

ACTIVITIES OF INSECTICIDE BRANCH (VBD Control)

Particulars of Organization, Functions & Duties

1. INTRODUCTION :

The Insecticide Branch of Public Health Department is a derivative of the original Malaria Department, established in the then Bombay Municipal Corporation as per recommendations of Dr. C.A Bentley, who took over the investigation in process regarding Malaria by his military predecessor Capt. F.V. Mackie, I.M.S. (1908) & Capt A.G. Mc Kendrick, IMS (1909) & Others.

As originated from the Malaria problem of Mumbai and also as a present need, Malaria eradication remained the soul behind the functioning of the department. At present, however, the department is functioning in a very diversified manner, but retaining its original identity by keeping Malaria as the top and constant priority.

1. FUNCTIONING :

The task of Malaria vector control is directly undertaken by the Governments of states, whereas mosquito nuisance control is an obligatory duty of the Local Self Government bodies. In case of Mumbai both the problems are dealt with by the Brihanmumbai Mahanagarपालिका.

Priority-wise various functions of the Insecticide Branch are as follows:-

(1) Mosquito Control

A) Malaria vector control.

B) Dengue vector control.

C) Mosquito nuisance control (Filaria vector)

(2) Fly control.

(3) Rodent control.

Vector Borne Diseases

| Name of Vector | Diseases transmitted |
|-----------------------|--|
| Mosquito | : Malaria, Filaria, J.E., Dengue, Yellow fever, Chikungunya |
| Fly | : Typhoid, Para – typhoid fevers , Diarrhoea, Dysentery , Cholera, Gastro enteritis, Amoebiasis, Helminthic infestations, liomyelities , Poliomyelities, Conjunctivitis, Tracho.a, Anthrax , Yaws. |
| Rodent | : Plague, Leptospirosis , Salmonellosis (food poisoning) , Rat bite ever etc. |

(1) MOSQUITO CONTROL

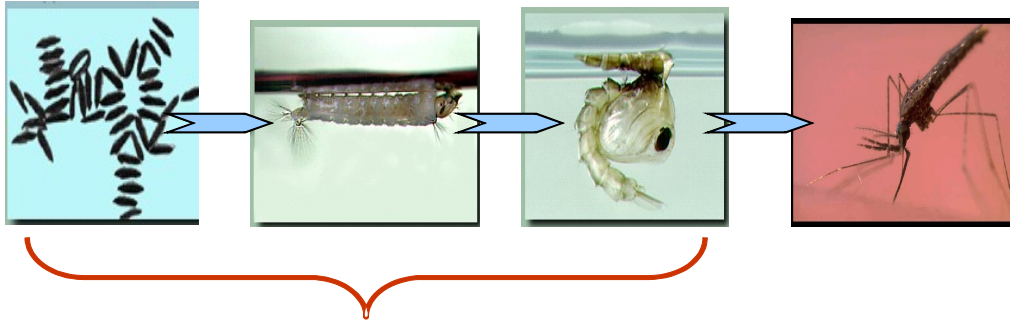
| TYPES OF MOSQUITOES | DISEASES TRANSMITTED |
|----------------------------|---|
| Anopheles | : Malaria, (P. Vivax, P. Falciparum) |
| Aedes | : Dengue & Chikungunya, Zica Yellow Fever (Not in India) |
| Culex | : Lymphatic Filariasis,Japanese encephalitis, Viral Diseases |
| Mansonia | : Lymphatic Filariasis |

Life cycle of Mosquito

LIFE CYCLE

(VARIES FROM 8 TO 11 DAYS)

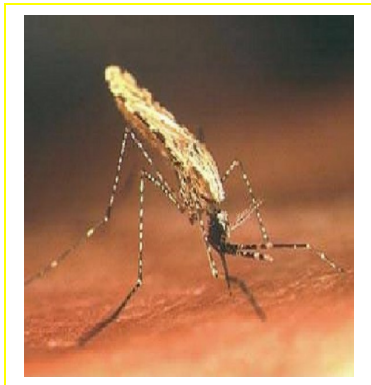
Egg → (2days) **Larva** → (4 days) **Pupa** → (2 days) **Adult**



