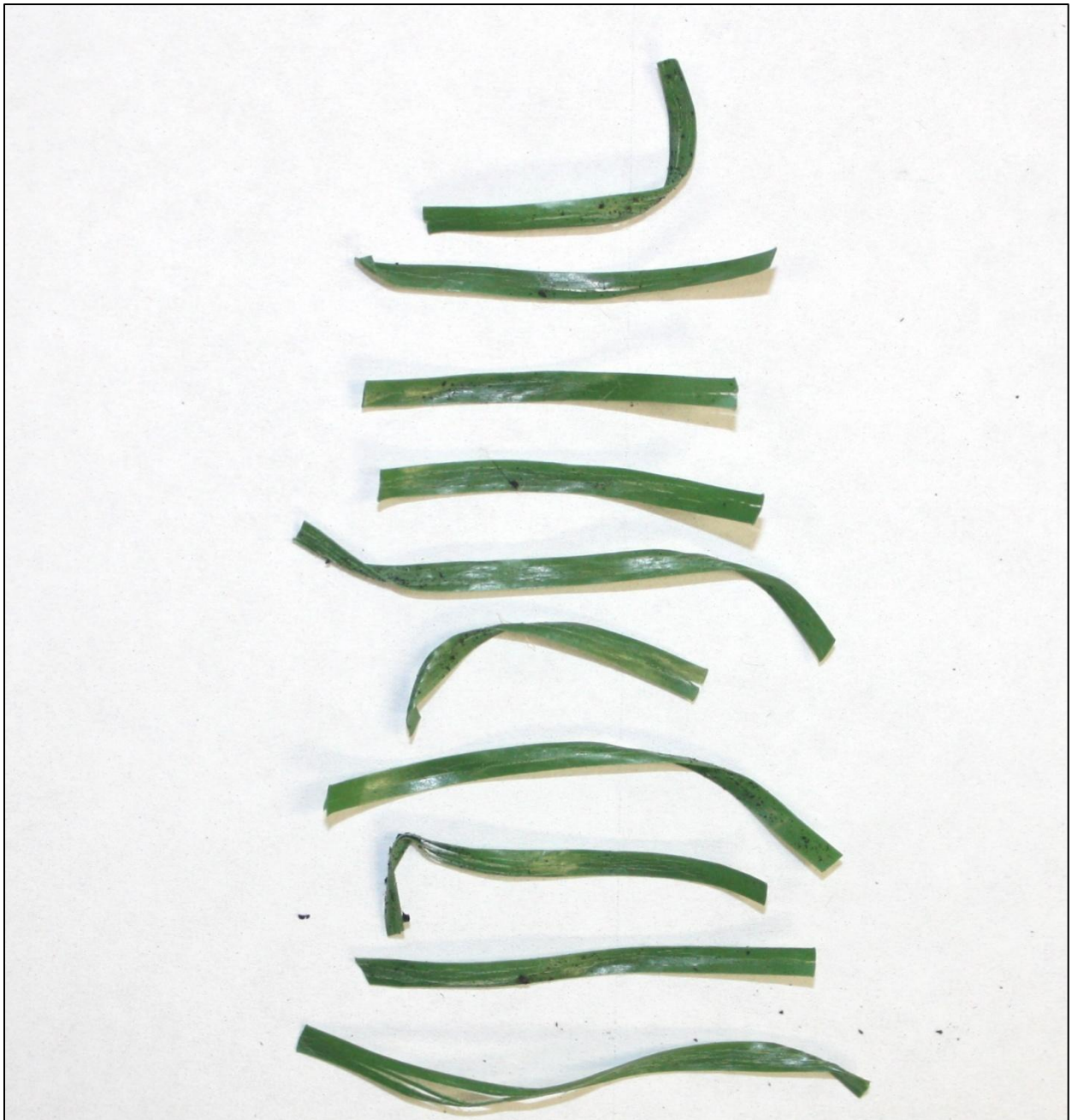
Tested October 2011



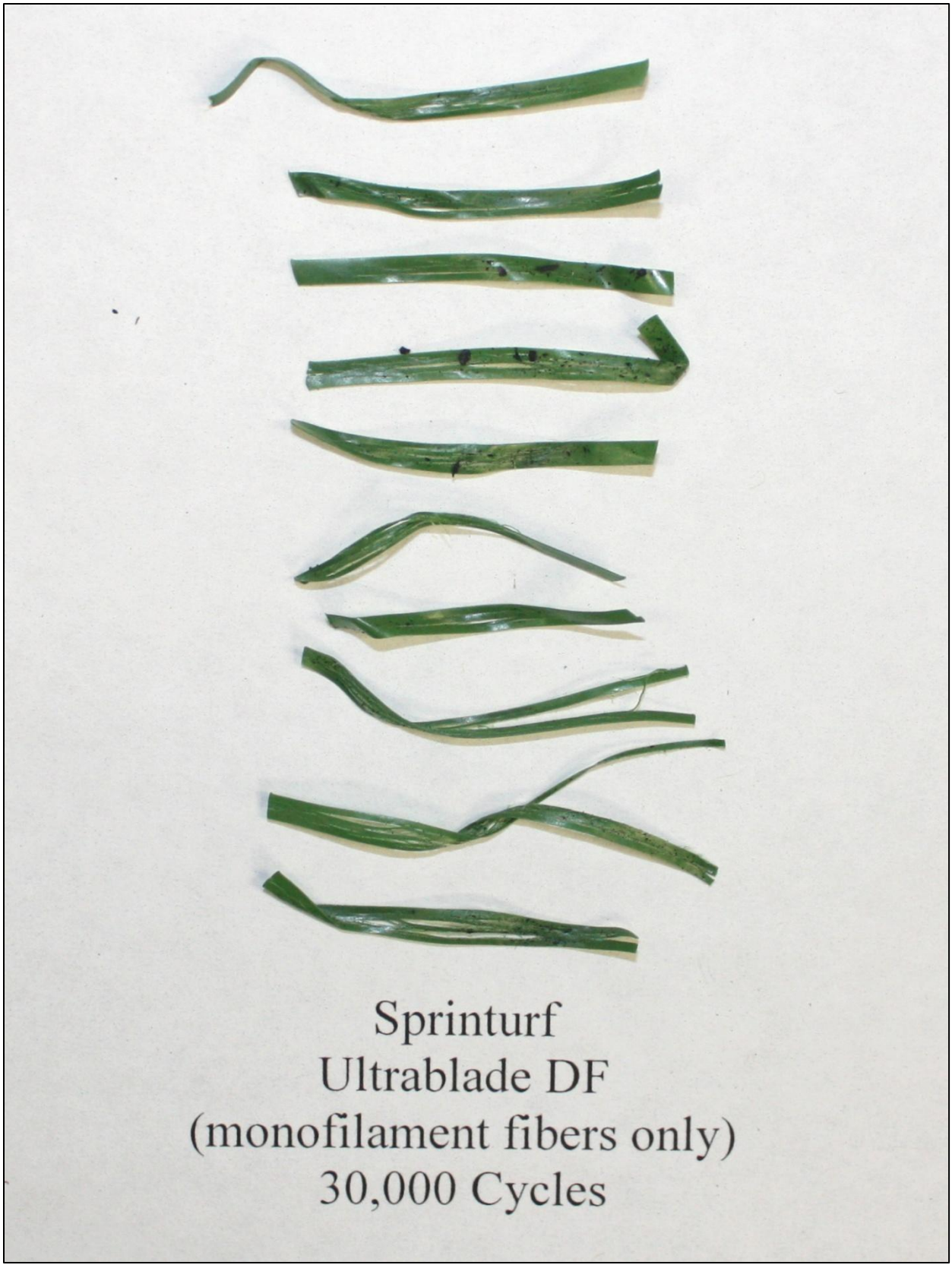
Cross section of Sprinturf Ultrablade DF monofilament fiber from sample tested.


