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User Guide For Specifying Input Parameters For The TAMU Sheep And Goat Simulation Models, SAV Version

by

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Introduction

An initial objective of the System Analysis project of the Small Ruminant Collaborative Research Support Program (SR CRSP) was to develop computer programs which would allow the simulation of sheep and goat production systems. This original objective was met, and the resulting models have been and are being utilized in a number of countries. With increased interest in these models for use on SR CRSP projects and by other institutions, it became apparent that the technology transfer could be enhanced if these complex and sophisticated programs could be made more user friendly.

To run a series of computer simulations; forage, management and genetic input parameters must be appropriately altered for each new simulation. Experience indicated that changing input parameters proved to be difficult and time consuming for someone inexperienced with the model's structure. Therefore, our efforts in making the sheep and goat models more user friendly entailed making the specification of input parameters interactive with the user. This modification makes it easier for someone to learn to run the models and it shortens the time required to perform a simulation.

Program Description

The interactive addition to the Single Animal Version (SAV) of the Texas A&M Sheep and Goat Simulation Models is an outgrowth of the application of systems science research to sheep and goat production problems. For a complete description of the model and explanation of input values see the technical bulletin by Blackburn et al. (1987).

The SAV of the sheep and goat simulation program has been made more user friendly by presenting a series of interactive, dialogue type questions to the user. The user is asked to answer either 'yes' or 'no' or to provide a value (or a vector of values) for a specific parameter. The interactive program is named INPUT.FOR and is supplied with a sample set of input parameters, SAV.DAT. The program INPUT.FOR asks the questions and displays the sample set of input parameters. If the program has previously been run, the sample set of input parameters will be the last parameters entered. If the user desires to change these initial values, he or she does so by answering the prompts from the screen. The new values keyed in from the screen are then stored in SAV.DAT, replacing the initial values. Therefore, SAV.DAT is rewritten every time INPUT.FOR is run. The SAV simulation program is named SAV.FOR which then uses SAV.DAT to run the simulation. Both SAV.FOR and INPUT.FOR have been compiled and linked. The user does not have to compile or link any programs to run a simulation unless alterations in the original FORTRAN program are made. It takes less than 30 seconds for both the Prime and the IBM-PC computers to run the simulation after all the parameters have been entered.

The flow chart of INPUT.FOR is shown in figures 1 to 7. To start the run, the user types R INPUT for Prime and INPUT for IBM-PC. INPUT.FOR gives the values presently assigned for the parameters and asks the user if any changes of the input values are desired. If the answer is 'yes', it prompts the user for the new values to be entered. If the answer is 'no', the values remain unchanged and the program proceeds to the next question. The parameters are format free with at least one space between consecutive values.

The first question asks whether the user wants the regular output or extended output. The extended output has more detailed information on the nutrient status of the animal. Then, it asks whether the user wishes to run the simulation program for goats or the program for sheep. After these two questions, the questions of genetic potential, phenotypic values, wool characters, parasite infestation and forage conditions are each grouped together to form blocks of information. Every single value in the group needs to be re-entered if the user wishes to change one or more of the values. The parameters for the first group, genetic potential, include mature size (WMA), milk yield at the peak of lactation (GMLKL) and ovulation rate (OVR). The program will prompt the present values for these three parameters and ask whether any of them needs to be changed. If the answer is 'yes', the user will be asked to enter these three values by three consecutive questions.

The second group is for phenotypic parameters which includes weight (W), structural size (WM), empty body weight (EBW), weight of fat (FAT), weight of lean (WL), weight of fill (FILL) and the age of the animal in periods (AGEP), where period refers to the 15 day time step used in the models. The above procedure is applied for all the groups.

Wool characters are in the third group. These are fleece weight (FW), wool growth rate (GWOOL) and yield (YIELD). The program asks whether the simulation is for a wool breed. If 'yes', the present values for FW, GWOOL and YIELD will be displayed and the user will be asked whether the values need to be changed. If it is not a wool breed, the wool parameters will not be displayed.

The fourth group of questions concerns breeding management. There are three breeding schemes: once a year, twice a year and three matings in two years. The user enters 1, 2 or 3, respectively, for the breeding scheme selected Either 1, 2 or 3 breeding times (in periods) must be entered. Then, the user is asked to specify the number of fetuses (FETN) and the time period of weaning as kid age in periods (WAGE).