Stages in stagnant clean water

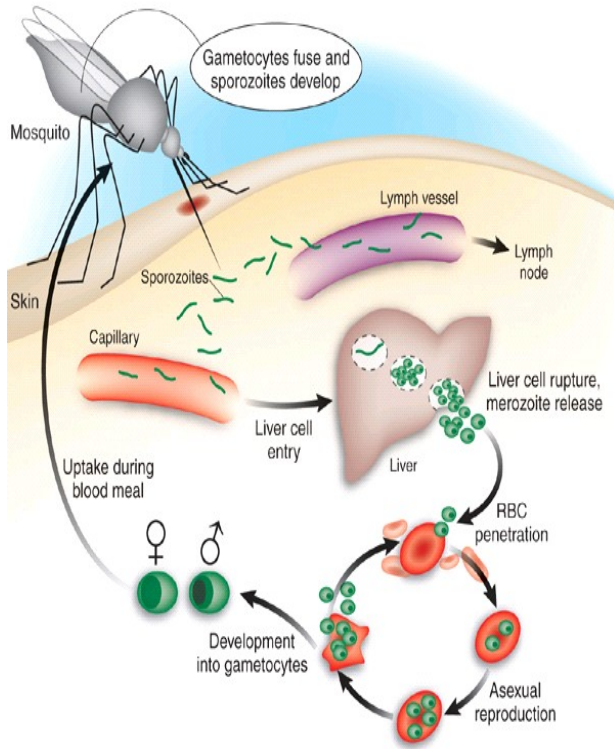
(A) MALARIA VECTOR CONTROL :

Malaria is a communicable disease caused by certain parasites of the Genus – Plasmodium. It is caused by the bite of an infected female Anopheline mosquito.



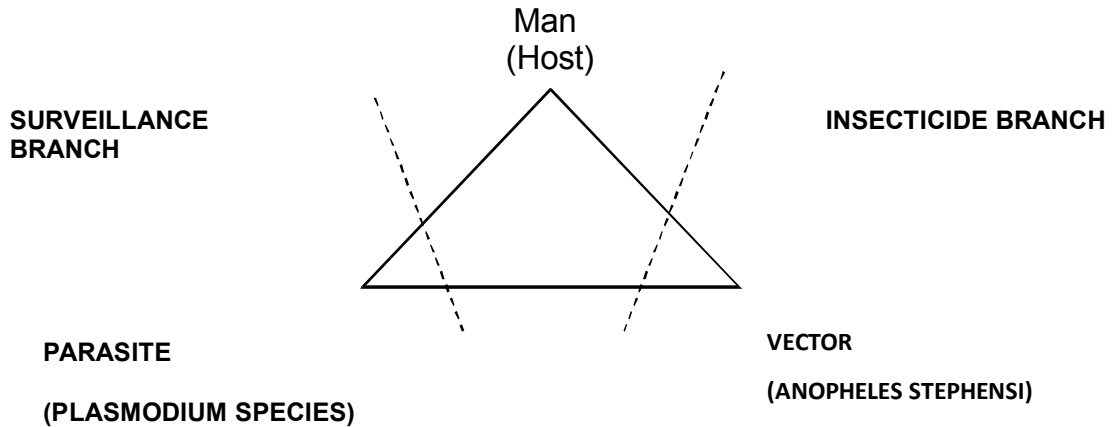
Anopheles Mosquito

Life cycle of Parasite-



Malaria Transmission Cycle

To have no Malaria eliminate either Vector or Parasite



The statement of Major G. Covell in his report “ Malaria in Bombay, 1928 “ is equally true even today with all the great changes in the area, population, living habits, standard of living and development with fast urbanization of the city of Mumbai.

“There is no natural Malaria in Bombay. The chief reason being the absence of natural streams. Anopheles stephensi is the only species of mosquito which plays an appreciable part in the transmission of the disease in the island, and its breeding places are exclusively man made. This mosquito is one of the Malaria carrying Anopheline in India which is able to adapt itself to life in a large city. In the case of other carriers facilities for breeding suitable to their needs are not produced in urban areas. But A. stephensi is the great well and cistern breeder of India, and unless this breeding places and others of a similar nature are rendered permanently mosquito proof it will continue to flourish even in the heart of the city.”

The Biting Habit;

Anopheles mosquitoes enter the house between 5 p.m. and 9.30 p.m. and again in early hours of morning. They start biting by late evening and the peak of biting activity is at midnight and early hours of morning.

Life span:

The average life span of a female infective mosquito is 2-3 weeks. It can be longer in ideal living conditions.

Flight Range:

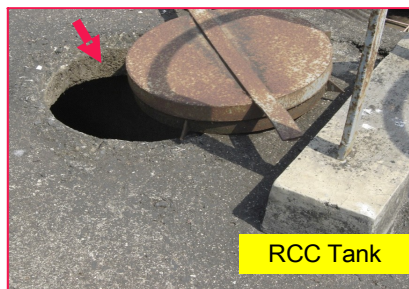
Though the Mosquitoes can fly up to 2 -3 kilometers. The active transmission reach far off places by taking shelter in motor vehicles, ships and aircraft.