Sprinturf
Ultrablade DF
(monofilament fibers only)
0 Cycles


Sprinturf
Ultrablade DF
(monofilament fibers only)
10,000 Cycles



Sprinturf
Ultrablade DF
(monofilament fibers only)
20,000 Cycles



Sprinturf
Ultrablade DF
(monofilament fibers only)
30,000 Cycles

Sprinturf Ultrablade DF after 30,000 cycles

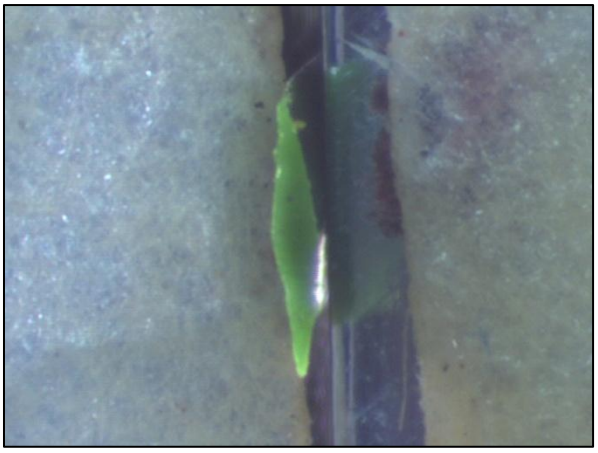
UBU Sports Balance MN69

# of cycles	Good	Hair-Splitting	Fractured	Complete Splitting
0 cycles	10	0	0	0
10,000 cycles	7	3*	0	0
20,000 cycles	6	4*	0	0
30,000 cycles	4	4**	1	1

