

NO-TILLAGE IN FLORIDA FROM A FARMERS VIEWPOINT

Danny Stephens

INTRODUCTION

I have been asked by Dr. Raymond Gallaher to give my views concerning minimum tillage farming. As you read this please understand that these are my views for our situation at this present time. I do not intend for you to accept statements written in this article as absolute fact or to receive the impression that I am making the statements I make as absolutes nor to be taken as specific guidelines upon which to base your program. Read these thoughts of mine wisely as you would those of others. By this I mean, use what I say only to influence your thinking as you consider if this different method of farming might fit in your program. Again remember as you read, the statements I make are simply my opinions now, some of which may have changed by the time you read them.

CONSIDERATIONS

I have been attempting to use a method of minimum tillage for seven years. During that time I have made many mistakes most of which were very costly. I would advise anyone considering minimum tillage to be very careful in their consideration. This is not a new wrinkle you can add to your conventional method. It is an entirely different approach to farming and should be dealt with as such. I do not intend to influence anyone against minimum tillage, the opposite is actually true. It is my opinion that within the next decade most farming operations that survive will be centered around some form of minimum tillage multicropping system. My reasons for making this statement are many, I will list a few. One--economically there is no doubt that a well planned, well executed minimum tillage system will produce more dollars for less dollars invested. This will be recognized in the form of less equipment needs, fewer man power hours per acre, fewer acres needed to produce needed income because of higher production per acre, less energy input, and quality land gained that would be lost from erosion.

Two - from a management standpoint I do not think that there is any comparison. Any system with the advantages possible from minimum tillage over the conventional methods must be considered by the farm managers in business in the future.

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Three - morally I believe it to simply be closer to the right way to farm. The more you study this system the more it appears to be the way undisturbed nature maintains and reproduces itself. Also we have the moral obligation to conserve and wisely use our resources. With well planned systems of minimum tillage and multicropping we make use of and conserve all resources.

Four - when we consider soil erosion from wind or water, minimum tillage can cut soil loss to almost zero. This loss of available soil for the production of food and fiber and in the future fuel, must be stopped. We lose much more productive soil to erosion and urban development in our country every year than we gain.

Five - I believe this system has more to offer in the Southeast than any other area of our country, though I do believe some customized form can be used anywhere. Because of climate we can produce usable plant energy year round. We can do this much more efficiently through minimum tillage multicropping than through our conventional methods. One day I believe we as farmers will be growing much of the fuel to run our country. No other section of our country has the climate so well suited to continuous production as here in the Southeast.

PLANNING AHEAD

Most of the remainder of what I have to say will be geared to how I believe a farmer should plan to grow a crop next year using some form of minimum tillage or minimum tillage multicropping. This, I will try to do in an orderly sequence, or in the order I think things should be done beginning now and following through with the crop.

First I believe we should be very honest with ourselves in pursuing the following question. Am I prepared and do I get things done exactly when they should be done the majority of the time? If the answer to this question is yes one will succeed with minimum tillage. If the answer is no one will not succeed. Timeliness (doing the right thing at the right time) is probably the biggest single factor in farming. The timely farmer will succeed, the untimely farmer will eventually fail. Almost every failure I have ever experienced farming can be traced directly to simply not being ready to do the job when it should have been done. I believe timeliness becomes much more important in minimum tillage and multicropping than in conventional farming. One of the reasons I say this is because we must obtain our weed and grass control from some means other than mechanical cultivation if the system we are using involves litter left on the soil surface. Another reason we must be more timely in a minimum tillage system is we must plant when soil moisture conditions are nearly optimum because we will not have the seedbed we prepare with conventional tillage. Most of the failure experienced with minimum tillage will be due to poor weed and grass control and inadequate crop stand.

If a person decides to try minimum tillage in 1981 he should decide now, in the following order, what crop he will plant, which field he will plant,

approximately how many acres he will plant and how he will handle equipment needs. Before making these decisions I believe a person should get acquainted with people who have knowledge and experience in this type of cropping. This could very well be the best advice you could accept. We need answers to questions concerning soil fertility, weed control, water management insect management, equipment needs, choices of crops, planting dates, and many others that will arise. These questions need to be answered as to how they apply to minimum tillage in each individual situation. Many times the answers would be different in minimum tillage and/or multicropping than they would in conventional practices. An example of this would be in the area of weed identification and recommended control practices for minimum tillage situations. We farmers a lot of the time are not accurate enough in weed identification and we need the assistance of an expert. I would suggest that you get to know a weed specialist through your county extension office and ask him to come look at your situation a full season before you intend to plant your minimum tillage crop.