In the fifth group, the program asks the user to provide the length of time to be simulated and the starting time of the simulated year.

The sixth group is for parasite parameters. Again, if the user does not wish to simulate parasite infestation, the questions in this section will be skipped. The parameters of this group are vectors of worm intake (WINTK), efficacy of any drug treatment (EFDRUG) and a single value for resistance (PRST). Both WINTK and EFDRUG have 24 values, one value for each period. If no drenching or other treatment is applied, zeroes are entered in the vector of EFDRUG. Since it is easy to make a mistake in typing 24 values, the program keeps prompting the user if a further change in parasite parameter is needed until no more change is to be made.

The forage parameters are in the last group. These are digestibility (D), crude protein (CP), availability (AVC), distance travelled (DIST), time spent eating (EAT), supplement (SPA), digestibility of supplement (SPD) and crude protein of supplement (SPP). Each of these parameters is also a vector of 24 values except for SPD and SPP, which are both single values for digestibility and crude protein of supplement. For each of the forage parameters, the

user is asked whether a change is required. The entire vector must be re-entered even if only one of the 24 values is changed. After all the forage vectors have been entered the user is again asked if any changes in the entire forage parameters are needed until no more change is to be made.

The last question asks whether the user wishes to start from the beginning. If the answer is 'yes', the question will start again with whether the user chooses to have extended output and so on. If the user answers 'no', INPUT.FOR then writes the parameters to SAV.DAT. The simulation is now ready to start by typing R SAV for the Prime computer and SAV for IBM-PC. The user has to keep in mind that every time the INPUT.FOR is run, the SAV.DAT is rewritten with values of the parameters that were last entered. Therefore, it is a good idea to have a backup copy of the sample parameter set (SAV.DAT) in case for some reason the INPUT.FOR is not run properly.

List Of Groups Of Parameters

1. Genetic parameters (potentials)

mature size, kg	(WMA)
peak milk yield, kg/d	(GLMKL)
ovulation rate,	(OVR)

2. Phenotypic parameters

weight, kg	(W)
structural weight, kg	(WM)
empty body weight, kg	(EBW)
weight of fat, kg	(FAT)
weight of lean, kg	(WL)
weight of fill, kg	(FILL)
age, in periods	(AGEP)

3. Wool characters

fleece weight, kg	(FW)
wool growth rate, g/d	(GWOOL)
yield, fraction	(YIELD)

4. Breeding management

once a year, 1	
breeding, period of conception	(BRDP)
twice a year, 2	
breeding, 2 periods of conception	(BRDP1, BRDP2)
three matings in two years, 3	
breeding, 3 periods of conception	(IPBR1, IPBR2, IPBR3)
number of fetuses, 1 - 3	(FETN)

kid's age at weaning, in periods (WAGE)

5. Time frame

length of simulation, in periods (NPS)

starting period, 1 - 24 (PERIOD)

6. Parasite parameters

worm intake, worms/period * (WINTK)

drug efficacy, fraction * (EFDRUG)

parasite resistance, % (PRST)

7. Forage parameters

digestibility, fraction * (D)

crude protein, fraction * (CP)

availability, kg/hd/d * (AVC)

distance travelled, km/d * (DIST)

time spent eating, hr/d * (EAT)

supplement, kg/d * (SPA)

digestibility of supplement, fraction (SPD)

crude protein of supplement, fraction (SPP)

* vector of 24

Reference

Blackburn, H. D., T. C. Cartwright, G. M. Smith, N. McC. Graham and F. Ruvuna. 1987. The Texas A&M Sheep And Goat Simulation Models. Texas Agr. Exp. Sta. Bulletin-1559.

