

Plant Could Reclaim Acid Mine Waters

A plant that grows like wildfire in acid water is being groomed to ignite a chain of life in acid streams.

Scientists at The Pennsylvania State University believe it might help rehabilitate some of the 6000 miles of U.S. waterways that have become flowing deserts as a result of acid mine drainage.

Game fishing in acid streams may even be an outcome.

The plant, a bright-green reed, is a relative of the Biblical papyrus. It has been observed in acid streams in mats as large as a putting green and almost as pure.

"In most of these underwater oases," says Dr. Richard Wagner, assistant professor of botany at Penn State, "not one weed is to be found in a whole colony of *Eleocharis acicularis*. For even weeds will not grow in acid water."

But *Eleocharis* (pronounced:

eely-occris, also called a needle rush) does grow. Why it grows is still a mystery, but Wagner and graduate assistant Paul Rothrock have now established at least one of its requirements: lazy water.

"*Eleocharis*," says Rothrock, "is found only in quiet pools, backwash areas, or where there is only a slight downhill grade to a streambed."

Hurricane Agnes undoubtedly wiped out flourishing underwater swards of this plant, and each winter ice floes take their toll. But the plant has a remarkable ability to spring back to life. Its seeds germinate with extreme rapidity.

"In the laboratory," says Wagner, "we have seen shoots emerge from seed in less than a week."

Wagner believes the plant might be used as a starter crop, a base on which micro-organisms, algae, and insects might take hold.

"Ultimately," says Wagner, "these might serve as food for certain acid-tolerant fish, such as the black bullhead."

Wagners idea is that an *Eleocharis* population explosion might be systematically fostered in acid streams. The plant does lend itself to transplantation:

"Divots removed from a mat easily take hold if replanted where conditions are favorable," reports Rothrock. And the Penn State studies have shown the needle rush to be adaptable to extremes of both cold and heat.

An earlier study at Penn State by graduate student John Kroh (1970) showed that *Eleocharis* flourished in acid streams for the

very reason that most other living things do not: strip mining upstream, where acids are generated, also generates large amounts of silt.

This fine sediment is apparently required by *Eleocharis* as a growing base.

Like deserts, acid streams are popularly supposed to be sterile.

The supposition in both cases is incorrect. Though not exactly teeming with life, acidic streams do contain certain species of living things:

In 1939, some thirty-eight species of micro-organisms were identified by a West Virginia scientist as residents of acid waters.

One bacterium that actually feeds on acid is being used by Penn State mine drainage experts to remove acid from the water.

Several plants, the burr reed, for one, are found in scattered stands on acid streams, as are various forms of algae.

In addition to the black bullhead, the sunfish, white sucker and creek chubb have been known to inhabit acid streams.

So, the ingredients of a food chain are there. If large carpets

of *Eleocharis* could be cultivated in quiet places on a stream those ingredients might come together and provide a kind of granary for game fi

"This research," cautions Wagner, "should not lull anyone into a false sense of security about acid mine drainage. Steps still need to be taken in mining operations to prevent such drainage from forming, and chemical and other techniques

need to be used on-stream to neutralize acids.

"But partial rehabilitation by plants like *Eleocharis* is a possibility, and the scope of acid mine drainage—in Pennsylvania alone four and a half billion gallons of acid water is generated every day—is such that we can't afford to ignore any possibility."

One bonus from *Eleocharis* has already been observed, at least by Paul Rothrock.

"To come upon a backwash where orangy-red-stained rock provides the backdrop for a lush carpet of lime-green vegetation is a breathtaking experience, and one you can't expect to find anywhere but in an acid stream."

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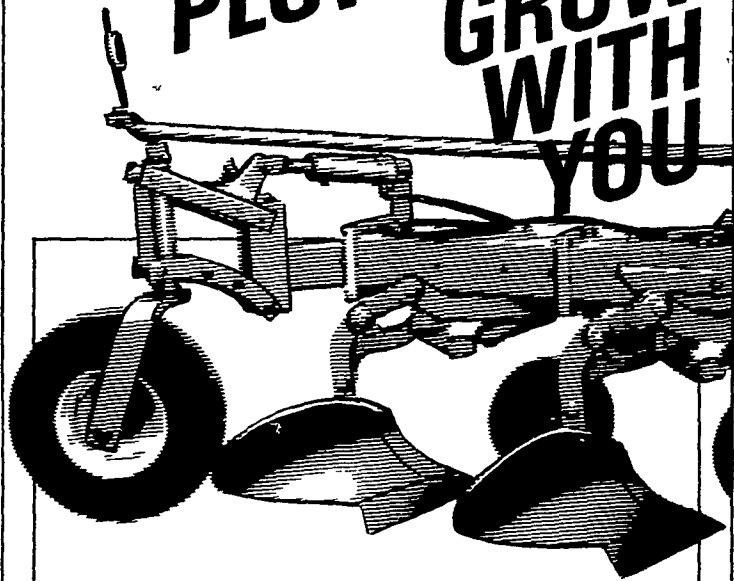
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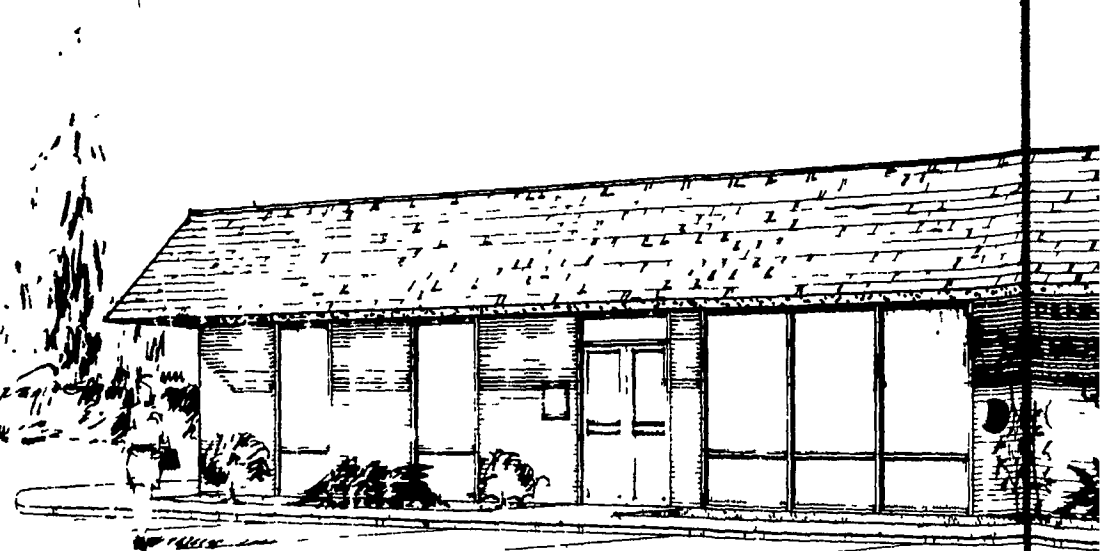


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