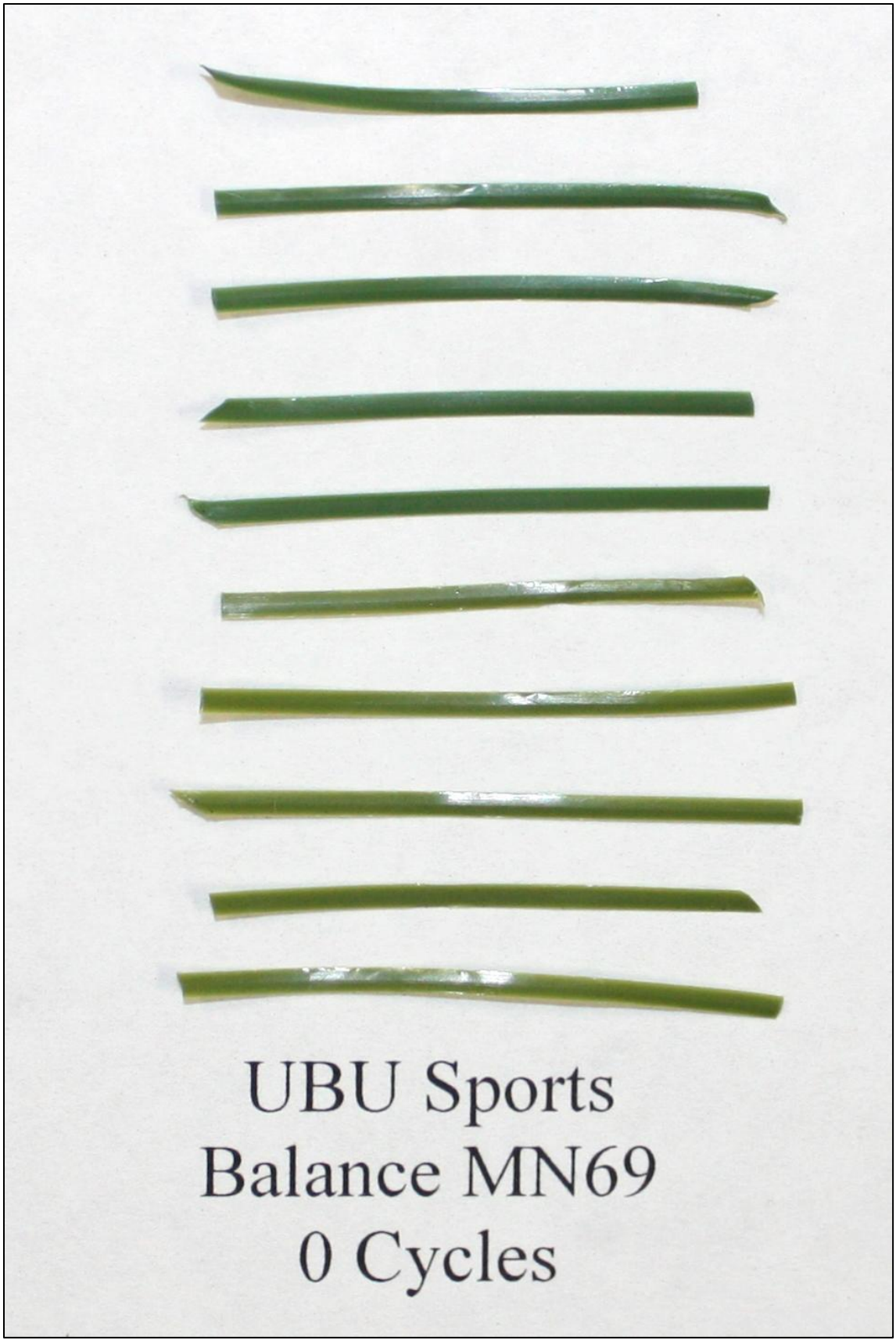
*Hairsplitting on edges of fibers only

**3 fibers with hairsplitting on edges, 1 fiber with hairsplitting down center

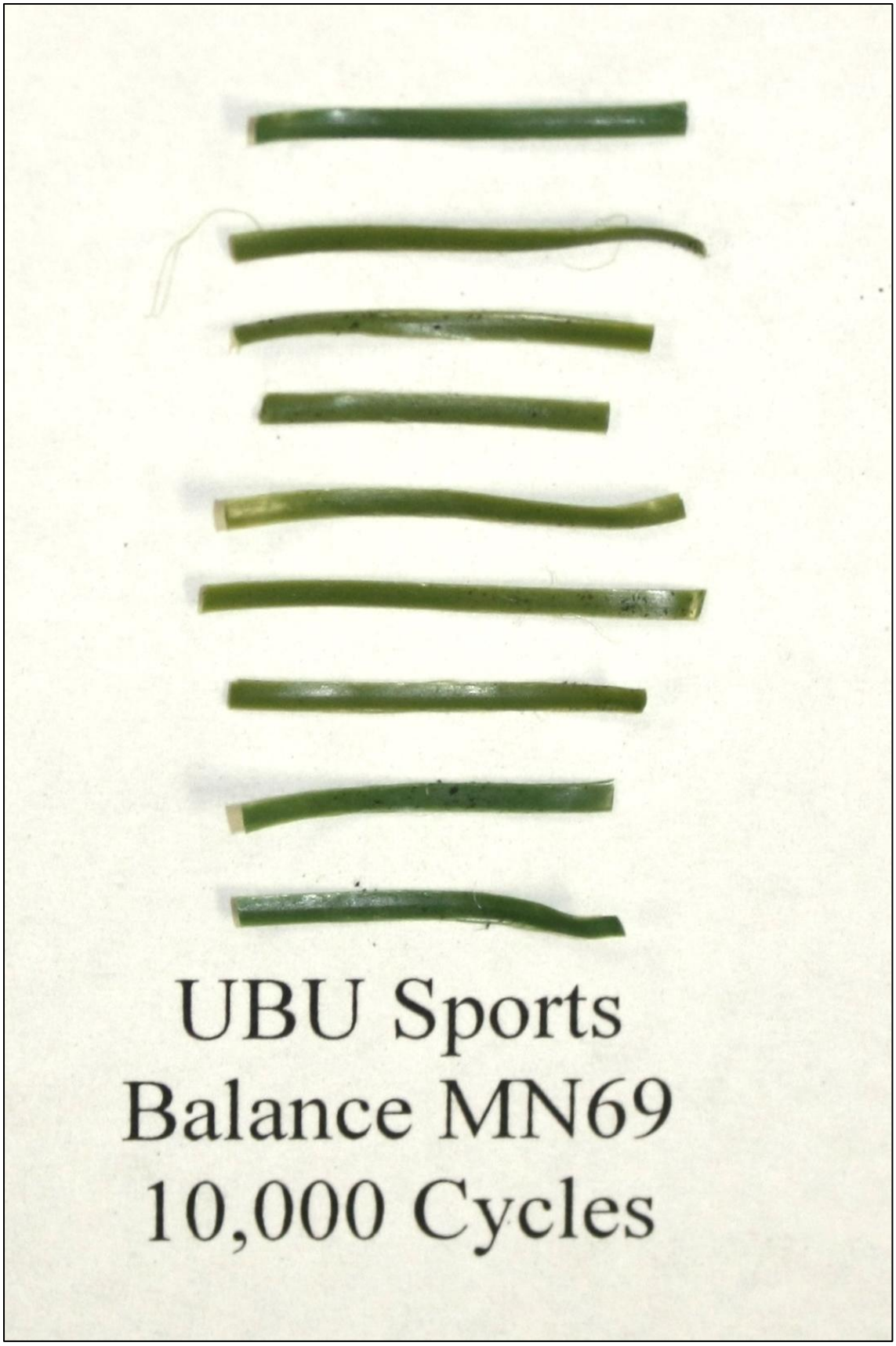
Tested June 2011

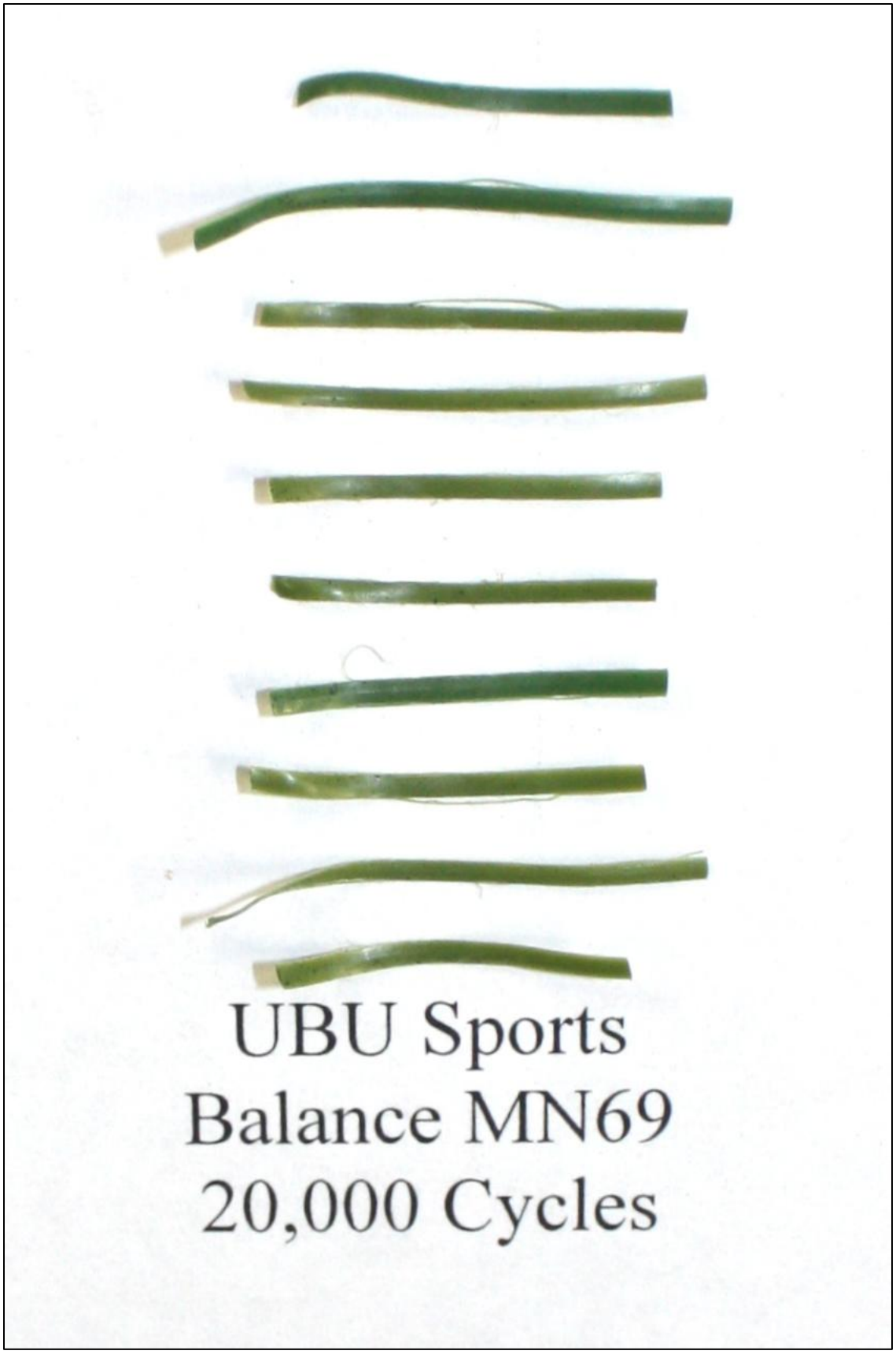


