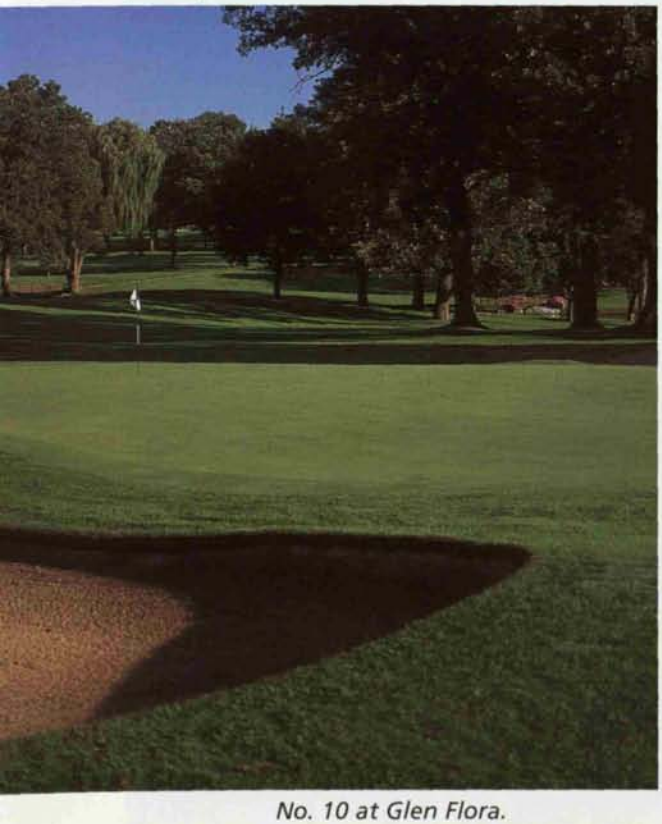
Paul Bastron –N– Glen Flora C.C.

During the fall and winter months, Paul and twin sons Patrick and Phillip enjoy pheasant hunting together.

The Illinois Turfgrass Foundation (ITF) and the MAGCS will coordinate efforts to stage the ITF Fall Golf Day and Annual College Scramble on October 7 at Glen Flora Country Club, where Paul Bastron is the host superintendent. This event is held annually and is important to our industry because the proceeds go to the ITF, which supports turfgrass research in the state of Illinois.

Golf course photos by Jim Trzinski.



No. 10 at Glen Flora.

Paul Bastron began as golf course superintendent at Glen Flora in 1987. Prior to coming to Glen Flora, Paul was the superintendent at the Ottumwa Country Club in Ottumwa, IA. Paul also served as an assistant superintendent under Jeff Scott (now at Rich Harvest Links) at the Rock Island Arsenal Golf Club. Paul worked for five years with John Deere and Company in Moline, IL before returning to school and earning an A.S. degree in landscape design and completing the two-year turf management program at Michigan State University.

Paul presently resides in Winthrop Harbor with his wife, Darla, and twin sons Patrick and Phillip; meanwhile, the Bastrons are building a new home in Pleasant Prairie, WI. The boys are honor students at St. Joseph's High School and are involved in band, track and golf. Both spent their summer caddying and as members of the grounds crew at Glen Flora. Paul and his sons also enjoy fishing when time permits and pheasant hunting during the fall and winter.

Paul has been a Certified Golf Course Superintendent since 1992 and has been active in his profession through the years. He has served on several advisory committees, the MAGCS Golf Committee and the CAGCS Board of Directors. Glen Flora has been an active contributor to the ITF Sunset Ridge Plan and is certified in environmental planning with the Audubon Cooperative Sanctuary Program. Paul feels that his greatest professional reward has been the opportunity to form friendships with so many individuals in our industry. His biggest challenge has been dealing with "unreasonable expectations" that sometimes come with the position.