Breeding habitat: Based on the above facts and also that A. stephensi requires fresh water, preferably constantly reviving, to breed in, places such as wells, water storage tanks, Fountain, Cooling tower, Swimming pools, HDPE tanks, Over Head tanks, Static tanks, Building Constructions sites, and if adult density is high then any odd article which can hold rainwater, etc.,

■ Cisterns

- ❖ R.C.C. tanks
- ❖ Mild steel tanks
- ❖ Hume pipe tanks
- ❖ H.D.P. tanks
- ❖ Over head tanks
- ❖ Over head Mill tanks
- ❖ Masonry tanks
- ❖ Garden tanks
- ❖ Static tanks
- ❖ Cooling tanks

Non Mosquito Proof Tanks



Mosquito proofing of Tank





Inaccessible
Over Head
Community
Tank

- Wells:

- ❖ Open wells
- ❖ Trap door wells
- ❖ H.C.C. wells
- ❖ Tube wells
- ❖ Ring wells
- ❖ Ditch wells



■ Others

- ❖ Building constructions
- ❖ Water stored for curing
- ❖ eg. W.C.& bathroom pits
- ❖ Basements
- ❖ Architectural Elevations
- ❖ Fountains
- ❖ Ornamental tanks
- ❖ Swimming pools
- ❖ Mill ponds
- ❖ Cooling Tower
- ❖ Odd articles
- ❖ Drums



Massive Bldg. construction



 मुंबई आरोग्य अभियान
आपली मुंबई, विरोगी मुंबई

Bldg. Construction

Curing – Water collection – potential breeding spots



LET'S TOGETHER MAKE MUMBAI MALARIA FREE

FIGHT THE BITE



Cooling Tower



Swimming



Fountain



Dilapidated Mills



mosquito vector control is sequentially designed as below :

- (1) Reduction of breeding sources
- (2) Engineering methods – Major and minor for total elimination of breeding potentialities
- (3) Biological methods – zoological & botanical
- (4) Chemical Methods
- (5) Legal methods

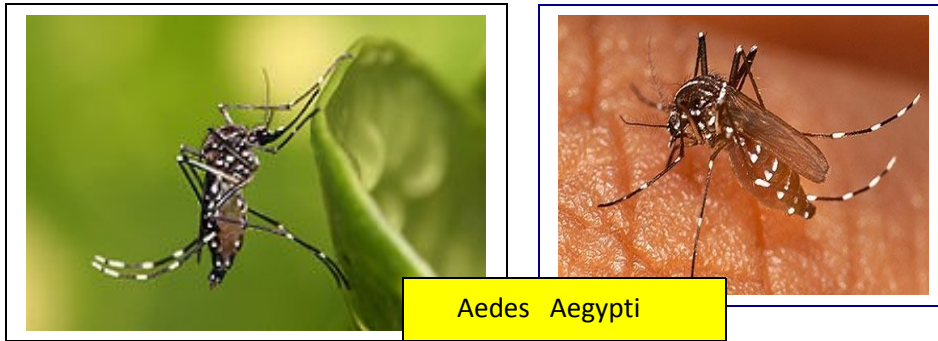
Community participation is an indispensable factor in any Public Health program. In metropolis like Mumbai no administration can depend on community participation based only on public education especially when it comes to Malaria. Considering the scientific facts involved in vector mosquito biology, mandatory participation of

community is achieved by adopting legislative measures. The then State of Bombay was the first government to adopt and implement Legislative measures for the control of the vector mosquito.

(B) Dengue and DENGUE HAEMORRHAGIC FEVER VECTOR CONTROL:

There are 3 species (Aedes aegypti, Aedes albopictus and Aedes vittatus) of Aedes mosquito detected in Mumbai. Aedes aegypti plays a role of vector in dengue (Dengue Hemorrhagic fever virus transmission from an infected person to a healthy person) in Mumbai. Fortunately the habit and habitat of these species of mosquito are such that, considering the fact that **transovarian** transmission is possible in case of dengue disease,

Mere reduction of temporary breeding places along with confined thermal Fumigation can work as a method of total relief during monsoon or focal outbreak.



Breeding Habitat :

Drum, tyre, Odd article, coconut shells, flower pots, petri dish, Tarpauline sheets, discarded **thermocool**, Machinery parts, scrap materials and many such Peri domestic containers.



Drum



Petri Dish Holding water below



Money Plant Bottle



Fengshui, Bamboo plants



Air condition trays



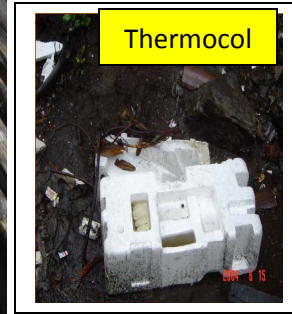
Tarpaulin Sagging



Tyres



Coconuts shells



Biting Habits :

This mosquito bites during day time. Peak biting time is at dawn and Dusk – 2 hours after sunrise & 2 hours before sunset. It has short flight range, approximately 100 meters. Hence generally Dengue cases are found in clusters. And disease is caused by virus Den I to IV.