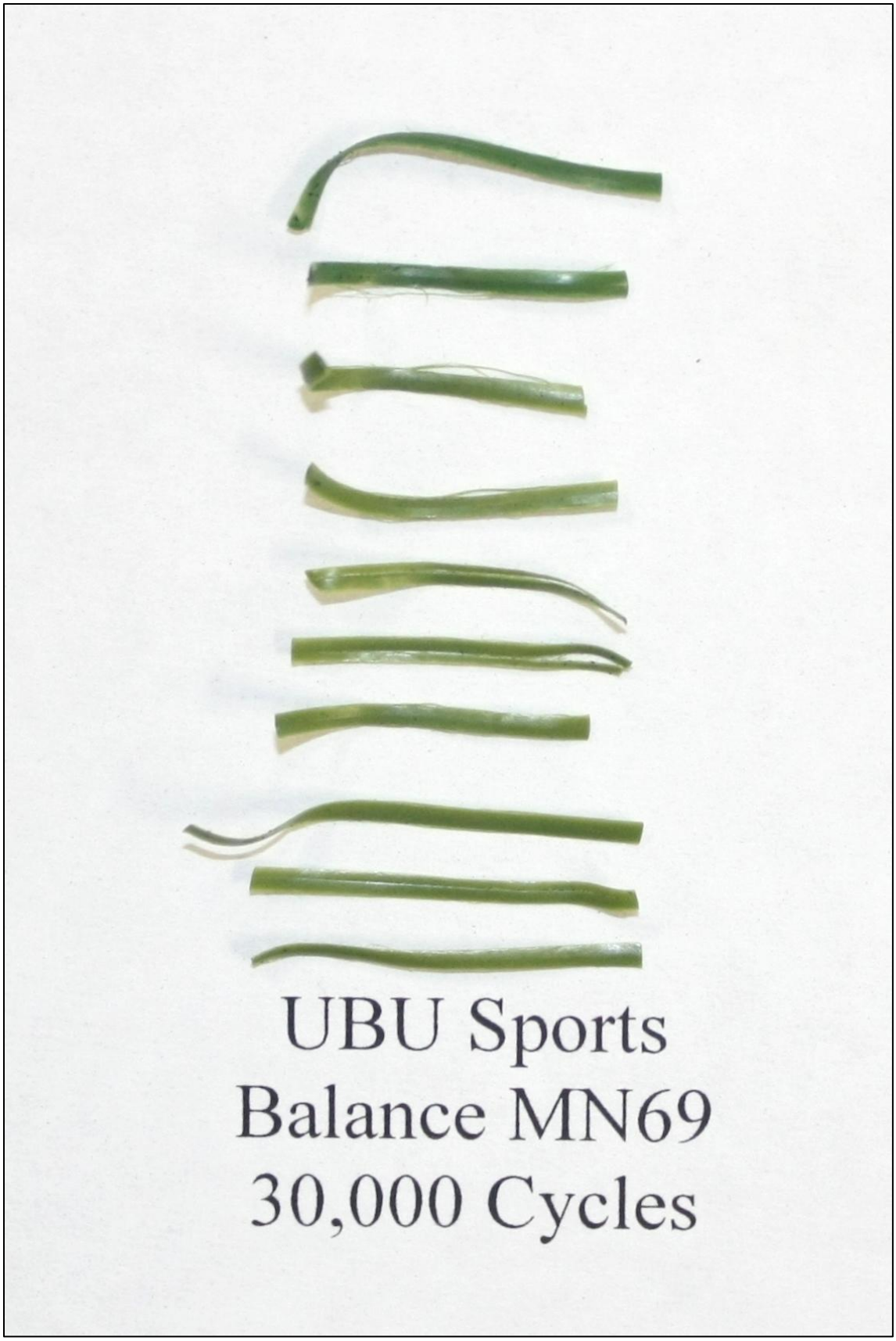
Cross section of UBU Sports Balance MN69 fiber from sample tested.



UBU Sports
Balance MN69
0 Cycles


UBU Sports
Balance MN69
10,000 Cycles


UBU Sports
Balance MN69
20,000 Cycles


UBU Sports
Balance MN69
30,000 Cycles

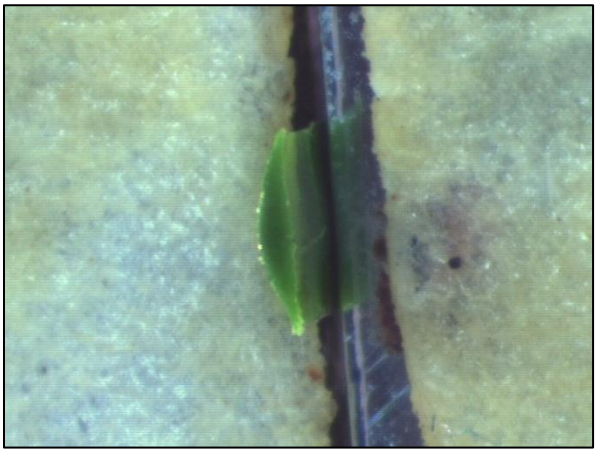
