

# CLASSIFICATION OF «VARIETIES» OF PASTEURELLA PESTIS STRAINS ISOLATED IN THE INTERIOR OF THE STATE OF PERNAMBUCO-BRAZIL

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*Studies were made on the biochemical behavior of 100 strains of P. pestis isolated in Northeastern Brazil with regard to production of nitrous acid, reduction of nitrates to nitrites, and acidification of glycerol. Results showed that 98 strains can be classified as "orientalis variety", while the remaining two could not be included in any of the existing "varieties".*

## INTRODUCTION

It is known that production of nitrous acid, reduction of nitrates to nitrites, and acidification of glycerol has no diagnostic value in regard to identification of *Pasteurella pestis*. However, such laboratory tests are useful for differentiation of the so-called "geographical races" of the plague bacillus (10).

In 1928 the Russian investigator, Bezsonova (4) for the first time called attention to the biochemical variability of strains of *P. pestis*. Strains isolated in India did not attack the glycerol, while those isolated in southeastern Russia did so.

Furthermore, Kurauchi (7) and Berlin & Borzenkov (3) were able to distinguish two "races" of *P. pestis*; they named these "continental", which acidified the glycerol, and "oceanic" which did not attack glycerol.

In 1949 Devignat (5, 6), while studying the above mentioned "races" with regard

to the production of nitrous acid, proposed a new classification for what he called "varieties" of *P. pestis*. He recognized three "varieties": (1) "orientalis", which reduced nitrates but did not attack the glycerol; (2) "antiqua", which attacked the glycerol and reduced nitrates to nitrites; and (3) "medievalis", which produced acid in glycerol but not reduced nitrates to nitrites.

In 1941 Machiavello (7, 8) studied 45 strains of *P. pestis* isolated in Brazil, all of which were unable to attack the glycerol.

The present study was undertaken with special interest of knowing more about the Brazilian strains of *P. pestis* and to relate them to the already described "varieties" of the plague bacillus.

## MATERIAL AND METHODS

The 100 strains of *P. pestis* employed in this study were isolated during epidemic and epizootic outbreaks of plague occur-

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ing in the interior of the state of Pernambuco-Brazil, in the year of 1966 and 1967. Sixteen of those strains were isolated from humans, 59 from wild rodents, and 25 from rodent fleas.

The following biochemical tests controls were employed as (a) a strain of *Staphylococcus aureus* for the reduction of nitrates to nitrites; and (b) a blank test for production of just acid nitrous.

The preparation of the culture media and reagents as well as the conduction of the tests were made in strict conformity to the methods of Baltazard et al. (2) in a paper produced in 1956.

## RESULTS

From the 100 strains of *P. pestis* studied, 98 were capable of producing nitrous acid and of reducing nitrates to nitrites.

According to the classification of Devignat (5, 6) the 98 strains of *P. pestis* studied in this paper should be placed among the "orientalis variety" while the remaining two strains could not be included in any of the others "varieties".

The controls behaved as expected.

## DISCUSSION

Results presented in the current paper show that 98 strains of *P. pestis* isolated in Northeastern Brazil belong to the "orientalis variety" according to the classification of Devigant (5, 6) or to the "oceanic race" of Kurauchi (7), Berlin & Borzenkow (3) and Pollitzer (9).

In view of the uniform biochemical pattern presented by great majority of the strains, the remaining two strains might represent mutants which became unable to reduce nitrates and to produce nitrous acid.

The majority of specialists agree (without any reasonable explanations) that the strains of *P. pestis* which have been introduced in virgin countries by sea route belong to the "orientalis variety" or "oceanic race".

It is known that Plague was introduced in Brazil by sea route via the port of Santos in 1899, five years after the pandemic occurred in Hong-Kong (1).

Results obtained in this paper as well as those of Machiavello (7, 8) give additional strength to the idea the strains introduced by sea route belong to the "orientalis variety".

## RESUMO

Os autores estudaram o comportamento bioquímico de 100 amostras de *P. pestis* isoladas no Nordeste do Brasil em relação ao glicérol, produção de ácido nítrico, e redução de nitratos a nitritos. Encontraram 98% das amostras pertencendo à "variedade orientalis" e 2% não enquadradas em nenhuma classificação das chamadas "variedades geográficas" de *P. pestis*.

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