(continued on page 15)

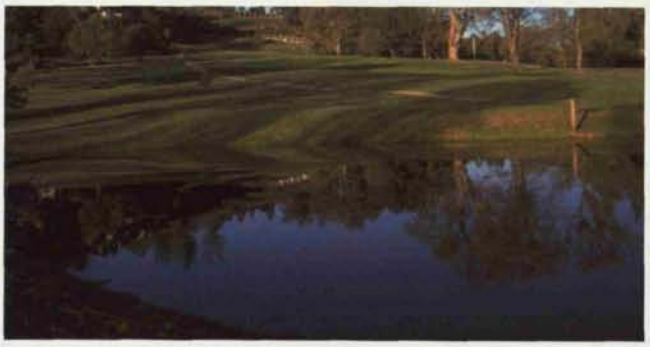
Glen Flora Country Club was established in 1911 as a nine-hole facility just west of its present site. The club prospered and the membership grew. In 1920, construction began for the new 18-hole course at its present location. Club historians credit Austin Clayssens, then Glen Flora's golf professional, with the design of the course, although a fire destroyed most records when the clubhouse burned down in 1970. Glen Flora's standout attribute is the challenging greens. Hit the ball straight, keep the three-putts to a minimum and you will play well.

Hole no. 7 at Glen Flora features a stunning stone bridge.

No. 8, a par 4, is Paul's favorite hole.

Carol Holmes *Xairos Ltd.*

Barley Straw Products: An All-Natural Solution to Pond Problems



Ponds are growing—so are pond problems.

Although the exact process is not fully understood by scientists studying it, the decomposition of barley straw in water appears to release substances that clarify pond water and affect nutrients. The result of decomposing barley straw in water is clear, healthy, natural ponds with sufficient oxygen and sunlight for aquatic plants, fish and frogs.

Recent years have seen a surge in the growth of ponds: backyard ponds for landscaping and raising koi, retention ponds mandated by local authorities in housing developments and golf course ponds on recently built and existing courses. This growth is fueled by two trends. The first is the consumer trend towards home enhancement and entertainment (named most colorfully as 'cocooning' by Faith Popcorn) as consumers seek to make their homes islands of tranquility in an ever-busier world. The second is the trend towards larger and newer homes, driving housing developments out onto the prairies and farmland and creating the need for flood control. Many of these new developments are built around golf courses. At the same time, increased use of phosphorus-based fertilizers on lawns and gardens and historically higher temperatures and periods of sunlight have created conditions for higher growth of naturally-occurring pond organisms, such as algae. The result has been a significant increase in the number of ponds with problems ranging from unsightly algal blooms to extensive silt build-up and oxygen deprivation in the water (known as eutrophication), resulting in the death of plants, fish and marine life.

Various chemical pesticides and natural bacteria and enzyme products have been introduced to control these algal blooms, including copper in both sulfate and chelated forms. In the long term, however, both types of products may actually increase the problem. The chemical and copper pesticides kill the algae, which fall to the bottom of the pond and release nutrients over time as they decompose, creating a richer environment for the next round of algal bloom. The bacterial/enzyme products eat the nutrients, starving the algae. But when the bacteria die, they, too, release nutrients and enhance the next algal bloom. Both types of treatments lead to increasing boom-and-bust cycles of algal growth and ultimately to eutrophication. In addition, pesticides and copper products may kill or damage plants, fish and marine life and create toxic build-up. The result is an increase in the number of unstable pond environments and frustrated homeowners and association and golf course managers.

Nature provides the solution in the form of barley straw, which has been used in the United Kingdom for over a decade to clarify ponds. Although the exact process is not fully understood by scientists studying it, the decomposition of barley straw in water appears to release substances that clarify pond water and affect nutrients. The result of decomposing barley straw in water is clear, healthy, natural ponds with sufficient oxygen and sunlight for aquatic plants, fish and frogs. Decomposing barley straw, however, takes one to three

(continued on page 18)

months to begin working and leaves a messy residue of rotten straw that must be cleaned out.