UBU Sports Balance MN69 after 30,000 cycles

UBU Sports Speed M4-M

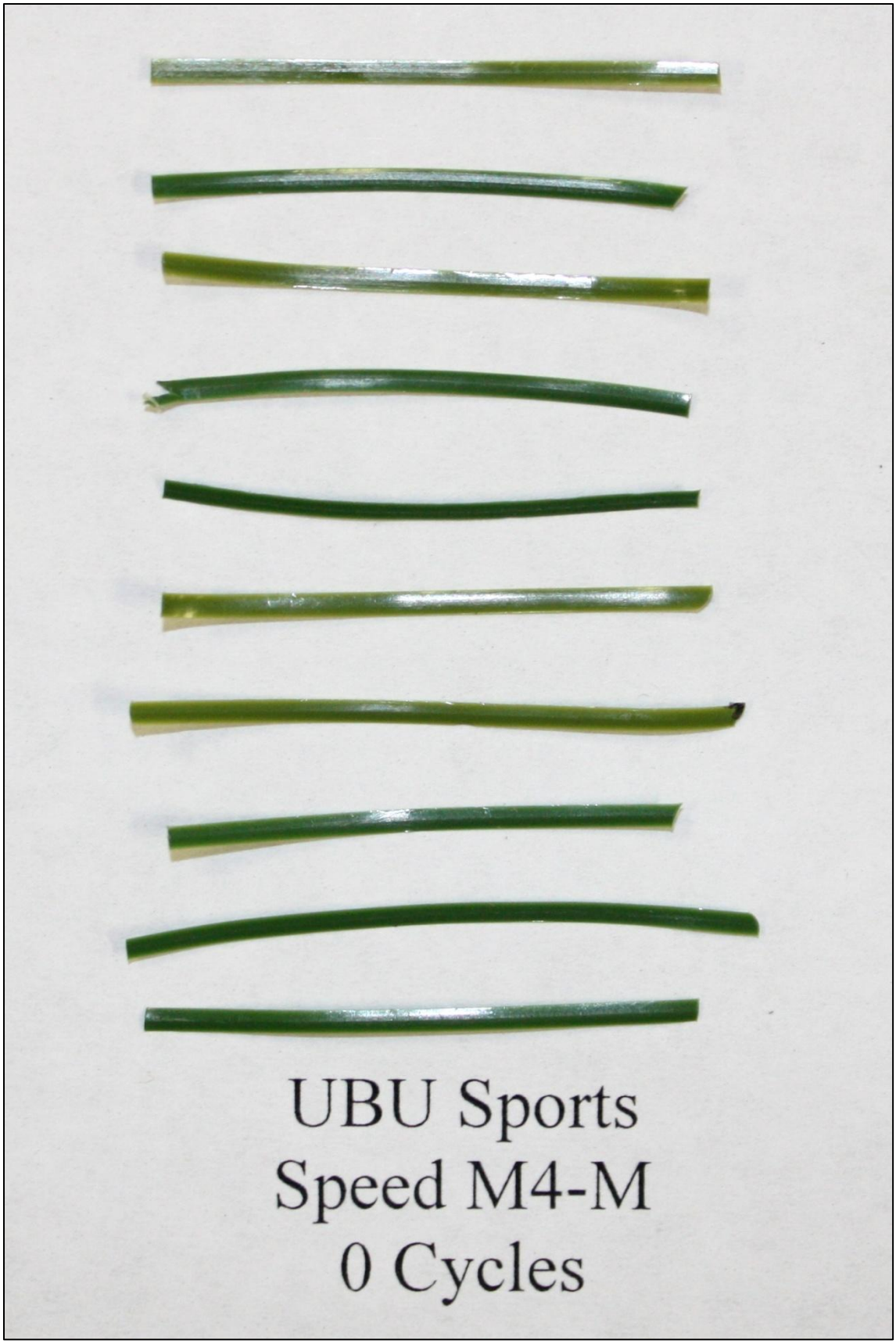
# of cycles	Good	Hair-Splitting*	Fractured	Complete Splitting
0 cycles	10	0	0	0
10,000 cycles	10	0	0	0
20,000 cycles	6	4	0	0
30,000 cycles	5	5	0	0