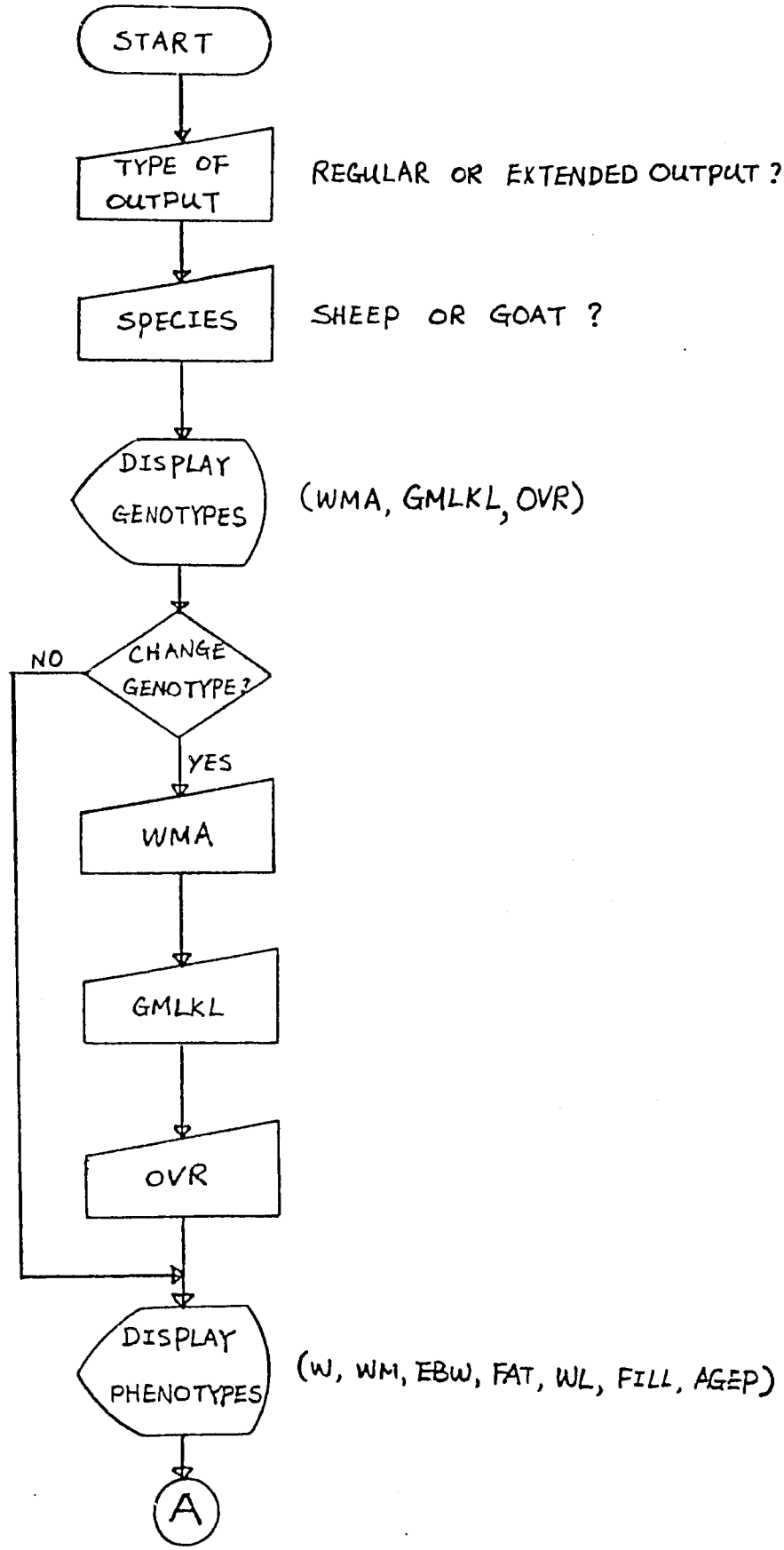

Figure 1. Flowchart of INPUT.FOR Program

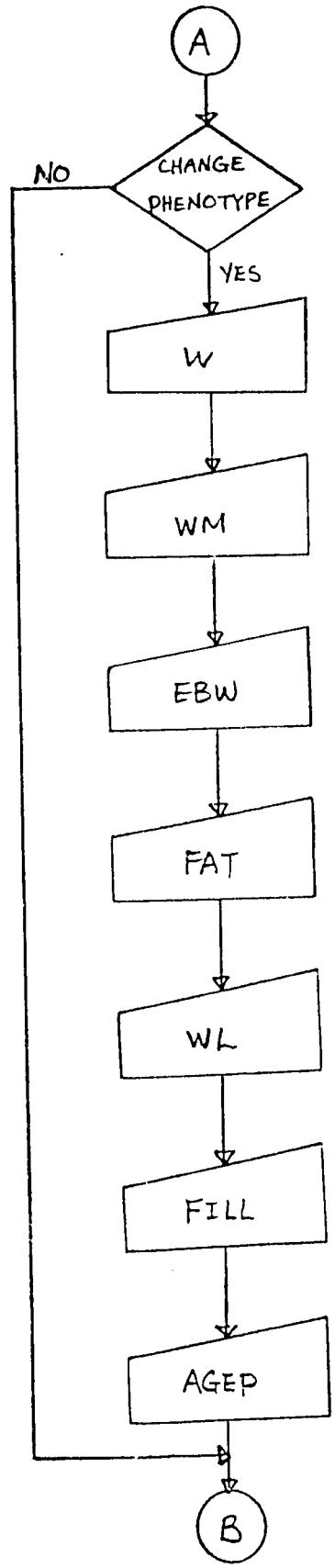