(C) MOSQUITO NUISANCE CONTROL (FILARIA VECTOR)



These are basically nuisance causing mosquitoes; the major role is played by *Culex quinquefasciatus* which is also a vector species for Filaria. This species is a typical breeder of polluted water. The breeding sources are open channel drains, Nullahs, Septic tanks, low lands, grass plots, Aqua Privies, Storm water entrances, etc. The selection of method for the control of this mosquito more or less remains the same as those of Malaria vector but differs with the size and nature of breeding sources.



Mosquito Control

I) Inspection

- 1) Periodical inspection of all premises for ground level mosquito genic situations, building construction sites for sampling and detection of mosquito breeding. – Frequency - weekly.
- 2) Periodical inspection of water storage tanks, cooling towers etc installed on the terraces of all premises, to ensure their mosquito proof condition and to sample water storages for detection of mosquito breeding.

II) Maintenance of field records

- 1) Enumeration of premises and other mosquitogenic situation and recording the permanent, potential breeding places premises-wise in the 'Crusade Book', maintained for each beat.
- 2) Recording the details regarding the ownership, number of flights of stairs and updating the information.
- 3) Compilation of data of all beats at the ward level.

III) Legal actions

- 1) Mosquito proofing of wells, cisterns, suction tanks, septic tanks, aqua privies.
- 2) Removal, demolition, filling in of : unauthorised cisterns, water storage tanks, masonry tanks, water fountains, swimming pools, cooling towers, wells etc.
- 3) Obtaining advance for treatment of building construction sites from the builders / contractors/ developer /owner.
- 4) Obtaining deposits from industrial establishments for larvicidal treatments to temporary water collections during rainy season.
- 5) Filling of low lands, ditches, depressions.
- 6) Other corrective actions.

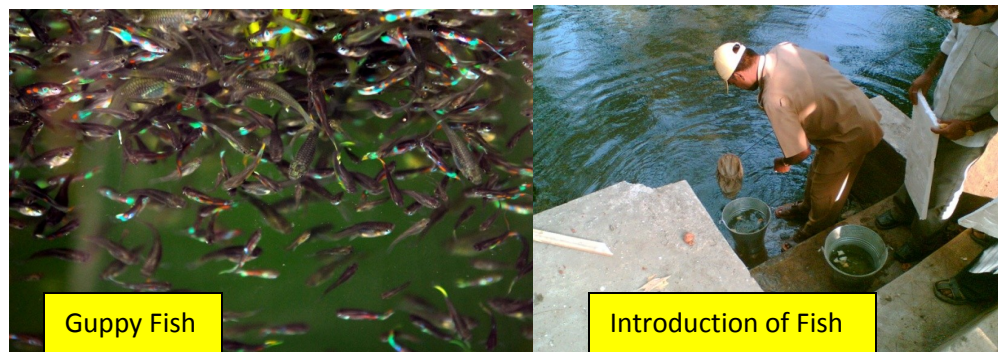
By issuing notices under section 381(1), 381(A) & 381(B) and prosecuting the defaulters in the Court of Law (In the court of Hon Metropolitan Magistrate) for correction of the defaults noted during inspection rounds.

IV) Co-ordination

- 1) "Mosquito Abatement Committee" under the chairmanship of Municipal Commissioner of Mumbai meeting twice in a year to coordinate activities of various Govt. and Semi.Govt. Agencies to review progress of work primarily pertaining to adoption of laid down policies in respect of mosquito control.
- 2) Coordination with various municipal departments and officers for the purpose as mentioned above.
- 3) Periodical joint inspections with project and maintenance engineers to problem sites for determination and review of remedial actions.

V) Introduction of Larvivorous fishes

Introducing larvivorous fishes in wells, ponds, tanks permanent cellar etc. E.g. Guppy, Gambusia



VI) Larviciding

Application of suitable larvicides to potential mosquito breeding places

– Year round



- MLO/ Temephos application to water collections
- Temephos granule treatment to shallow water collections

- **Extra efforts at building construction sites**

- 1) Regular inspection & treatment
- 2) Periodical inspection along with personnel from Building proposal department.
- 3) Site correction
- 4) Distribution of bed nets to workers



- 5) Regular workshop of site engineer. & safety officers.



6) IRS at construction workers' huts



7) Information to competent authority to issue stop Work notice in case of failure to rectified site
Correction requisition.

