

Modeling for size of damage-causing generation of rice leaffolder (LF)

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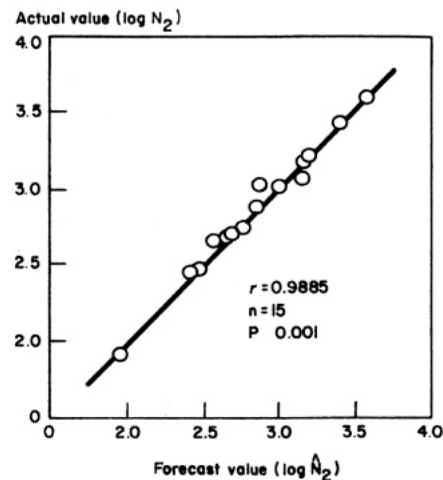
Second-generation LF *Cnaphalocrocis medinalis* Guenée (Jun-10 Jul) is the most damaging in Jiangxi Province, Yangtze River region. To predict the size of this generation, we used error analysis (or key factor analysis) to select in sequence environmental factors. The selection criterion is a correlation coefficient larger than 0.53. The model's multiple regression formula is:

$$\log N_2 = -6.6025 + 0.7387 \log N_1 - 7.1912 \log T_4 + 17.3500 \log S_5 - 2.0791$$

$\log W_8 + 1.0313 \log M_4 + 0.9988 \log T_5 - 0.7634 \log P_{12} - 0.2267 \log R_5$.

N_2 is emergence size of second generation, N_1 is emergence size of first generation, T_4 is average air temperature in Apr, S_5 is sea temperature in No. 25 region of Northwest Pacific in May, W_8 is back spot site of subtropical air pressure in late Aug, M_4 is terrestrial magnetism index in Apr, T_5 is minimum temperature in May, P_{12} is water vapor pressure in late Dec, and R_5 is total monthly rainfall in May. Correlation coefficient of the formula is 0.9885, $F = 9.19$, $df = 7.7$, $P < 0.001$.

The figure shows the emergence size in 1965-79 and predicted size of second-generation LF. \int



Emergence size and predicted size of second-generation LF at Jian prefecture, Jiangxi Province, China, 1965-79.

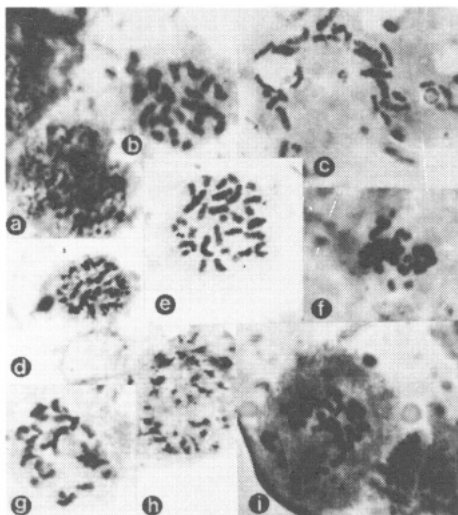
Brain cells and chromosomes of the brown planthopper *Nilaparvata lugens* (Stål)

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Standard air-drying techniques with lacto-aceto-orcein staining were used to observe the mitotic brain cells and chromosomes of fourth-instar *N. lugens* nymphs (Fig. 1). From 100 individuals, the mean number of cells undergoing mitosis was 487; the mean number of nondividing cells was 247, for a 67% mitotic index.

Premetaphase chromosome counts established the normal diploid complement at $2n = 30$. The karyotype included 28 autosomes and an XX (female) or XY (male) sex chromosome system. The sex chromosomes were heterochromatic and maximally contracted. The XX or XY tandem consisted of chromosomes which were smaller than or equal to some autosomes. The X and the Y chromosomes usually had different shapes; the X-chromosome was always bigger than the Y-chromosome.

Early metakinetic chromosomes (Fig. 1b, c, e, f, g, and i) were short and

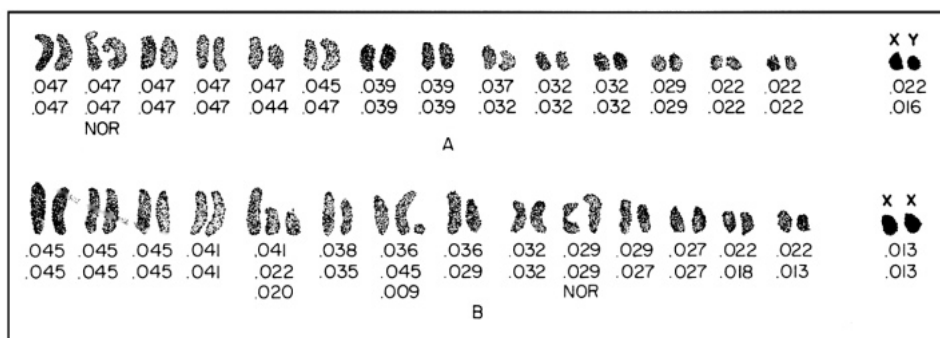


1. Brain cells and chromosomes of *N. lugens* biotype 1. IRRI, 1986. Magnification 1000X (oil immersion).

rod-shaped; each chromosome had two chromatids. The sister chromatids comprising the chromosomes were barely observable because of the lack of a distinct centromere. They appeared to have diffuse or scattered spindle attachments, implying that *N. lugens* chromosomes are holokinetic. At metaphase, the chromosomes occupied the spindle body with the chromosomal long axis at right angles to the polar axis.

Total chromatin was 11.90μ in female and 5.74μ in male *N. lugens*. Females possessed longer chromosomes (Fig. 1c) than males (Fig. 1b and e). However, the reverse was the case in relative mean lengths.

