

MEMO : EN/INPA /DH-12
SUBJECT: LIST OF PARAMETERS FOR MORE
TO : PPA-ELETRONORTE
FROM : JOHANNES SMITS
DATE : 23 MARCH 1987

INTRODUCTION

THIS MEMO CONTAINS A LIST OF THE PARAMETERS OF MORE (MACROPHYTES OCCUPYING RESERVOIRS). THE PARAMETERS HAVE BEEN LISTED ACCORDING TO A FEW PRINCIPLES. THE FIRST LEVEL OF DISTINCTION CONCERNS THE FUNCTION OF PARAMETERS IN THE MODEL. THE FUNCTIONS ARE: (1) INPUT, (2) VARIABLE, (3) PARAMETER, (4) OUTPUT, (5) PROGRAM COORDINATION. THE SECOND LEVEL OF DISTINCTION RELATES TO THE DISCIPLINE. THE DISCIPLINES ARE: (A) MACROPHYTES, (B) FORCING FUNCTIONS, (C) MASS TRANSPORT, (D) GEOMETRY, (E) AUXILIARY. A THIRD LEVEL HAS BEEN FOUND IN THE TYPE OF PARAMETER: INTEGER, INTEGER ARRAY, REAL, REAL ARRAY. THE FOURTH AND FINAL LEVEL IS THE ALPHABETIC ORDER.

LIST OF PARAMETERS FOR MORE

1. INPUT

A) MACROPHYTES

CBMAX : MAXIMAL BIOMASS DENSITY (G C/M²)
CBMCOV : BIOMASS DENSITY AT 100% COVER WATER SURFACE (G C/M²)
DCO : COEFFICIENT LIMITING FUNCTION WITH RESPECT TO DENSITY
ENT : BIOMASS DENSITY AT THE RIVER NEAR THE INFLOW (G C/M²)
HP : AVERAGE PLANT HEIGHT (M)
KSN : HALF-SATURATION CONSTANT FOR NITROGEN (MG N/L)
KSP : HALF-SATURATION CONSTANT FOR PHOSPHORUS (MG P/L)
MCO1 : MORTALITY RATE IN RELATION TO THE DENSITY (1/D)
MCO2 : COEFFICIENT TEMPERATURE DEP. MORTALITY RATE (1/OC)
MCO3 : COEFFICIENT TEMPERATURE DEP. MORTALITY RATE
PGMAX : MAXIMAL GROSS PRODUCTION RATE CONSTANT (1/D)
PHCO : COEFFICIENT LIMITING FUNCTION WITH RESPECT TO PH
PHOPT : OPTIMUM PH
RCO1 : FRACTION OF GROSS PRODUCTION CONSUMED IN RESPIRATION
RCO2 : COEFFICIENT MAINTENANCE RESPIRATION RATE (1/OC)
RCO3 : COEFFICIENT MAINTENANCE RESPIRATION RATE
RDWC : RATIO OF DRY WEIGHT AND CARBON
RPWS : RATIO OF PLANT SPEED AND WINDSPEED
RWDW : RATIO OF WET WEIGHT AND DRY WEIGHT
SIS : SATURATION VALUE AVERAGE DAILY PHOTOREACTIVE
INSOLATION (W/M²)
TCO1 : COEFFICIENT TEMPERATURE FUNCTION PRODUCTION (T<TOPT)
TCO2 : COEFFICIENT TEMPERATURE FUNCTION PRODUCTION (T>TOPT)
TOPT : OPTIMUM TEMPERATURE (OC)
WCO1 : COEFFICIENT RELATING WINDSPEED TO WAVE AMPLITUDE
WCO2 : COEFFICIENT MORTALITY IN RELATION TO WAVE INDUCTION
CBI(I) : INITIAL BIOMASS DENSITY FOR EACH SEGMENT (G C/M²)