– **Monsoon season (June to Sept)**

- Treatment of roof gutters in existing textile mills, large industrial units through seasonal workers (Kharwas)

– **Fair season (Oct to May)**

- Removal of aquatic vegetation from water bodies, channelization to drain out stagnant water, cleaning of nullah margins and larvicidal treatment through seasonal staff.

VII) Adulticiding (Thermal fogging)

Supplementing antilarval activity by Indoor thermal fogging in following priority areas

- Areas from where Malaria & Dengue cases are reported
- Areas from where Anopheles stephensi or Aedes mosquitoes are detected.
- Labour huts at building construction sites
- Surface drains covered by cement slabs rendering larviciding difficult
- Areas from where filaria infective mosquitoes are reported
- Pyrethrum extract 2% or Cyphenothrin 5%EC is used in high speed Diesel Oil.



Indoor Fogging



Vehicle Mounted Fogging

VIII) Residual spraying

Synthetic Pyrethroids 10% W.P. is used for indoor residual spraying - 25 mg per square meter in labour huts at building construction sites.

IX) Cross checking

A vigilance section headed by a senior officer and assisted by 10 insect collectors ensure cross checking of the work done for detection and treatment of Malaria vector breeding situations.

X) Mosquito collection & Laboratory work

Mosquito collections from fixed and random catching stations for detection of Malaria vector species

- filariasis studies (dissections and determination of filaria infection/infectivity rates)
- mosquito densities

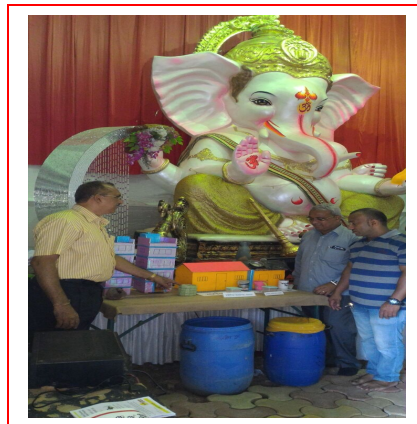
XI) Special Aedes Control Activity

1. Periodical inspection of each and every premises for detection of Aedes mosquito breeding situations and sampling such situations for detection of mosquito breeding. – Frequency – weekly.
2. Removal of scrap materials, Tins, Odd articles etc. inside the premises with the help of staff from other departments.
3. Removal of tyres & water collected in tarpaulin on huts



4. Temephos treatment of drums in slum & slum like localities.
5. Awareness to public not to allow stagnation of water in ornamental flower pots, plats kept below the flower pots, fengshui plants, plastic cups, tins, tyres tarpaulin, Water dripping out of AC machines, defrosting trays behind refrigerator etc. and periodical inspection of above article.

6. Training to NSS students, and taking their help for IEC during monsoon.
7. Sensitization and awareness. to students of Schools & colleges for their involvement in Aedes Control Activity
8. Audio visual presentation for prevention of dengue diseases through mosquito control at housing societies, industrial & commercial institution, corporate offices, etc.
9. Sensitization of elected representative i.e. Councillors , MLA, Social workers, Representative of ALMs , NGO's , etc
10. Exhibition to prevent dengue in health camps ward offices and other social gatherings during Ramzan, Ganeshotsav, Mount Mary fair and Navratri.



- **Concept of Mosquito Breeding Detector (MBD)**

Housing Societies, owner of the houses etc are appealed to appoint their own MBD for detection of Aedes Mosquito in their premises because it is not possible to enter each & every houses under present infrastructure .Training will be imparted to them theortically and practically for attaining expertise in detection of Aedes mosquito breeding.

MBD Appeal Letter

MUNICIPAL CORPORATION OF GREATER MUMBAI

**Office of the Pest Control Officer, 'E' ward, Ground floor, 10, Shaikh Haffizuddin marg, Byculla,
Mumbai – Phone No.: 022- 23081471. Extn. 112 /113.
No. PCO/E/ /SR; Dt. /05/2016.**

To,

**Sub: Appointment of 'MOSQUITO BREEDING DETECTORS'
in your Locality / Society / Workplace, etc.**

Sir / Madam.

You are aware that the situation of Malaria & Dengue in Mumbai City is reviewed by all concerned. Many preventive steps have been effectively undertaken by the M.C.G.M. and other Government, Semi Government agencies and big land holders in their properties for mosquito control.