A better solution has been developed by environmental experts in the U.K., commissioned by a local water company for use in potable water reservoirs. The environmental experts engineered a process that decomposes barley straw in bulk and stops the decomposition at exactly the right point for bottling the "liquor" that results. When re-exposed to sunlight, this extract of barley straw continues to act like decomposing barley straw and is a powerful water clarifier. Extract of barley straw acts like barley straw itself, but is faster and cleaner than the straw—reaching effectiveness in two-five weeks and leaving no messy residue.

Extract of barley straw was introduced into the U.S. market on a test basis in the summer of 2002. Initial tests have been successful in all segments of the market, despite a much wider range of environmental conditions than those in the U.K. The U.S. experiences hotter temperatures, more days of brighter sunlight, greater intensity of fertilizer use and higher flow-through of water in retention and irrigation ponds.

How do barley straw and extract of barley straw work?

No one is exactly certain what takes place when barley straw decomposes. Many of the organic compounds that appear as barley straw rots in water have not been identified. Research has been carried out for the past decade in the U.K. at the Centre for Aquatic Plant Management (associated with Cambridge

Barley Straw Products vs. The Alternatives

PRODUCT	EXTRACT OF BARLEY STRAW	BARLEY STRAW	BACTERIA/ENZYME	UV LIGHT	COPPER, INC. CHELATED	POLYMERS	CHEMICAL PESTICIDES
CHARACTERISTIC	All-natural solution	All-natural plant	Liquid, dry power, Water-soluble bags	Ultraviolet waves of light	Liquid and granular	Liquid and granular	Various liquid forms
KEY INGREDIENT	Plant materials resulting from decomposition	Plant materials resulting from decomposition	Naturally occurring organisms	UV waves	Copper as sulfate or double-chelated	Positive ionic, cationic or amphoteric charges	Various chemical algaecides?
EFFECTIVENESS BY VISUAL ASSESSMENT	100%	100%	Rarely more than 50%	Rarely more than 50%. Not effective against string or net algae	100%	Variable but not effective against string or net algae	100%
HOW IT WORKS	Clarifies pond water through control of water chemistry	Works on algae growth	Consumes nitrogen & phosphorous, major algaenutrients	Kills bacteria and clumping algae	Kills algae chemically	Attracts & agglomerates negatively charged algae	Kills algae chemically
RESULTS	Clear water free from unwanted pond scum	Clear water free from algae, including string algae	Bacteria grow faster than algae & take food sources	Algae can be removed	Kills pests, but may result in toxic build-up and harm life forms	Algae can be removed.	Kills pests, but may result in toxic build-up and harm life forms
DOSAGE	3 liters per foot acre, then 1 liter every two weeks	3 oz per 10 square feet of surface area	1 oz per 25 square feet	Volume of throughput is specified accordingly to size of UV lamp	Typically 8 oz per acre of surface area	Typically 10 parts per million	Various according to active component
APPLICATION	Pour or spray liquid	Float, suspend or sink bales or bundles	Rehydrate in water and pour over surface	Filter on pump	Dilute and then spread on surface	Dilute and pour into main body of water	Add directly to main body of water
REAPPLICATION	2 weeks or as needed	2 to 3 times yearly	Monthly	Continuous	2 – 3 times yearly	Monthly	Various
CONSEQUENCES OF OVERDOSE	None	Deoxygenate water	Deoxygenate water	Make water sterile	Can kill all life forms	Toxic to sensitive biological forms	Can kill all life forms
TIME TO WORK	1-2 weeks	1-3 months	1 – 3 months	Gradually over time	Immediate	Immediate	Immediate
SIDE EFFECTS	None	Messy residue to remove	Release of nutrients when bacteria die creates boom & bust cycle of more algae	Kills bacteria that remove waste & algae food	Kills 50% of fish in 96 hours; toxic to fish food chain in lakes	Release of nutrients when algae die creates boom & bust cycle of more algae	Often toxic by accumulation when used repeatedly