B) FORCING FUNCTIONS

CN : WEEKLY AV. DISS. NUTRIENT NITROGEN CONC. (MG N/L)
CP : WEEKLY AV. DISS. INORGANIC PHOSPHORUS CONC. (MG P/L)
DTEMP : TEMPERATURE INCREMENT OF THE LEAVES (OC)
PH : HYDROGEN POTENTIAL (PH)
SI : WEEKLY AVERAGE PHOTOREACTIVE INSOLATION (W/M²)
T : WEEKLY AVERAGE ATMOSPHERIC TEMPERATURE (OC)
W : WINDSPEED AT 10 M LEVEL (M/S)
WD : ANGLE BETWEEN THE LONGITUDINAL AXIS OF THE RESERVOIR
(DIRECTED TOWARDS THE DAM) AND THE WIND DIRECTION
FH(I) : HARVEST FRACTION PER WEEK FOR EACH SEGMENT
WRCO(I) : WINDSPEED REDUCTION COEFFICIENT FOR EACH SEGMENT

C) MASS TRANSPORT

QI : FLOW RATE INFLOW (M³/S)
QO : FLOW RATE OUTFLOWS (M³/S)

D) GEOMETRY

AMAX : MAXIMAL SURFACE AREA AT MAXIMAL DEPTH (KM²)
DEPRES : AVERAGE DEPTH OF THE CENTRAL SEGMENT (M)

DEPRIV : AVERAGE DEPTH OF THE RIVER NEAR THE INFLOW (M)
 EN : EXPONENT IN AREA-DEPTH RELATION
 GAMMA : COEFFICIENT IN AREA-DEPTH RELATION
 H : DEPTH OF RESERVOIR (M)
 HMAX : MAXIMAL DEPTH OF RESERVOIR (M)
 LAT : LATITUDE (DEGREES)
 LENS1 : LENGTH OF THE CENTRAL SEGMENT (KM)
 WIDS1 : WIDTH OF THE CENTRAL SEGMENT NEAR THE DAM (KM)
 FA() : SURFACE AREA FRACTION FOR EACH SEGMENT

E) AUXILIARY

IOPG : OPTION PARAMETER (1=DISTINCT GROWING SEASON, 0=NO
 DISTINCT GROWING SEASON)
 LWEEK : NUMBER OF WEEK (1-52)
 LYEAR : NUMBER OF YEAR (19??)
 NWB : NUMBER OF FIRST WEEK OF THE GROWING SEASON (1-52)
 NWE : NUMBER OF FINAL WEEK OF THE GROWING SEASON (1-52)
 N WEEK : NUMBER OF WEEK (1-52)
 NYEAR : NUMBER OF YEAR (19??)
 DTIME : TIMESTEP (D)
 TEX() : TEXT FOR INPUT AND OUTPUT
 TEXT(,) : TEXT FOR INPUT AND OUTPUT

2. VARIABLES

A) MACROPHYTES

CB() : BIOMASS DENSITY AFTER TIMESTEP (G C/M2)
 CBO() : BIOMASS DENSITY BEFORE TIMESTEP (G C/M2)

B) FORCING FUNCTIONS

HW : WAVE AMPLITUDE (M)
 DL() : DAYLENGTH (H)

D) GEOMETRY

AT : TOTAL SURFACE AREA AFTER TIMESTEP (M2)
 ATO : TOTAL SURFACE AREA BEFORE TIMESTEP (M2)
 DH : CHANGE OF WATER LEVEL DURING A TIMESTEP
 HO : DEPTH OF RESERVOIR BEFORE TIMESTEP (M2)
 A() : SURFACE AREA OF EACH SEGMENT AFTER TIMESTEP (M2)
 AD() : SURFACE AREA OF EACH SEGMENT BEFORE TIMESTEP (M2)

3. PARAMETERS

A) MACROPHYTES

FIRF : LIMITING FACTOR WITH RESPECT TO INSCLATION (0-1)
 FNIT : LIMITING FACTOR WITH RESPECT TO NITROGEN (0-1)
 FNUT : LIMITING FACTOR WITH RESPECT TO NUTRIENTS (0-1)
 FPH : LIMITING FACTOR WITH RESPECT TO PH (0-1)
 FPHOS : LIMITING FACTOR WITH RESPECT TO PHOSPHORUS (0-1)
 FTEMP : LIMITING FACTOR WITH RESPECT TO TEMPERATURE (0-1)
 RENT : ENTING RATE FOR THE CENTRAL SEGMENT 1 (G C/D)
 ROUT : OUTFLOW RATE FOR BIOMASS AT THE DAM SITE (1/D)