Usually, it is observed that, mosquito breeding for these diseases occurs in wells, water storage tanks, drums, Petri dishes of flower pots, bottled water plants, artificial fountains, air conditioning trays, water coolers, cooling towers, leakage of valves and water meters, uneven depression on terraces and ground basements, elevations, odd articles like tyres, tins, cups, plastic bottles etc. MCGM has through various media highlighted these facts for proactive community participation and general awareness. But it is observed that, despite all these efforts, the issue still needs to be effectively absorbed at all levels and the fact that mosquito breeding is detected indoors is a challenge. Hence as a innovative concept, MCGM appeals to appoint **'MOSQUITO BREEDING DETECTORS'**, from amongst yourselves, preferably interested Senior Citizens, active members, etc., to detect mosquito breeding within your premises & including individual homes/work places, etc. These **'MOSQUITO BREEDING DETECTORS'** will be thoroughly trained in the basics of Mosquito biology and breeding habitats. They will inform the Ward Pest Control Officer about detection of mosquito breeding to take further preventive measures. This proactive role from the Citizens will greatly help MCGM in effectively controlling mosquito breeding sources and consequent control over incidence of Dengue / Malaria.

Hence it is once again appealed and requested to furnish names and contact details of 2-3 interested and active members from your Society/Locality/Workplace, etc. at the earliest so as to arrange a interactive training session to all the **'MOSQUITO BREEDING DETECTORS'**.

Details may please be sent at the above address or also mail us at E-mail ID - pco01pco.e@mcgm.gov.in.

Your proactive support to make this concept successful will greatly enable MCGM in its efforts to improve Community and Public Health at large.

In anticipation of your early proactive response.

Thanking you.

Sincerely,

Pest Control Officer 'E' ward

Appointment & training to MBD's



The MBD Can also be appointed through the authorised private pest control agencies which are approved by MCGM.

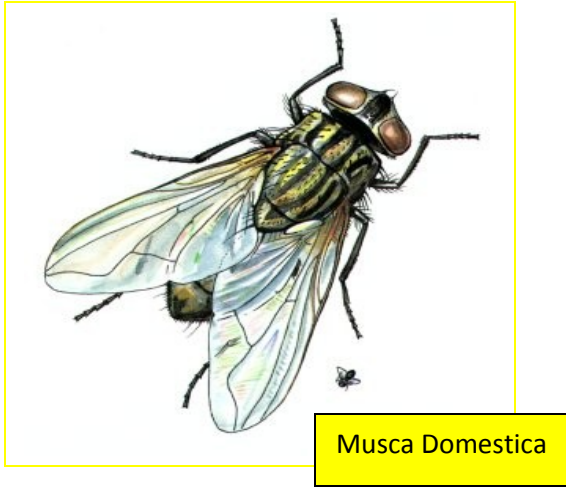
BRIHANMUMBAI MAHANAGR PALIKA**Public Health Department****Insecticide Branch**Primary School Building, 2nd Floor, Gilder tank Ground, Dr. Dadasaheb Bhabkamkar Marg, Mumbai – 400007.**LIST OF APPROVED PRIVATE PEST CONTROL OPERATORS**