In karyotype analysis of



2. Relative mean lengths of premetaphase brain chromosomes of male (A) and female (B) *N. lugens* biotype 1. IRRI, 1986. Magnification 1000X (oil immersion).

premetaphase chromosomes of males, the relative length of autosomes ranged from 0.022 to 0.047. The NOR measured 0.047; the X-chromosome, 0.022; and the Y, 0.016 (Fig. 2A). The relative length of autosomes in females ranged from 0.013 to 0.045. The relative length of NOR was 0.029, that of the X-chromosome was 0.013 (Fig. 2B).

Very few cells (3/individual) were detected undergoing anaphase immediately after metaphase. Anaphase occurred so fast that it was least trapped in fixed brain tissue. In contrast, the frequency of telophase cells was high (30 cells/ individual). Later, cytokinesis ensued and formed two daughter nuclei. The first prophase nucleus measured 7.05 μ by 5.88 μ . Each nucleus had a circular nucleolus 1.76 μ in diameter. Seven more variations of prophase nuclei were found (see table).

During the regular mitotic cycle in *N. lugens* biotype 1, prophase was the

Prophase forms of brain cells of *N. lugens* biotype 1.

Prophase form	Length (μ)	Width (μ)	Remarks
II	8.23	7.64	Nuclear membrane present; nucleolus present; chromosomes granulated
III	11.17	10.58	Nuclear membrane and nucleolus disintegrating; chromosomes granulated
IV	15.29	13.52	Nuclear membrane disappearing; nucleolus absent; chromosomes appeared as intertwined threads
V	17.64	14.11	Same as above
VI	11.76	7.06	Nuclear membrane disappeared; chromosomes elongated
VII	8.23	7.06	Chromosomes condensed into irregular forms and scattered all over the nucleus
VIII	17.64	10.58	Irregular scattered chromosomes

longest stage, followed by telophase and metaphase; anaphase was the shortest.

Some brain cell nuclei displayed either an increase (agmatoploidy) or decrease (hypoploidy) in chromosome numbers. Hypoploidy resulted from somatic chromosomal fusions (Fig. 1f).

Agmatoploidy resulted from chromosomal fragmentations, leading to the appearance of extra chromosomes, such as m-chromosomes. On the whole, hypoploidy was more frequent than agmatoploidy in *N. lugens* biotype 1. *S*

Parasitoids of the rice gall midge (GM) in Indonesia

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Several hymenopterous parasitoids of GM *Orseolia oryzae* (Wood-Mason) have been recorded in Java and Bali (see figure):

Egg-larval parasitoid:

Platygaster oryzae Cameron
(Platygasteridae)

Larval parasitoids:

Propicicroscytus mirificus (Girault)
(Pteromalidae)

Eurytoma setitibia Gahan
(Eurytomidae)

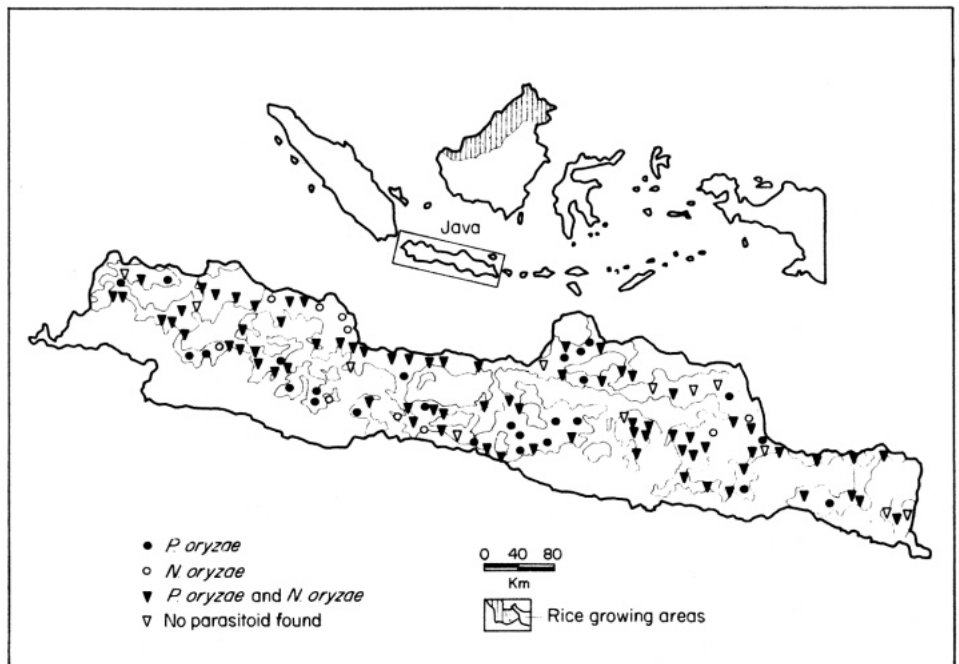
Trichorpia sp. (Diapriidae)

Terrastichus sp. *nyemitawus* Rohwe
groups (Eulophidae)

Pupal parasitoid:

Neanastatus oryzae Ferriere
(Eupelmidae)

Only *P. oryzae*, *N. oryzae*, and *P. mirificus* are considered important. In surveys during 3 consecutive years, *P.*



Distribution of *P. oryzae* and *N. oryzae* in Java, Indonesia

oryzae and *N. oryzae* were normally found; *P. mirificus* was found only with intensive observation. *P. oryzae* was found in 91% and *N. oryzae* in 70% of the locations where silvershoots were

sampled. The degree of parasitization varied, but ranged from 30 to 70%. Based on the number of parasitized hosts, the ratio of *P. oryzae* to *N. oryzae* ranged from 3.3:1 to 6.8:1. *S*