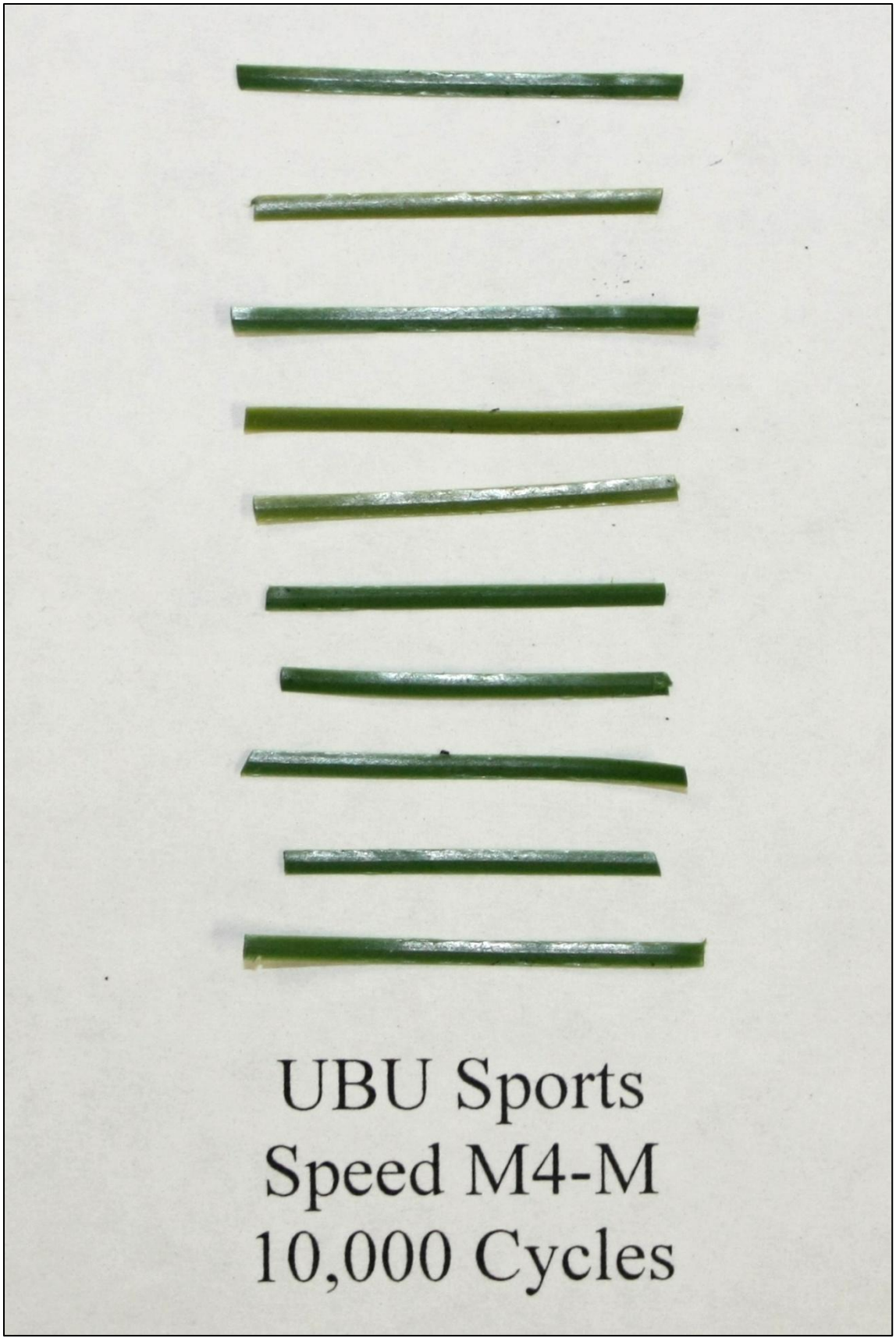
*Hairsplitting on edges of fibers only

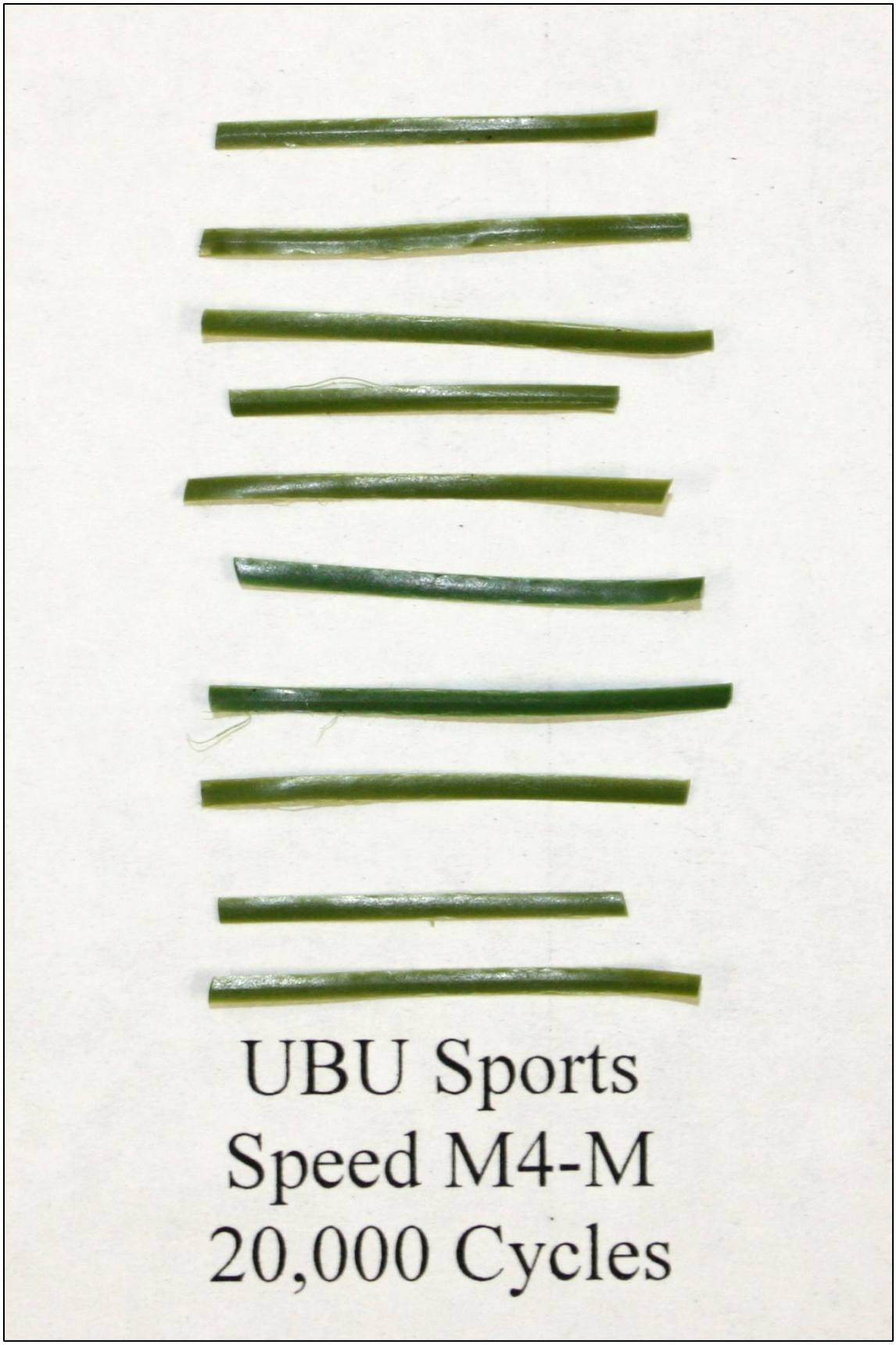
Tested June 2011

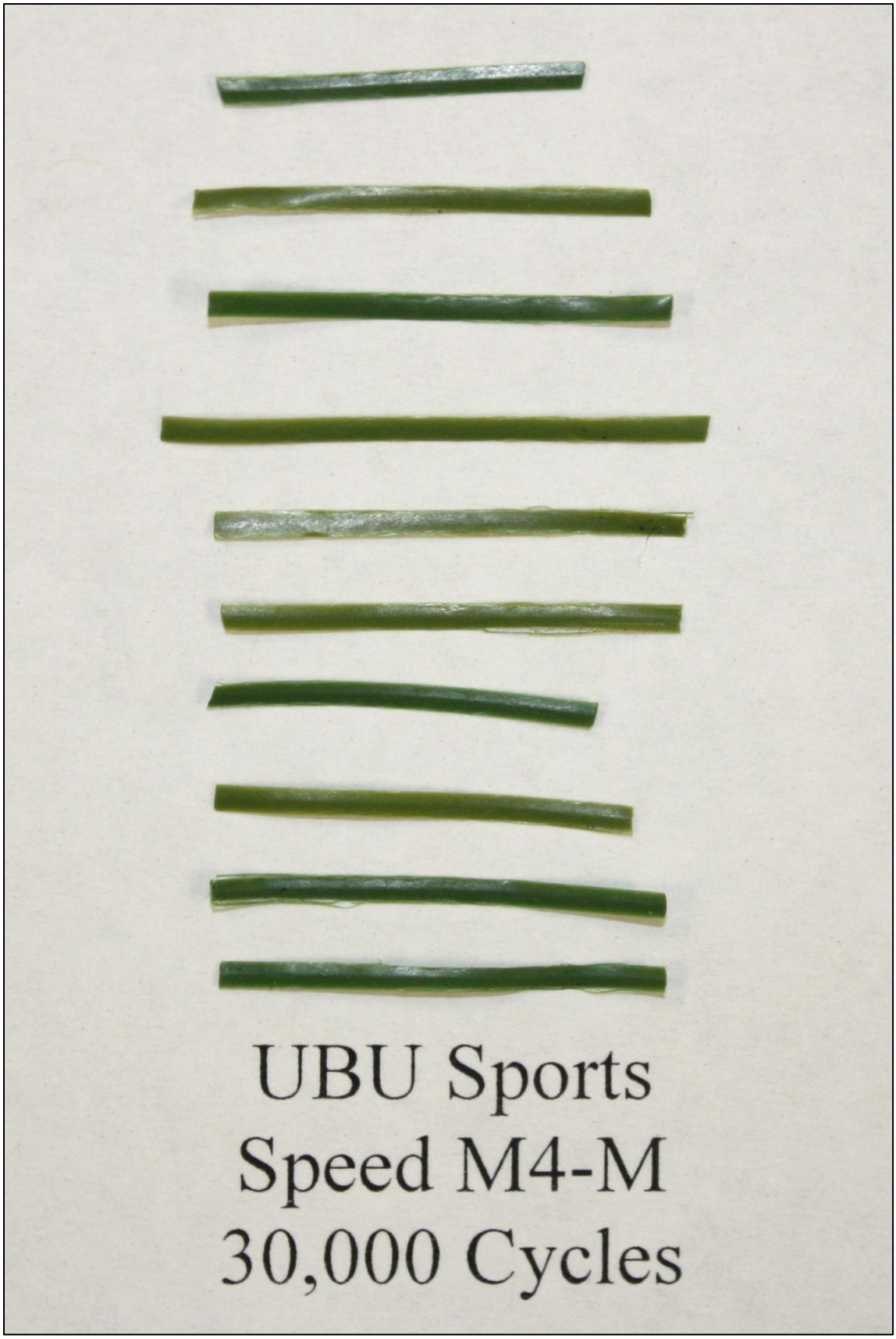


Cross section of UBU Sports Speed M4-M fiber from sample tested.