Figure 2. Flowchart of INPUT.FOR Program, continued.

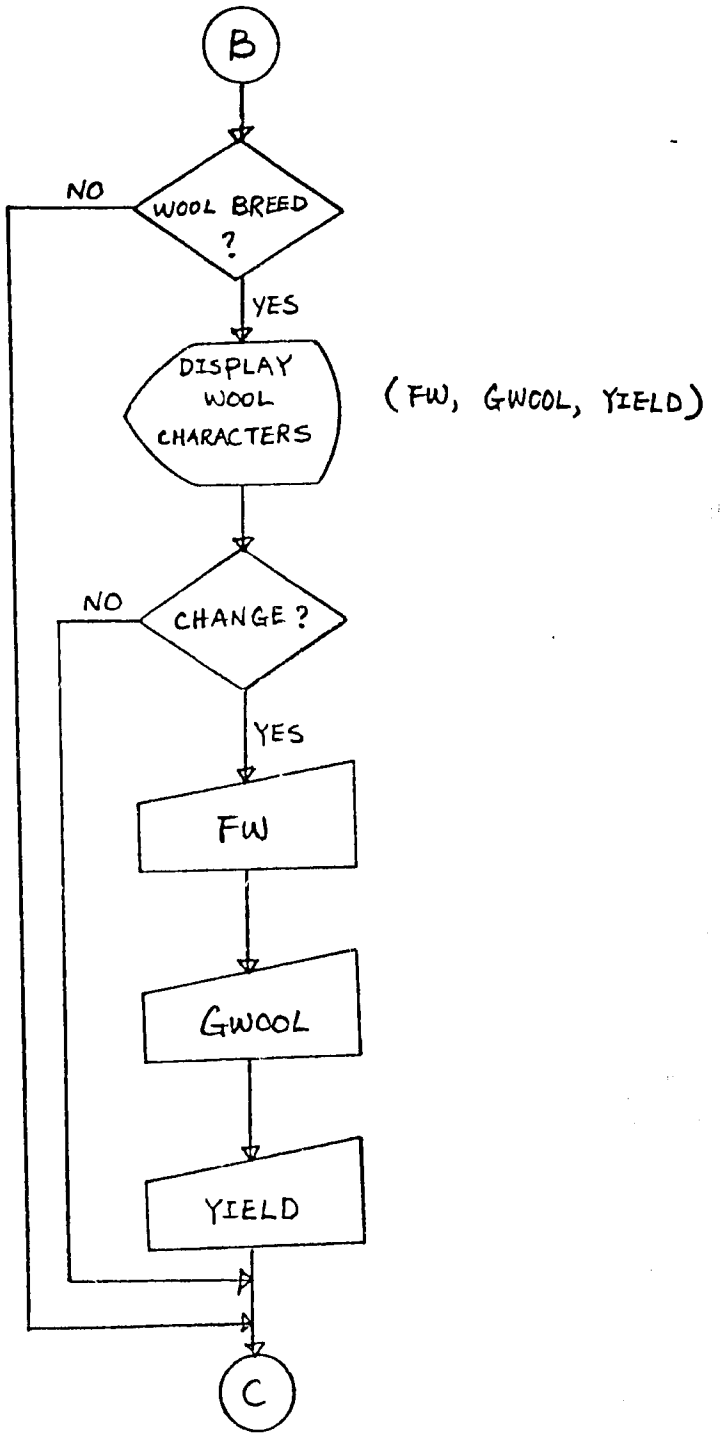

Figure 3. Flowchart of INPUT.FOR Program, continued.