| Sr. No. | PRIVATE PEST CONTROLER COMPANY NAME | OFFICE ADDRESS |
|---------|---|---|
| 1 | M/s JD PEST CONTROL Pr.- Prathmesh Adsul | 26 Manthan Plaza, Neharu Rd. Santacruz (E) Mumbai- 400 055. Email- SALES@JDPESTCONTROL.IN WWW.JDPESTCOTROL.IN Tel No./ - 022-26666007; 65288268. Mob No. - 982059949 |
| 2 | M/s CITYLOGIC Pro. - Mr. V.P Sing | B/103, Revti Apartment Opp. Sai Datt Temple, Sanyukta nagar, Acole Cross Rd. Nalasopora (E) Dist - Palghar, Pin Cod – 401 209 Email – citylogic.ss@gmail.com Mob No. – 9322729172, 8793306661 |
| 3 | M/s AAKANKSHA APANG SEVA SAH. SANSTHA. MARYADIT Pro. Mr. Surendra Kharat | 281/5,R.D Lokhande Chawl, Dr. Ambedkar Chowk, Kurla (W) Mumbai – 400 070. Mob No.- 9869778124, 9767498997 Email – ncfdph@gmail.com |
| 4 | M/s P SQUARE PEST CONTROL Pro.- Mr. Pravin S Bait | Khandke Building No. 9 Room No. 25,B-wing, R.K. Vaidya Rd. Opp. Plaza, Dadar, Mumbai – 400 028. Email - pravinsquare@gmail.com Tel No. 022 24377274 Mob No. 9820548338/9920548409/9820548414. |
| 5 | M/s PEST –O-STOP PEST CONTROL SERVEISE Pvt Ltd. M/s Deepak S. Chauhan. | 2,Kulswamini Building, Sai Nath Nagar, Behind Anad Cinema, Thane (E) Pin No. – 400 603. Email – pestostop@gmail.com www.pestostop.com Tel No. – 022 - 65101010/25982041/42 Mob No – 9323682041/8446060040 |
| 6 | M/s ELITE CORPORETION Pro. Mr. Jatin Trivedi | Vireshwar Chambers, 405,4 th Floor, Next to shan Cinema, M.G. Rd., Vile Parle (E), Mumbai – 400 057. Email – elite2k@vsnl.com support@elitecorporation.in Tel No. 8253809/5117373, Mob No 9979852072 |
| 7 | M/s PEST CONTROL UNIVARSAL Pro. Mr Jaya K. Amin | Saidham, Plot No. L/24, Hira Kumbhar Chawl, S.G.Barve Marg, Kurla (W) Mum. – 400 070. Tel No. – 6504731/6503636/6508030 |
| 8 | M/s EXECUTIONER PEST CONTROL Pvt. Ltd. Pro. Mr. Aslam Marchand | 1, Tripta Sadan, Shantawadi, 31, J.P. Rd. Andheri (W), Mumbai – 400 058. Tel No. – 6246668/6718872 |
| 9 | M/s PEST CONTROL INDIA Pvt.Ltd. Pro.- Gururaj Agnihotri | Narayani Ambbai tempal Compound, Aarey Rd. Goregaon (W), Mumbai – 400 062. Email – solutions@pcil.in www.pestcontrolindia.com Tel No – 022-28739013 Mob No. - 9324801564 |
| 10 | M/s TOMCAT PEST CONTROL Por. – Mr. | 10-A ,Grace Plaza, S.V. Rd. Jogeshwri (w) Mumbai- 400 102 Email – adtomcat29@yahoo.com Tel No. - 26796006 |
| 11 | M/s HINDUSTAN INSECTICIDE Pro. - Mr. Angel Castelino | 39/2011,Shivam Hsg. Society, Gandhi Nagar Bandra (E), Mumbai 400 051. Email – hindustaninsecticide@hotmail.com www.hindustaninsecticide.com Tel – 26555492/26420566 Mob No. – 9821137624/9867743579 |

| Sr. No. | PRIVET PEST CONTROLER COMPANY NAME | OFFICE ADDRESS |
|---------|---|--|
| 12 | M/s PARAGON PESTICIDES Prop. Mrs. Pallavi Thomas | 164, Modi street, 4 th floor, Fort, Mumbai- 400 001. Email : pallavithomas01@gmail.com dicken.thomas@yahoo.com Tel No. - 22611399 Mob. No.- 9820663604 |
| 13 | M/s PESTERMYNATE ENTERPRISES Pro.- Mr. | 4, Mahesh Buvan, Ganesh Lane, Lalbaug Mum. - 400012. Tel No. 4138243/4138167 |
| 14 | M/s NEW KILL ALL PEST CONTROL Pro. - Mr. | 157/A, Nancy Chawl, Tanaji chowk, New Mill Road., Kurla (W), Mumbai - 400 070. Tel No. - 2611399/22632663 |
| 15 | M/s RAJSHREE PEST CONTROL Pro. - Mr. Manohar Chawan | A/29 - A, Ismail Bldg., 381, Dr. D.N. Road, Mumbai - 400 023. Email : info@rajashreepestcontrol.com www.rajashreepestcontrol.com Tel No.- 22626396/22622348 mob No.-9969871385 |
| 16 | M/s ULTIMA SEARCH Pro. - Mr. Yogesh Jadhv | 9/10, Shree Krishna Commercial Center, 6, Udyog Nagar, Opp. Raheja Solitare, of S.V. Road, Goregon (W) Mumbai - 400 062. Email - ultima@vsnl.com www.ultimasearch.com Tel No. - 28751618/28722711 |
| 17 | M/s PEST- O RID PEST CONTROL Pro. - Mr. Rajani Jagdale | 202, Romson Estate, Cincholi Bunder, off link Road, Malad (W) Mumbai - 400 064. Tel - 8739163/8739318/8746988 |
| 18 | M/s SAFELIFE ENTERPRISES Pro.- Mr. Manohar D. Padekar | D-6, Plot No. 52, Shree Sai Co-Op-Hsg. Society Gorai- 1, Borivli (W) Mumbai - 400 092 Email - safelifeenterprises@yahoo.com Tel - 28698290 Mob No. 9819180828/9819184828 |
| 19 | M/s RAJ ASSOCIATES Pro. - Mr. Sandip P. Adsul | Vaibhav Co-Op-Hsg. Society 121/3997 Nehru Nagar, Kurla(E) Mumbai - 400 024. Tel. - 25290322 |
| 20 | M/s HYGEIA PEST CONTROL Pro.- Mr. Suhas Kadam | Plot No 60-d/5, Navaratna C.H.S. Gorai No.1 Borivali (w) Mumbai - 400 091. Web Add - www.hygeia.co.in Tel No.- 29671060/61/62 |
| 21 | M/s BHARAT PEST CONTROL Pro. - Mr. Raj.R Sreiyam | 5/B Vishwajeet Apartment, 4 Bunglows, Andheri (W) Mumbai - 400 053. Email - bharatpest@hotmail.com Tel No. - 26354277/26354293 Mob No. - 9820995553/9820995554 |
| 22 | M/s INDIA PEST CONTROL SERVICE Pro. - Rakesh s. Shivsharan | 42 Ahisa nagar Govt. Colony Bandra (E), Mumbai - 400051. Email - ipcs.rakesh@gmail.com Tel No - 26571999/26570335 Mob No. - 9821234564/9892686717 |
| 23 | M/s ZED PEST CONTROL Pro. Aneeta Rajesh Khade | A/105, Campz landmark, kevani naka, s.v.road, jogeshwari(W), Mumbai - 400 102. Tel No. 26780424,26772484 Mob.No. 9821655578 |
| 24 | M/s SUPER PESTICIDES Pro. - Trivedi | 260/L-11, Kranti Nagar, 1 st Floor, J.S.S.Road, Girgaum, Charni Road (E), Mumbai -400 004. Tel. No. 23874301. |