UBU Sports
Speed M4-M
0 Cycles


UBU Sports
Speed M4-M
10,000 Cycles


UBU Sports
Speed M4-M
20,000 Cycles


UBU Sports
Speed M4-M
30,000 Cycles

UBU Sports Speed M4-M after 30,000 cycles

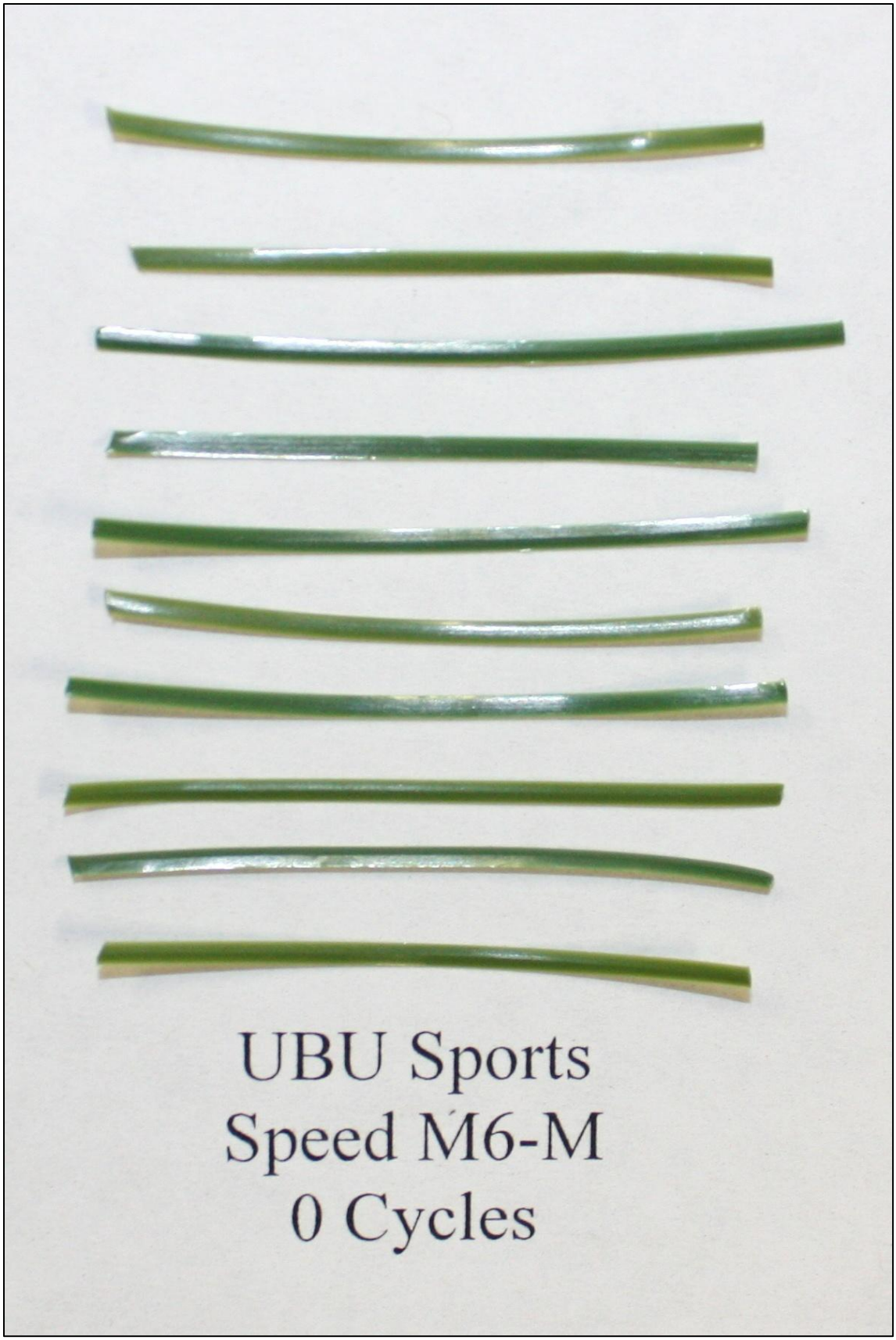
UBU Sports Speed M6-M

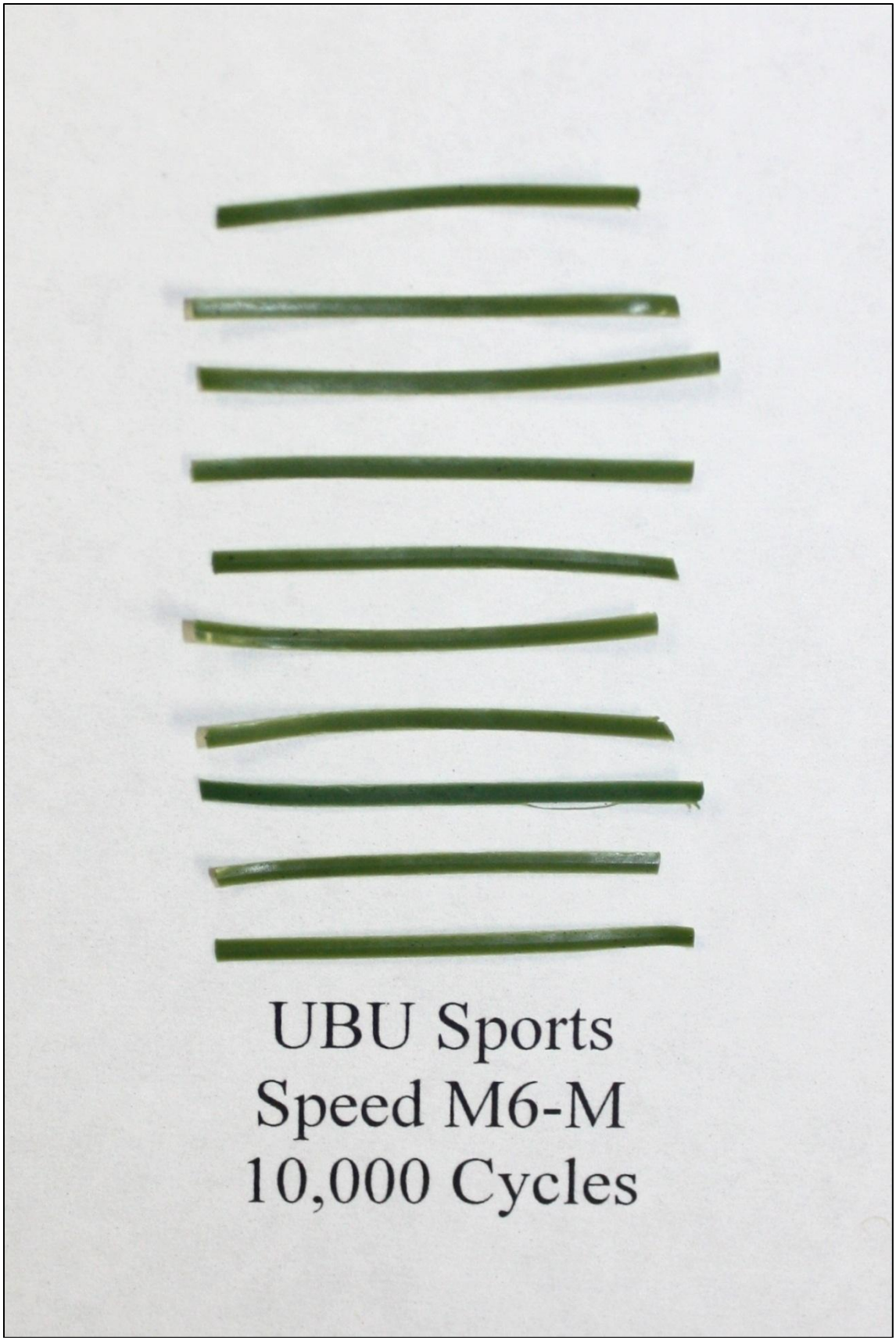
# of cycles	Good	Hair-Splitting*	Fractured	Complete Splitting
0 cycles	10	0	0	0
10,000 cycles	9	1	0	0
20,000 cycles	6	4	0	0
30,000 cycles	6	4	0	0