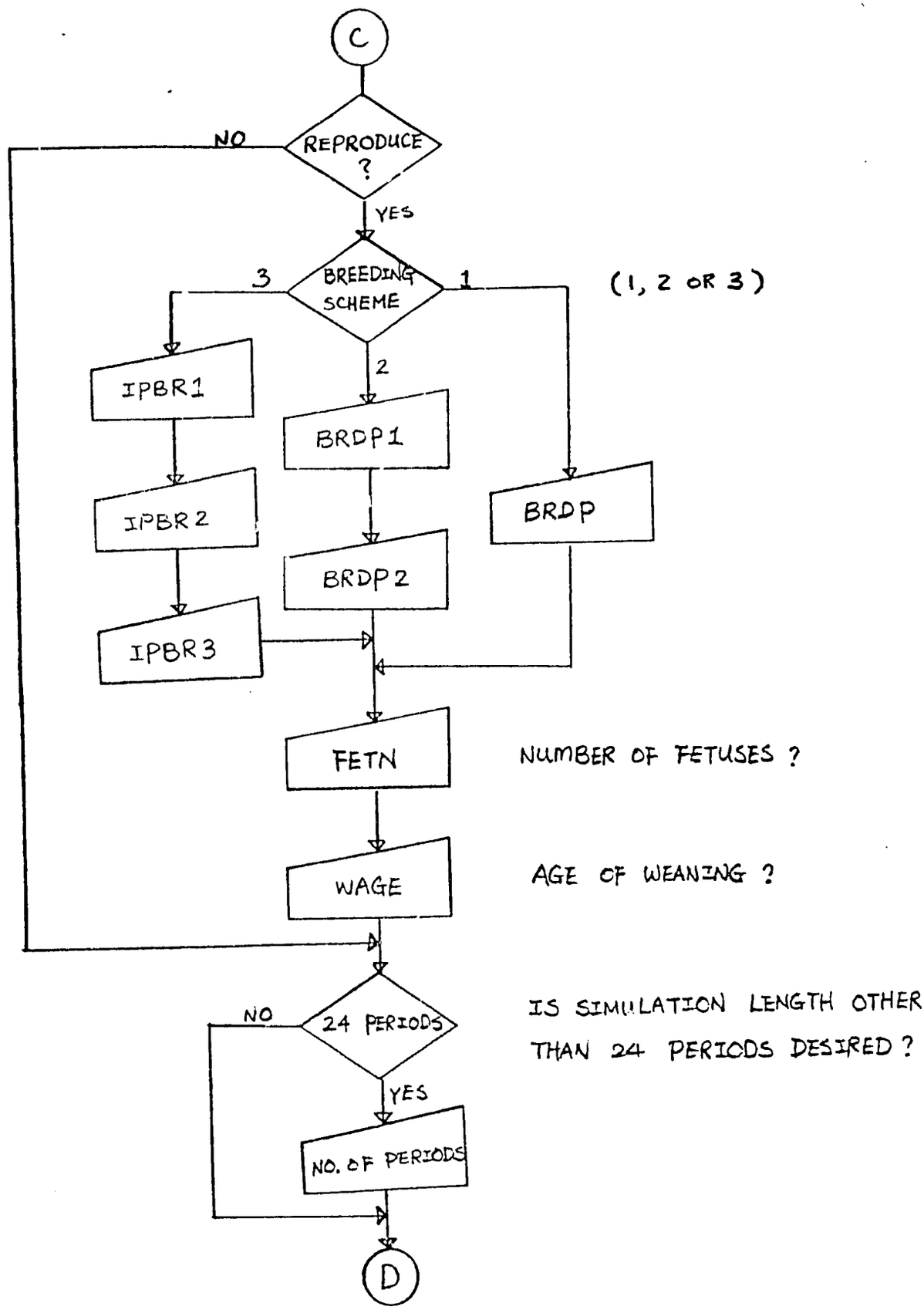

Figure 4. Flowchart of INPUT.FOR Program, continued.

