Food shortages limit fish growth in most Texas farm ponds. Increasing the growth of microscopic plants (phytoplankton) is the key to increasing fish growth. Microscopic crustaceans (zooplankton) feed on the phytoplankton. When both forms of plankton sink to the bottom, they create an organic ooze which feeds aquatic insects. Small fish feed on the zooplankton and insects. These small fish are then eaten by bass and other predator fish. Applying fertilizers to promote the growth of phytoplankton (the first part of this food chain) will usually increase annual fish production by 100 to 400 percent.

Pond owners should be committed to a long-term management program before fertilization begins. One-time or haphazard fertilization is uneconomical and often causes aquatic weed problems. More importantly, since fertilization increases the food supply which results in more and larger fish, if fertilization is stopped, there is not enough food for the increased weight of fish.

The following step-by-step guide will help pond owners establish a successful pond fertilization program.

1. Study the present condition of your pond.
   Is the pond muddy?
   Sunlight is necessary for phytoplankton growth. If the water is too muddy to see an object at least 8 inches beneath the surface, see Extension publication L-2161, Clearing Muddy Ponds, for information on how to clear the pond. Neither clearing nor fertilization are necessary for fed catfish ponds.

   Are the pH and alkalinity satisfactory?
   Some ponds are too acidic for good fish growth or survival; and some are too low in bicarbonates for good phytoplankton growth. Check with your county Extension agent on procedures for testing your pond water.

   Are aquatic weeds present?
   Aquatic weeds absorb the added fertilizer, which prevents beneficial phytoplankton from using it, your county Extension agent can provide recommendations for controlling weeds before fertilizing. After rooted aquatic weeds are controlled, shading by phytoplankton hinders their regrowth. If you have excessively large areas of shallow water in your pond, weed control may not be practical.

   What kinds and sizes of fish are in the pond?
   If many undesirable fish, such as bullhead catfish, carp or gar, are in the pond, you should remove them with rotenone and then restock (see Extension publication L-2084, Renovation of Farm Ponds). If you have too many stunted sunfish (bream) and/or bass, see Special Publication No. 2, "Assessment and Corrective Management for Fish Populations in Small Impoundments" (Published by the Texas Chapter, A.F.S.), available from the Texas Agricultural Extension Service, Soil Conservation Service and Texas Parks and Wildlife Department. Fertilizing will produce more undesirable fish, if they are already present, and will not correct an unbalanced fish population.

   How much water flows through the pond?
   Fertilization is not usually successful if a constant flow from springs or creeks flushes the added nutrients and phytoplankton from the pond.

   Are you feeding catfish in your pond?
   Regularly fed fish ponds usually do not require fertilization, as the added waste products from fish being fed adequately fertilize the water.

2. Select a fertilizer.
   Inorganic fertilizers are recommended for sport fishing ponds. Granular and liquid forms are available; both give satisfactory results when properly applied. Compare costs, availability and ease of application in your area before selecting either or both forms.

   Granular formulations high in nitrogen and phosphorus, such as 20-20-5, 16-20-0 or similar analyses, produce good results in most situations. Ponds that have been heavily fertilized for several years may respond equally well to phosphate alone. Liquid formulations of ammonium polyphosphate (10-34-0 or similar
analyses) are easy to apply and usually cost less
for the same results.

3. Fertilize as often as necessary to
maintain a plankton bloom throughout
the warm months.

Begin fertilizing when the water temperature
reaches 65 degrees F. Earlier application can
cause growth of filamentous algae. Fertilize so
that the nutrients are dissolved in the top 2 feet
of water. Phytoplankton stay near the surface to
absorb sunlight.

If granular fertilizer is used, it should be dis-
solved in shallow water. Never pour fertilizer
into deep water. The best method is to pour the
fertilizer on a wooden platform placed about 1
foot below the water surface. The platform pre-
vents phosphorus from losing its effectiveness
by keeping it from contact with the bottom mud.
A platform 4 feet square is adequate for ponds
up to 5 acres. An alternative method for small
ponds is to slip the fertilizer bag on one side
and place the bag in shallow water with the
open side up. Pouring fertilizer into shallow
water is satisfactory for small ponds, but more
will be needed than with the platform or open
bag method. Apply 100 pounds of granular fer-
tilizer per surface acre for the first application.
Follow with 50-pound applications at 1-month
intervals, or more frequently if needed, to
maintain the bloom.

If liquid fertilizer is used, mix 1 gallon with 10
gallons of water and slosh the mixture on the
surfaces of small ponds. In larger ponds the
fertilizer should be mixed into the water with an
outboard motor or sprayed on the surface. Liq-
uid fertilizer is heavier than water and will sink to
the bottom if applied undiluted. Begin with 1
gallon of fertilizer per surface acre. Follow with
1-gallon applications at monthly intervals, or
more frequently if needed, to maintain the bloom.

A light green color in the water indicates suc-
cessful fertilization (plankton bloom). A white
object or cupped hand should disappear at 12
to 15 inches beneath the water surface. Add
more fertilizer as necessary to maintain this
condition. Do not fertilize when the visibility is
less than 12 inches.

Cease fertilizing in the fall when the water tem-
perature drops to 70 degrees F.

Liquid fertilizers containing ortho-phosphates
should not be stored in unheated buildings
during the winter. Low temperatures cause
inactivation of the phosphate. Suspensions
containing polyphosphates can be stored
satisfactorily at low temperatures.

4. Record the dates fertilizer is applied,
application rates and results to de-
velop a schedule for future manage-
ment.

Use the following form or a similar one to pro-
vide a basis for continuing fertilization pro-
grams, for help in identifying problems, and for
estimating the cost of increasing fish produc-
tion.

5. Contact your county Extension agent
or private fisheries consultants if
problems develop without apparent
reason.

Farm ponds are complex systems with many in-
teracting factors, and results can not always be
predicted. Some common problems, probably
takes and remedies are:

NO PLANKTON
BLOOM:

EXCESSIVE
FILAMENTOUS
ALGAE (SCUM):

EXCESSIVE
AQUATIVE WEED
GROWTH:

Check pH and alkalinity. Make
sure fertilizer is applied near
the surface of the water and
kept off the bottom. Check for
aquatic weeds, water clarity
and excess water outflow.

Stop fertilization until scum
disappears. Reduce nitrogen in
the fertilizer formulation. Tilapia
fish will control filamentous
algae at high stocking rates.

Control weeds before adding
more fertilizer. Deepen shallow
water areas if problems con-
tinue.

FERTILIZATION RECORD
(Example)

<table>
<thead>
<tr>
<th>Date</th>
<th>Fertilizer formulation</th>
<th>Amount applied</th>
<th>Water Clarity (how deep can you see)</th>
<th>Water Color color</th>
<th>Water temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 5</td>
<td>20-20-5</td>
<td>100 lbs.</td>
<td>20 inches</td>
<td>light brown</td>
<td>72 degrees</td>
</tr>
</tbody>
</table>