In deciding which crop to plant, I would suggest corn. In my opinion, corn is by far the easiest crop to deal with in minimum tillage conditions. Some of the reasons that I say this are: (1) We can plant corn early enough to get a jump on grasses and weeds, (2) we have a broader selection of herbicides to use in corn in minimum tillage conditions than we do in other crops at this time, (3) the quick, erect growth nature of corn gives us the ability to come underneath the plant canopy with post-direct applications of contact herbicides to solve any weed problems which might escape preemergence or postemergence herbicides (post-direct cultivation can be used in most crops but seems to be easier in corn), (4) it seems to be the opinion of people who have worked with minimum tillage for several years that corn is very well adapted to minimum tillage conditions without sacrificing yield. I would suggest that a farmer not choose soybeans as the crop for his first experience with some form of minimum tillage. Even if a farmer has had successful experience with minimum tillage corn he should approach minimum tillage beans with much caution. The reasons why I maintain these opinions are: (1) It is more difficult to obtain proper seed placement in minimum tillage conditions. Those who plant soybeans know the seed must be placed shallow and in adequate moisture. This is more difficult to obtain in minimum tillage conditions than in a well prepared conventional seedbed. If we do not achieve proper seed placement we will not get the quick and proper stand we must have to aid in grass and weed control. (2) The time of year we plant beans in the southeast is also the optimum season for most of our weeds and grasses. This, together with the fact that we are very limited in our choices of herbicides to be successfully used in minimum tillage soybeans, gives us reason to be cautious. I believe the grasses are our problem in minimum tillage beans and not the broadleaf weeds. At the present time I think the timely manager has available to him, the herbicides to successfully deal with most broadleaf weed problems. But I do not think, at the present time, we have the chemicals nor the know how to deal with these grasses an acceptable percentage of the time in most conditions.

After the decision of which crop to plant is made, the decision of where it is to be planted must be made. One thing to consider in making this decision is, will irrigation be used? If possible plan to irrigate. In our operations we use the center pivot systems for more than just to add supplemental water in dry conditions. We will use them to apply herbicides in the future. We presently apply fertilizer through them. Many times in minimum tillage conditions we are planting into existing live plant growth of some kind. This live growth is constantly pulling moisture from the soil causing dry planting conditions at a time when we would like to be planting. With irrigation, we have the advantage of planting when we would like to. Planting into existing plant growth and trash is different from planting into a clean, well prepared seedbed. As a person begins to use minimum tillage equipment and deal with different kinds of situations it is comforting to know we can irrigate to compensate for mistakes. If it is not possible to irrigate I would be more careful in my consideration of where to plant. I would seek the advice of people who have had several years experience in this type of cropping. I believe after a farmer gains experience in minimum tillage or no-tillage farming he has a better possibility of success without irrigation than the conventional because of having trash (or mulch) on the soil surface. But this advantage will develop as a person gains experience because farming successfully under minimum tillage conditions without irrigation takes much planning and the timely application of those plans.

The second thing I would consider in the choice of a field or fields, is soil type. Some soil types lend themselves very well to minimum tillage planting operations and some do not. Heavy, dense, hard clay type soils can be a problem to plant in with the equipment available on the market at this time. If possible, I would choose a loamy, easily worked soil. If a farmer has some of both soil types or a random mixture it probably would be good for him to plant some of both. This would prevent him from making the mistake of thinking he could or could not plant in a particular soil type without actually doing so.

The third thing I would do is make a very careful weed study of the fields I was considering. I think this should be done a full season previous to the actual planting of the crop. If possible get someone trained in weed identification and herbicide use to help you do this. I do not think it will be a problem for farmers to get someone who is trained in this area to help them if they start a year before actually planting the crop. Many times the farmer is not able to identify the weeds in his field and make proper selections of herbicides to be used. This is especially true under minimum tillage conditions. Much of the time we have herbicides available that will fit a particular weed in a particular field under conventional farming practices but under minimum tillage conditions will not perform successfully at all. Since weed control is one of the two main obstacles to be overcome in minimum tillage farming, I would again like to stress the importance of securing the help of someone who has experience in this area.