TRIS2 : TRANSPORT RATE OF BIOMASS TO SEGMENT 2 (1/D)
 TRIS3 : TRANSPORT RATE OF BIOMASS TO SEGMENT 3 (1/D)
 TROS1 : TRANSPORT RATE OF BIOMASS OUT OF SEGMENT 1 (1/D)
 TROS2 : TRANSPORT RATE OF BIOMASS OUT OF SEGMENT 2 (1/D)
 TROS3 : TRANSPORT RATE OF BIOMASS OUT OF SEGMENT 3 (1/D)
 FDENS() : LIMITING FACTOR WITH RESPECT TO BIOMASS DENSITY
 FOR EACH SEGMENT (0-1)
 RCROM() : MORTALITY RATE IN RELATION TO DENSITY FOR EACH
 SEGMENT (1/D)
 RHARV() : HARVESTING RATE FOR EACH SEGMENT (1/D)
 RMORT() : OVERALL MORTALITY RATE FOR EACH SEGMENT (1/D)
 RPROD() : NET PRIMARY PRODUCTION RATE FOR EACH SEGMENT (1/D)
 RWDES() : MORTALITY RATE IN RELATION TO WAVE INDUCTION FOR
 EACH SEGMENT (1/D)

B) FORCING FUNCTIONS

PI : 3.1415926
 RAD : RADIALS

C) MASS TRANSPORT

ALPHA : ABSOLUTE VALUE OF THE ANGLE BETWEEN THE LONGITUDINAL
 AXIS OF THE RESERVOIR AND THE WIND DIRECTION (DEGREES)

4. OUTPUT

A) MACROPHYTES

CBD() : DRY WEIGHT BIOMASS DENSITY FOR EACH SEGMENT (G/M2)
 CBW() : WET WEIGHT BIOMASS DENSITY FOR EACH SEGMENT (G/M2)
 TB() : TOTAL DRY WEIGHT BIOMASS FOR EACH SEGMENT (TON)
 TBW() : TOTAL WET WEIGHT BIOMASS FOR EACH SEGMENT (TON)
 PC() : PERCENTAGE OF WATER SURFACE COVERED (%)

E) AUXILIARY

NDATE : DATE (YEAR PLUS WEEK)

5. PROGRAM COORDINATION

A) MACROPHYTES

IGS : OPTION PARAMETER FOR CONSIDERING A GROWING SEASON
 (1=YES, 0=NO)

B) FORCING FUNCTIONS

AOB : PARAMETER FOR CALCULATION OF DAYLENGTH
 COSLD : COSINE FUNCTION FOR CALCULATION OF DAYLENGTH
 DEC : PARAMETER FOR CALCULATION OF DAYLENGTH
 SINLD : SINE FUNCTION FOR CALCULATION OF DAYLENGTH

D) GEOMETRY

F2 : RATIO OF SURFACE AREA OF SEGMENT 2 AND THE SUM OF THE
 SURFACE AREAS OF SEGMENTS 2 AND 3
 F3 : RATIO OF SURFACE AREA OF SEGMENT 3 AND THE SUM OF THE
 SURFACE AREAS OF SEGMENTS 2 AND 3

E) AUXILIARY

NC : PARAMETER FOR COUNTING THE WEEKS
NERROR : NUMBER OF ERROR (1=CHANGE OF WATER LEVEL TO RAPID,
2=INCORRECT SPECIFICATION OF DATES IN INPUT,
3=SIS, HP OR CBMCOV IS ZERO, 4= DTIME, DEPRIV OR
DEPRES IS ZERO)
NTS : NUMBER OF TIMESTEPS