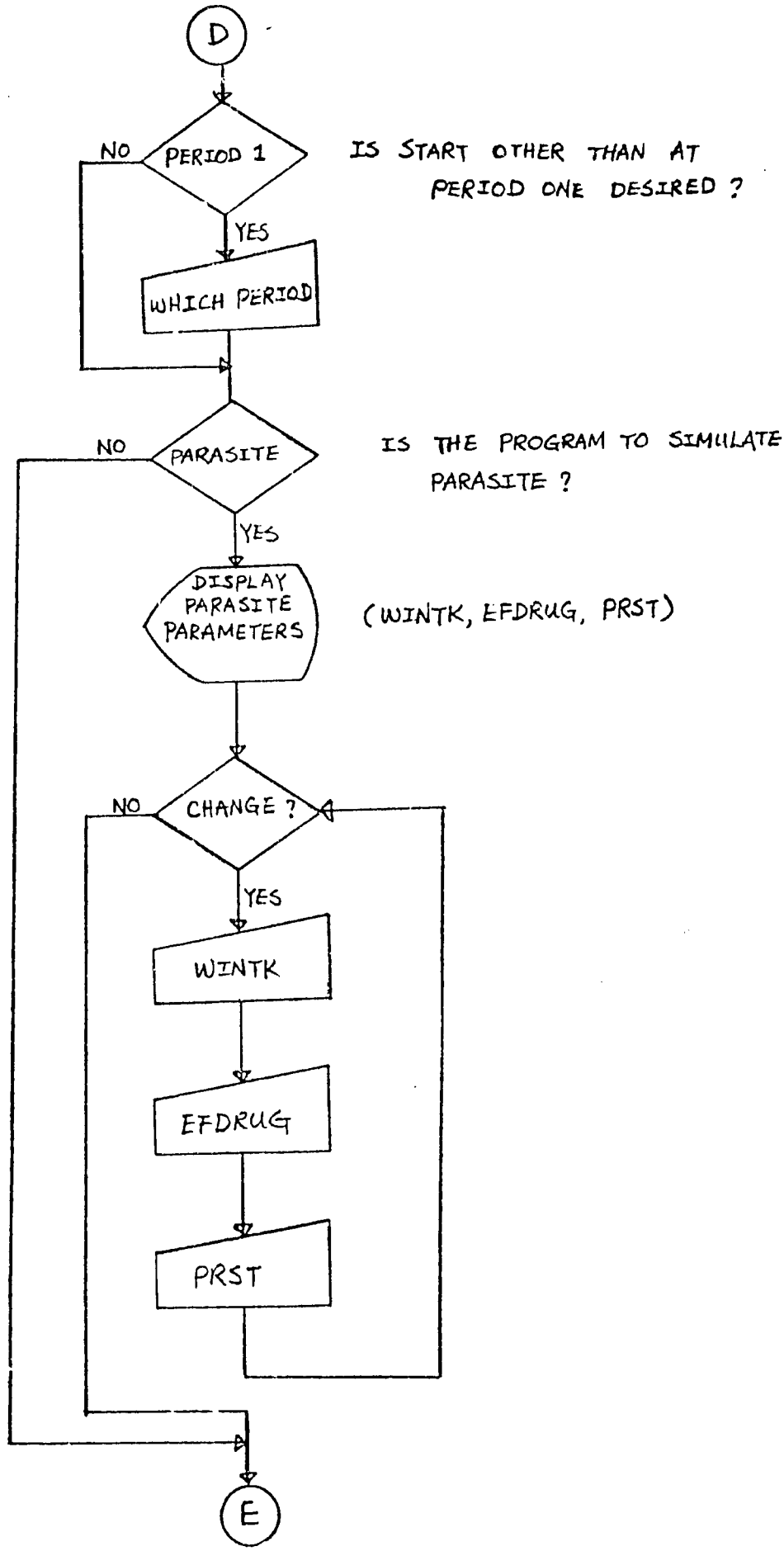

Figure 5. Flowchart of INPUT.FOR Program, continued.