University), where Jonathan Newman is the best-known expert. It is generally believed that the decomposition of the straw results in the slow release of hydrogen peroxide:

"When straw rots, chemicals in the cell walls decompose at different rates. Lignins are very persistent and are likely to remain and be released into the water as the other components decay. If there is plenty of oxygen available in the water, lignins can be oxidised to humic acids and other humic substances. These humic substances occur naturally in many waters and it has been shown that, when sunlight shines onto water which contains dissolved oxygen, in the presence of humic substances, hydrogen peroxide is formed. . . . experiments have shown that sustained low concentrations of hydrogen peroxide can have a very similar effect on algae to that of straw. Peroxides are very reactive molecules and will only last in water for a short time. However, when humic substances are present, peroxides will be continuously generated whenever there is sufficient sunlight. The slow decomposition of the straw ensures that humic substances are always present to catalyse this reaction."[1]

However, at least one expert in the U.S. believes that phenols are more likely to be the effective agents.[2] Aquarium practitioners in Canada and Australia appear to agree with this view:

"There are many phenolic groups in lignin and its decomposition products. Lignin is found in terrestrial plants. Very loosely, it is like glue that holds cellulose bundles together. Sort of the collagen of terrestrial plants. Cellulose is the rigid material in macrophytes or what we think of as regular plants. The decay of plant tissues, even before the leaves detach from the stem, releases phenol and phenolic compounds in very low concentrations. . . . It is thought that some plants release phenols and other chemicals as a form of chemical warfare called allelopathy in order to compete with algae and other plants. Straw or hay has been used to clear algae or duckweed from ponds; it works extremely well!"[3]

Natural solutions can be tried now

Barley straw and extract of barley straw are easy to use and can be tried without risk to marine life. It is impossible to overdose the extract, since it was developed for drinking water and is safe enough to drink. Extract of barley straw provides maximum ease of use and is well suited for most ponds. However, if there is extensive flow-through of new water, the action of the water will dilute the extract and limit its effectiveness. Irrigation ponds on golf courses, for example, might experience enough flow-through to affect the working of the extract. The extract is effective in closed systems where water recirculates. In environments with high flow-through, bales of barley straw anchored to the bottom or side of ponds and streams can be effective and do not require breaking up. In slower-moving water, barley straw bales must be broken up to allow the oxygen in the water to act

(continued on page 20)

upon the straw. Most sellers of the straw recommend putting the loose straw in some form of netting, such as Christmas tree bags, for ease of removal of the decomposed remains and to prevent unsightly masses of straw in the water.[4]

More research is necessary to establish the organic compounds and mechanism by which decomposing barley straw clarifies pond water. Given the growing interest in all-natural solutions to pond problems, there is little doubt that this scientific puzzle will be solved in the next few years. In the meantime, those charged with keeping their ponds clear—without polluting the environment and de-oxygenating the water—have two natural treatments to try!

Carol Holmes is a Director of Eco-Ponds USA, a distributor of all-natural pond products, and the President of Xairos Ltd., a strategy and marketing consulting firm.

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[1] CONTROL OF ALGAE WITH STRAW, IACR INFORMATION SHEET 3
IACR—Centre for Aquatic Plant Management, Science and Plants for Schools, Homerton College, Cambridge, U.K.
http://saps1.plantsci.cam.ac.uk/articles/barley.html (for the longer article by Jonathan Newman, see "Control of Algae Using Straw" at www.capm.org.uk).

[2] Dan Terliza, University of Maryland, private conversation.

[3] http://fins.actwin.com/aquatic-plants/month.9703/msg00156.html See also Diana Walstad, ECOLOGY OF THE PLANTED AQUARIUM ISBN 0-9673773-0-7, Chapter 3, and NC Everall and DR Lees "The identification and significance of chemicals released from decomposing barley straw during reservoir algal control," WATER RESOURCES, Vol. 31, No. 3, pp 614-620, 1997.

[4] See the IACR Information Sheet 3 for details.