INSECTICIDE OFFICER

FLY CONTROL:



Flies are the commonest and most familiar of all insects which live in close association with man and occur throughout the year abundantly. Flies should be regarded as a sign of insanitation and their numbers as an index of that insanitation.

The fly *Musca domestica* found in Mumbai is called as 'Housefly'. Their breeding place varies from fresh horse manure, garbage to decaying foods and vegetables. They are prevalent near dwelling houses, restaurants, hospitals, cattle shades, slaughter houses, dumping grounds, markets etc. The span of metamorphosis of fly is variable as per the environmental conditions and nature of breeding grounds.

The flies are mechanical carrier who transmits diseases like Typhoid, Diarrhoea, Dysentery, Cholera, Gastro-enteritis, conjunctivitis, etc. The control of flies can be achieved by spraying various types of insecticides. However, constant control can be achieved by eliminating their breeding places and by bringing an overall improvement in the environmental sanitation.

Spraying :

Year round

- Treatment to dust bins, refuse sheds at vegetable, meat and fish markets.

Monsoon season

- intensification of spraying activity by augmenting staff for daily spraying of knock- down insecticides
- Weekly spraying of places vulnerable to high fly infestation e.g. Fishermen's villages, market refuse dumps, roadside refuse bin roadside catering vendors etc.



RODENT CONTROL :



Rats are a part of man's environment and because of its close association, they are not only a hazard to health but also cause great damage to buildings, food and other commodities. Apart from its nuisance value they cause disease like Rat-bite fever, Salmonellosis (Food poisoning), etc. rat who carries fleas on its body are responsible for diseases like Plague, Mumbai has remained an active port since historical times and hence is in constant danger of Plague epidemics. During the Plague threat of 1994 in Mumbai, this Branch has played a very important role in preventing the probable entry of Plague incidence in Mumbai. The invention of anti-plague vaccine was done at the Municipal Rat Destruction Unit at Parel. Regular dissection of various rat species is carried out to assess the susceptibility to plague bacilli.

The common species of rats in Mumbai are:-

- 1) *Rattus rattus* :- House Rat
- 2) *Rattus norvegicus*:- Sewer Rat
- 3) *Bandicota bengalensis* & *Bandicota indica* :- Field Rat
- 4) *Mus musculus* :- Mice.

The common methods of rat destruction are Physical and Chemical.

Additionally Night Rat Killing is an unique method of rat control used only in Mumbai.

General supervision

Rodent control programme supervision is done by Junior Overseer (Rat).

Night Rat Killing

Clubbing and killing rats during night hours, by specially trained staff moving in areas of high outdoor rat infestation i.e. house gullies, grain warehousing areas etc. Each night rat killer producing 30 freshly killed rats to earn his daily wages.

Complaint trapping

Supplying rat traps to complainants and collecting the trapped rats in the morning
Each worker handles 30 rat traps.

Rodenticide poison baiting

Poison baiting along with Rodenticides -

- 1) Acute poison – Zinc phosphide
- 2) Chronic poison - Anti coagulants

Fumigation

Fumigation of Rat burrows by Aluminium Phosphide (Celphos).



Logistics

Procurement of insecticides, equipments and vehicles. Provision & deployment of manpower for smooth running of programme.

Maintenance of spraying equipment

Repairs and upkeep of spraying equipment