y<-data.matrix(read.table("y.txt", header=FALSE))

trap coordinates:

trx<-c(-40,-30,-20,-10,0,10,20,30,40,-40,-30,-20,-10,0,10,20,30,40,-40,-30,-20,-10,0,10,20,30,40,-40,-30,-20,-10,0,10,20,30,40,-40,-30,-20,-10,0,10,20,30,40,-40,-30,-20,-10,0,10,20,30,40,-40,-30,-20,-10,0,10,20,30,40,-40,-30,-20,-10,0,10,20,30,40,-40,-30,-20,-10,0,10,20,30,40)

try<-c(-40,-40,-40,-40,-40,-40,-40,-40,-40,-30,-30,-30,-30,-30,-30,-30,-30,-30,-20,-20,-20,-20,-20,-20,-20,-20,-20,-10,-10,-10,-10,-10,-10,-10,-10,-10,0,0,0,0,0,0,0,0,0,10,10,10,10,10,10,10,10,10,20,20,20,20,20,20,20,20,20,30,30,30,30,30,30,30,30,30,40,40,40,40,40,40,40,40,40)

X<-cbind(trx,try)

K <- 4

M <- 100

nind<-dim(y)[1]

J<-nrow(X)

Xl<-min(X[,1])

Xu<-max(X[,1])

Yl<-min(X[,2])

Yu<-max(X[,2])

xlims=c(Xl, Xu)

ylims=c(Yl, Yu)

area<-(Xu-Xl)\*(Yu-Yl)

sink('SCR.txt')

cat('

model {

  psi~dunif(0,1)

  pi~dunif(0,1)

  for(t in 1:2){

    alpha0[t]~dnorm(0,.1)

    logit(p0[t])<- alpha0[t]

    alpha1[t]<-1/(2\*sigma[t]\*sigma[t])

    sigma[t]~dunif(0, 150)

  }

  for(i in 1:M){

     z[i] ~ dbern(psi)

     SEX[i]~dbern(pi)

     SEX2[i]<-SEX[i] + 1

     s[i,1]~dunif(Xl,Xu)

     s[i,2]~dunif(Yl,Yu)

    for(j in 1:J){

      d[i,j]<- pow(pow(s[i,1]-X[j,1],2) + pow(s[i,2]-X[j,2],2),0.5)

      y[i,j] ~ dpois(p[i,j]\*K)

      p[i,j]<- z[i]\*p0[SEX2[i]]\*exp(-alpha1[SEX2[i]]\*d[i,j]\*d[i,j])

    }

  }

  N<-sum(z[])

}

',fill = TRUE)

sink()

nz<-M-nind

sex<-c(1,1,1,1,1,1,2,2,2,2,2,2,2)

SEX <- c(sex - 1, rep(NA, nz))

ntraps<-J

Yaug <- array(0, dim = c(M, J))

Yaug[1:nind, ] <- y

data <- list(y = Yaug, SEX = SEX, M = M, K = K, J = ntraps, Xl = Xl, Yl = Yl,

  Xu = Xu, Yu = Yu, X = X)

parameters <- c('psi', 'p0', 'N', 'D', 'sigma', 'pi')

Sin <- matrix(NA, ncol = 2, nrow = M)

Sin[(nind + 1):M, ] <- cbind(runif(nz, Xl, Xu), runif(nz, Yl, Yu))

inits = function() {

  list(z = c(rep(1, nind), rbinom(nz, 1, 0.5)), psi = runif(1),

    s = Sin, SEX = c(rep(NA, nind), rbinom(nz, 1, 0.5)), pi = runif(1),

    sigma = runif(2, 2, 3), alpha0 = runif(2))

}

n.chains<-3

n.adapt<-200

n.iter<-500

library(rjags)

library(coda)

library(lattice)

mod.out <- jags.model('SCR.txt', data, inits, n.chains = n.chains,

  n.adapt = n.adapt)

coda.fit <- coda.samples(mod.out, parameters, n.iter = n.iter)

summary(window(coda.fit,start=500), dig=3)

xyplot(coda.fit)