After the crop to be planted and the field or fields to be planted has been chosen, then I would test the soil and water. Every farmer, I am sure, is familiar with how to properly take samples for soil tests. But the thing that is different under minimum or no-tillage conditions is that we probably are not moving the soil vertically. The layer of soil on the surface remains on the surface. This can cause the surface soil to be quite different (fertility wise) than the soil deeper than one inch. Because of this, and because we subsoil, I like to sample the soil at three depths. We sample at one inch, two to twelve, and thirteen to eighteen inches all out of the same hole. The one inch sample will mainly tell you if you have a pH problem on the soil surface which will affect herbicide activity. The sample deeper than twelve inches will show you if you have fertility differences between the normal root zone and the subsoil. Another thing that I think is a good thing to do is to divide the samples and send them to at least two labs and preferably three different soil testing labs. This makes a comparison possible which can be valuable. I am learning more all the time as to how minor element imbalances can completely cause all other proper practices to be ineffectual. By having the different soil analysis we have a better chance of detecting these problems. The more intensively we farm the more scientific we must be to keep from causing ourselves problems. Also, we should have the water we plan to use (as irrigation or in the spray tank) checked. pH and calcium levels in water are things that can cause big problems. These may sound like small unimportant things until we have a crop that so far as we know, we have done everything right. For some unknown reason the crop may not do like it should and then we find out we have some small problem that all of a sudden has become big because we did not check the things we could have and made proper corrections.

As we make the decisions as to how many acres we are going to plant, again I would suggest beginning with a small number of acres and increase the acreage as our experience and confidence increases. This possibly can be done by borrowing equipment, having the work done by someone who has the equipment, or by more than one farmer sharing in the cost of the needed equipment. The main thing is to remember you must be capable of doing the right thing at the right time.

This brings us to the final thing I listed in which a farmer needs to make decisions on, a full season in advance of actually planting his first minimum tillage crop. When I use the term minimum tillage I am referring to some method of planting into existing crops or crop residue without previous soil preparation. I know that there are other ways of reducing tillage such as plant, disc and plant, chisel and plant, and others but I do not consider these true minimum tillage systems in the sense we are dealing with. To practice minimum tillage it takes equipment especially adapted to the situations. The choice and the securing of minimum tillage equipment is the final thing I have listed that a farmer needs to do in advance of planting his crop. There is limited availability of economical equipment on the market that will do an adequate job in all conditions a high percentage of the time. A farmer should probably look at all the different planters he can find out about and evaluate the job they actually do by looking at the crops planted with them and the field conditions under which they were planted. One of

the most important things to look at is the soil type in which the planter was used. Was the soil a very easily worked soil such as sand or was it a more difficult soil to deal with such as clay. In the deep sands any of the planters will do a pretty good job unless there is a lot of litter on the soil surface. Under heavy mulch or litter conditions some of the planters do not have enough clearance to avoid dragging on the planter. This is especially true of the subsoil planters. In heavier type soils I have not seen a planter that I feel will consistently do an acceptable job. Some will do a good job if moisture conditions are just right, but if it is a little too wet or dry you began to see a poor stand.

If the planter to be used is of the subsoil type look at the length of the subsoilers. It takes adequate clearance between the soil surface and anything on the planter that might catch trash and cause a build up of trash which will prevent smooth operations,

Look at the ability of the planter to prepare an adequate seed bed. I think that many of the manufacturers who are attempting to build and sell minimum tillage planters have the wrong attitude about seedbed preparation. We must have a smooth, well prepared seedbed even though it may not be but two to four inches wide. We cannot get by with just a slit in the ground to drop a seed in. This may work in some conditions but consistently it will not. Also the seedbed must be firm enough behind the subsoiler to prevent caving in. Another thing to look at are the planter parts used to prepare the seedbed. Many use spiders or other attachments that will wrap up or cake up some way with crop mulch or other things on the soil surface. As you look at the planting job by different planters take note of whether irrigation was used to compensate for a poor planting job. Many times in situations where a poor seedbed was formed causing improper seed placement or coverage, the problem can be overcome with an application of water.

I stated before that I believe the two things that cause failure with minimum tillage cropping, most of the time, are poor weed control and improper stand. Both of these are directly related to the job done with the planter. If the seed is well placed in an adequately prepared seedbed we obtain the stand we need and also we obtain the proper, even growth which gives us our most effective weed control. In my opinion the manufacturers of minimum tillage equipment must become conscious of the need for a narrow yet well prepared seedbed. In your search for the proper equipment for your situation look for the planter that disturbs the soil surface the least but leaves a narrow well prepared seedbed under the soil conditions on your farm.

I think to be successful with minimum tillage a farmer needs three basic pieces of equipment. These are a planter, a broadcast sprayer, and a directed sprayer. We have discussed the planter. The sprayer should be capable of delivering from 20 to 50 gallons of material per acre under adequate pressure and maintain proper agitation. The directed sprayer must be capable of placing the sprayed material properly in relation to the crop. When the crop grows as it should and the weeds are suppressed

adequately this is a simple job, we just spray broadcast directed under the plant canopy. In some situations we may need to use shields. Therefore, the directed spraying unit probably should have the option of adding these shields. In my opinion every minimum tillage farmer should own or have a directed sprayer available to operate the direct sprayer properly. This can be the difference in success or failure. I believe the first step toward success in 1981 is for you to make these decisions now and not six months from now.

