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ously thought.”
That’s where American Crystal’s map-
ing project comes in. The cooperative
hopes to be able to determine precisely
which fields are infected and to what
extent. The information will give share-
holders additional information to help
them decide which fields should be
planted to resistant varieties.

Keep a watchful eye on
sugarbeet Rhizoctonia

BY LON TONNESON

E RICAN Crystal Sugar Co. is pre-
paring to fly over and photograph
all of the sugar beet fields in the
Red River Valley to determine the extent
and severity of Rhizoctonia infections.
Rhizoctonia is one of the most common
and most financially devastating sugar-
beet diseases in the region.
“Approximately one-quarter of all
American Crystal fields have shown signs
of moderate to severe Rhizoctonia infec-
tion, and only 30% have none,” says Brian
Ingulsrud, American Crystal vice presi-
dent of agriculture.
Rhizoctonia will reduce the yields and
quality of beets. It will also create higher
sugar losses in the beet piles during
storage, and during processing in the
factory. The Rhizoctonia pathogens remain
in the soil for many years and will spread
under the right conditions.
In the past, about the only defense
against Rhizoctonia was to plant resistant
varieties. But resistant varieties typically
did not have as much yield potential as
susceptible varieties.
“Shareholders sometimes decide to go
with less-resistant varieties to increase
their maximum yield potential,” Ingulsrud
says. “That decision can backfire if the
field has more of a problem than previ-
ously thought.”

EYE ON BEETS: Healthy sugarbeets
exhibit lush growth. An aerial survey this
summer will help determine levels of
Rhizoctonia infection in the Red River
Valley.

Seeing Rhizoctonia

T HE most common symptom of
Rhizoctonia is wilting of the leaves,
starting with the oldest leaves. It is
likely a consequence of damage to the
vascular system. Leaves may or may
not become yellow. In some instances,
the petioles may blacken where they
are attached to the crown.
Crown rot infection begins when
infected soil is thrown into crowns
during cultivation, by the rain splash
of infected soil into the crowns or where
the petiole attachment to the crown is
covered with infected soil.
Root rot infection typically starts at
or just below the soil line, and some-
times lower on the taproot. Root symp-
toms may range from scattered brown
to black lesions on the root surface
to complete rotting of the root.
Initially, the disease may occur in
a few patches in a field. If significant
inoculum is present, often as a result
of continuous planting of susceptible
hosts, entire sugar beet fields may be
lost to the disease when conditions are
favorable for disease development.
Sources: Mohamed F.R. Khan, North
Dakota State University Extension sug-
arbeet specialist, Department of Plant
Pathology; and Melvin D. Bolton, U.S.
Department of Agriculture Agricultural
Research Service, Northern Crop
Science Laboratory, Fargo, N.D.

Transgenic wheat
now a step closer

W O scientists from Kansas State
University are working on a trans-
genic wheat that tolerates warmer
temperatures during wheat’s critical grain
filling stage.
With just a single added gene to boost
 thermo-tolerance, this wheat could in-
crease yields by up to 35%, claims Harold
Trick, a plant pathologist.
Wheat has an optimum temperature
range during the grain filling stage of 59 to
64 degrees F. Trick explains that for every
1 degree Celsius rise in temperature above
that level, 3% to 4% of yield could be lost.
As the grain begins to fill, it accumu-
lates starch. This starch will account for
75% to 85% of the dry weight, making it
an important part of the final test weight.
That starch is converted from sucrose by
the enzyme-soluble starch synthase.

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Trick and his team sought a way to in-
crease the wheat plant’s tolerance to these
higher-than-optimal temperatures. They
started with rice, a tropical plant grown
at higher temperatures that also has grain
that fills. They found a single SSS gene that
provides more thermo-tolerance when
added into the genome. This gene shows
the best yield increase at temperatures of
85.1 to 90.1 degrees F.
They are now working to cross this
 thermo-tolerance into elite wheat vari-
eties that have their own heat tolerance
potential.
Because no genetically modified wheat
is currently in the U.S. supply chain, this
heat-tolerant wheat will eventually need a
sponsor that can take it through the regu-
latory process before it can be planted by
wheat growers.