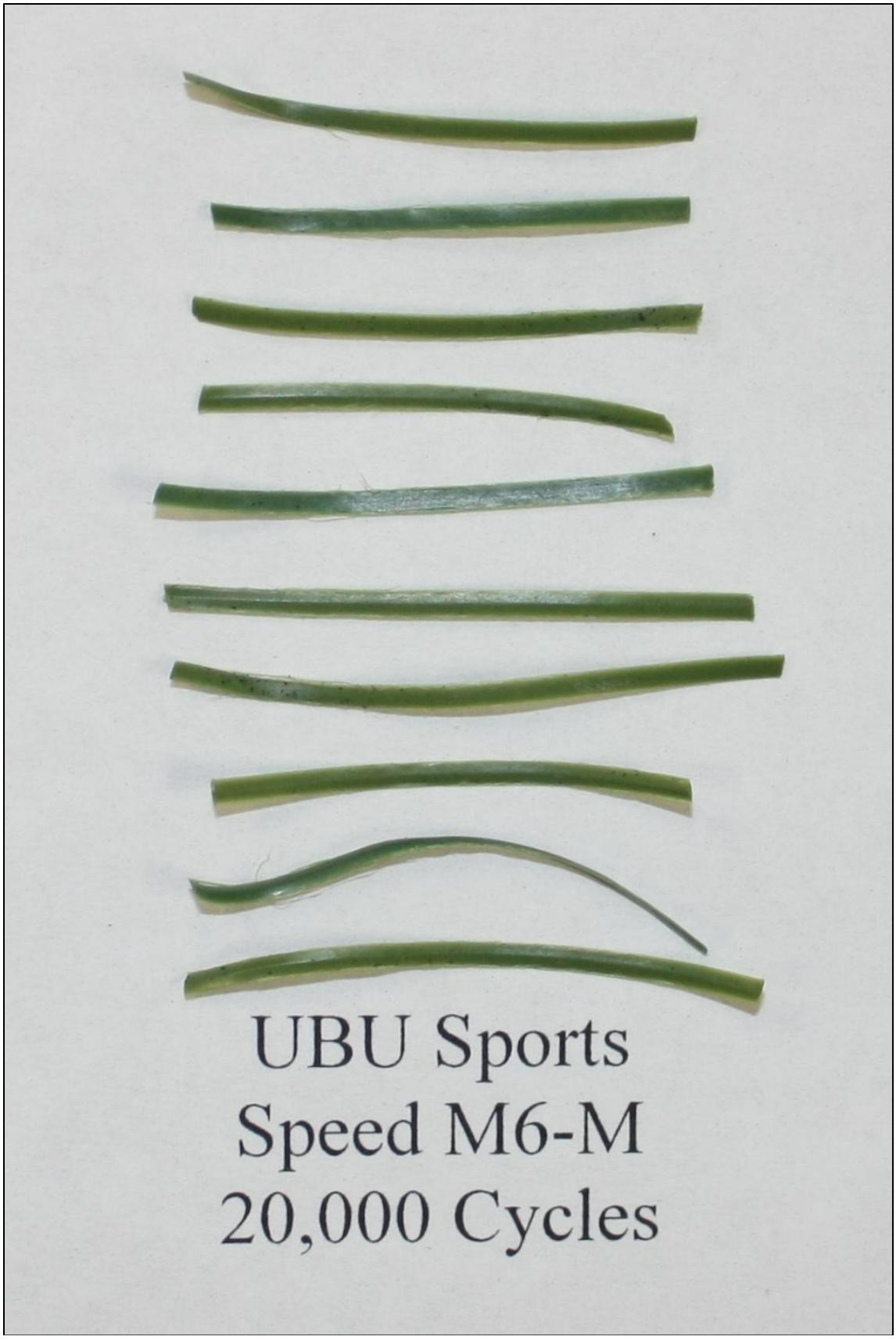
*Hairsplitting on edges of fibers only

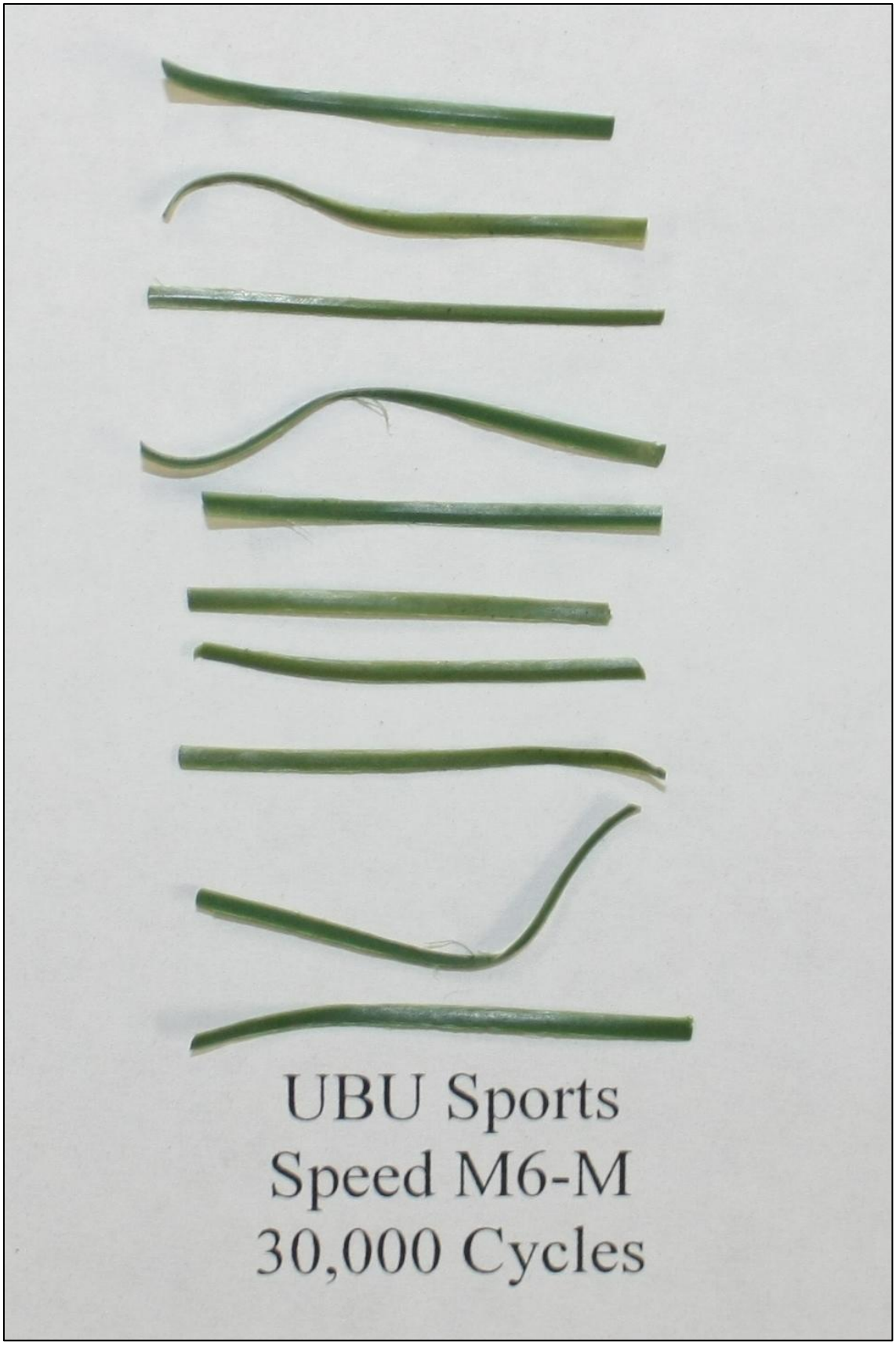
Tested July 2011

Cross section of UBU Sports Speed M6-M fiber from sample tested.


UBU Sports
Speed M6-M
0 Cycles


UBU Sports
Speed M6-M
10,000 Cycles


UBU Sports
Speed M6-M
20,000 Cycles


UBU Sports
Speed M6-M
30,000 Cycles

UBU Sports Speed M6-M after 30,000 cycles