Lets imagine that you have decided what crop and variety to plant, you have decided where it will be planted, how many acres you will plant, and have made all necessary decisions concerning equipment. A true minimum tillage cropping situation begins with the crop grown previous to the actual crop to be grown. This, in my opinion, is one of the tremendous advantages of the system. Every crop carries over into and influences the following crop. An example of what I mean is in the area of fertility. We can afford to adequately fertilize the first crop because we know the following crop will benefit from it. In some planned rotations the following crop will not need any additional plant food other than the residual from the previous. An example of this could be soybeans following corn in the same year. I know this program can be followed under conventional tillage practices but not nearly as effeciently as with minimum tillage. You probably will want to begin your program with a winter crop of small grain. This small grain crop may be used in many different ways depending on the system you have chosen. Some of the options you have when growing this small crop are to use it for grain, silage, or just a mulch for the following crop. The idea of growing a heavy mulch may become important where irrigation is not used. As you make plans for your cover crop, have someone who trained in fertility help you work out a season-long fertility program using your soil test results. One of the things you might consider is the application of calcium after the cover crop is planted to insure proper pH on the soil surface if, of course, soil test results show a need. There are choices of cover crops depending on your program.

After the cover crop has been planted and utilized as you planned, it becomes planting time. All decisions concerning variety, population, fertility, insect control plans, and herbicide use have been made months before. One of the things you should be cautious about is how to handle the existing live plant growth at planting. One of the things I think we are in need of, that we have not had, is an economical product we can use that will completely kill everything growing at planting time. Most of the time it is desirable to have everything completely killed at the time of planting to give the crop a head start. So far we have not had a product I felt we could afford that would do this job. Paraquat has not done the job for-me. Early in the year we have not been able to kill small grains with paraquat without making two to three applications. Later at soybean planting time we have not been able to satisfactorially kill existing grasses. The thing I would caution you about is to not plant your crop and wait until just before it emerges to use paraquat and expect to consistantly get an adequate kill of existing plant growth.

You might want to spray paraquat several days previous to crop emergence and then again just before emergence. There has been some work done with low rates of Roundup that looks good, but the tests are limited at this time. A product like Roundup is what we need but we can not afford it at the manufacturers present recommendations and prices.

After we have planted, we should monitor for insects and weeds just as in conventional tillage methods. Many times the minimum tillage planted field will look very rough to the traditional eye. This look will disappear as the crop covers the soil surface and becomes tall enough to go under the plant canopy and clear up any undesirable weeds which exist with direct spraying. From this point on the management will be much like that which we traditionally use. Some things we might plan to do that we have not done before is soil test in the middle of the crop growing season and have plant tissue analyses run. As we begin to more intensively use the soil through multicropping we must be more aware of soil fertility.

REMINDER AND POSSIBILITIES

Remember, probably the most important advice in what you have read is to contact people who can advise you and help you make decisions as we learn a different method of producing food, fiber and fuel. Soon we will be seeing professional consultants in this area.

I do not think that there has ever been anything come on the scene in agriculture that offers the production possibilities and problem solving abilities that minimum tillage and multicropping does. As an example to think on, consider this - A farmer in Levy County Florida (or any other county in the Southeast), has problems with wind and water erosion, high cost of fuel and equipment, high cost and unavailability of labor. His best solution is to produce more per acre and farm fewer acres. He plants a crop of small grain (with or without legumes) to graze. He grazes that crop 60-90 days then plants irrigated corn. He harvests the corn crop as silage or high moisture grain. He then plants a second crop of corn for silage (using tropical corn varieties), or plants grain sorghum or soybeans. He harvests this third crop and plants small grain to graze again. He has done this with almost zero erosion from wind or water and a minimum of input for what he has produced. This is just one possible program. There are many other combinations such as this one which are being successfully applied by a few farmers.

CONCLUSION

I believe farming has a bright future, but we need to produce more per farmed acre to minimize cost to the farmer and also provide our people with high quality food at the lowest possible price. Our people must eat and I for one want to see us eat as inexpensively as possible. Do not say it can not be done, the first step toward accomplishment is to believe it can be done, There will always be farmers, that is not the question. The question is, who will be the farmers? I believe the majority of those who continue to farm will be applying some form of the type program we have been discussing.

Remember as I stated at the beginning of this article, "these are my views and feelings". Some of them may have changed or may not apply to you but I thank you for taking your time to read them.

I would like to make public written record of appreciation for service to agriculture to John Bladwin (Levy County Agent), Dr. David Teem, and Dr. Raymond Gallaher.

To you the reader, consider this - what greater use of a life can there be than ~~to~~ work with the soil of the earth and see ~~it~~ produce.