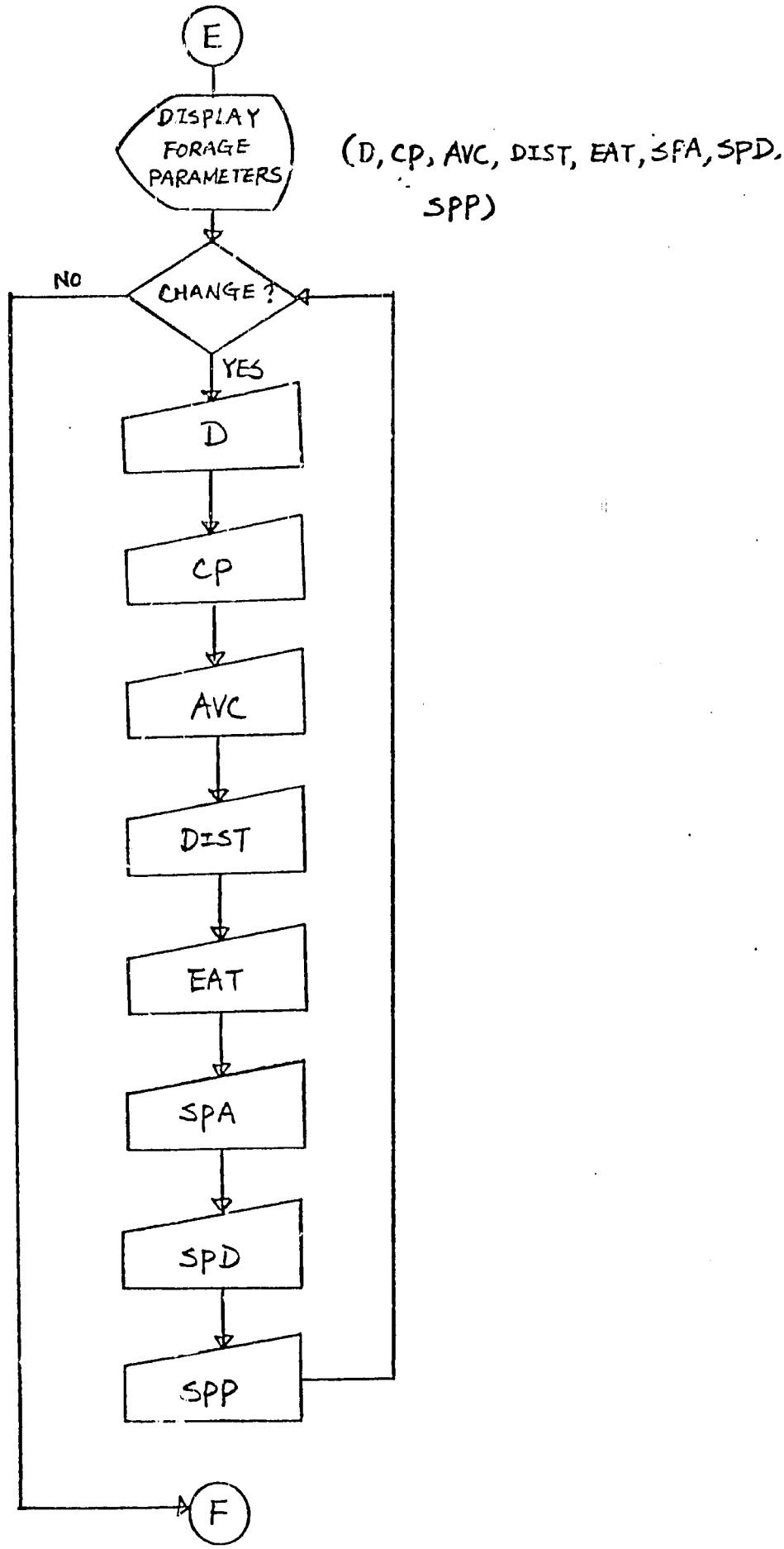

Figure 6. Flowchart of INPUT.FOR Program, continued.

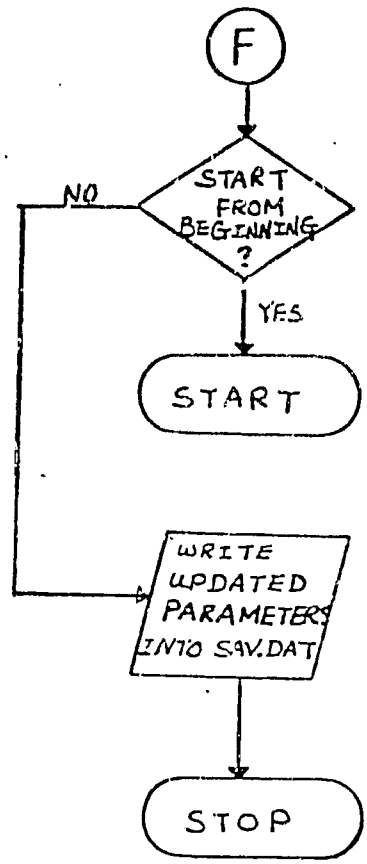

Figure 7. Flowchart of INPUT.FOR Program, continued.